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Predictors of Secondary School Students' Future Technological Academic and Professional Readiness: A Study of Teachers and Students' Factors in Learning Online

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Dissertation presented in partial fulfillment

of the Requirements for the degree of

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PREDICTORS OF SECONDARY SCHOOL STUDENTS' FUTURE TECHNOLOGICAL ACADEMIC AND PROFESSIONAL READINESS: A STUDY OF TEACHERS AND STUDENTS' FACTORS IN LEARNING ONLINE

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School of Education______________________________

Date ______May 2023______________________________

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Dedication

I would like to dedicate this work to my family, who has been a constant source of inspiration throughout my academic journey. In particular, I want to honor my mother, who passed away a decade ago. Her unwavering love have been a driving force for me. My husband, Steve, has also been an incredible pillar of support. His steadfast encouragement has meant everything to me.

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I am deeply grateful for the persistent support and mentorship of Dr. Munyi Shea. You are a true guiding light, and I would not have made it to the finish line without your faith in my abilities and constant encouragement. Your mentorship has been an integral part of this journey, and I am proud to have finished something that is a testament to your guidance.

I am also immensely thankful to Dr. David Wicks for noticing me and bringing me to the SPU DEL program, which has played a pivotal role in shaping my passion for educational technology. Your recognition of my potential has been transformative, and I am honored to have been a part of this program. I would also like to extend my gratitude to Dr. David Denton, who served on my committee and provided invaluable feedback, particularly regarding the statistics.

To my sisters, Brandi, Jaime, and Bailey, and to my dear girlfriends from Renton, Vanessa, Desiree, Mehak, Danielle, and Melissa, I am humbled by the support and encouragement you have provided throughout this journey. Your loyal support has been a constant source of inspiration and motivation, and I am grateful to have such a powerful group of women in my life. I would also like to extend a special thanks to my survey guinea pig and nieces, Sophie and Brynn, for their willingness to participate.

I am proud to be the first person in my family to reach this level of academic achievement. I must thank my maternal grandfather, who, though he did not graduate high school, fought in WWII and instilled in us a fighting spirit and a drive to be better.

I would also like to express my gratitude to the teachers and student participants who took the time out of their busy schedules to fill out my survey about their feelings toward technology. A special thanks to the admins and head teachers who generously agreed to let me give this survey to their students. Your generosity and willingness to help have been a true inspiration.

Finally, to my husband and best friend, Steve, I am eternally grateful for your dedication, support, and encouragement. Your willingness to listen to my stats jargon, celebrate the little wins, and unwillingness to let me settle for anything but the best has been a constant source of strength.

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Abstract

This research endeavors to investigate the factors that influence satisfaction with online learning among secondary students in hybrid or blended environments in the United States. With a focus on social-emotional learning and digital citizenship, the study begins the exploration and the impact of teacher interactions, teaching presence, self-management of learning, and academic self-efficacy on students' satisfaction with learning online and how this satisfaction can impact their future readiness to use technology effectively. The study involved a sample of 320 secondary students and a supplemental survey of 32 teachers who completed online surveys that took no longer than 10 minutes to complete over a 4-week period. Results indicate that academic self-efficacy, self-management of learning, interactions between students and instructors, and teaching presence are positively associated with students' satisfaction with online learning. Additionally, satisfaction with online learning was found to predict both students' intention to continue using to use technology and their future readiness. These findings have significant implications for educators as they provide insight into effective strategies to enhance student satisfaction while learning online and contribute to the understanding of the complex relationship between satisfaction and intention to use online learning activities among secondary students in hybrid or blended environments, particularly in the context of social-emotional learning and digital citizenship.

Keywords: future readiness, social-emotional learning, digital citizenship, academic self-efficacy, self-management of learning, learning online, educational technology, professional development, student satisfaction, future intention to use technology, perception of learning.

Chapter 1 Introduction

Problem

As schools continue to invest in technology tools and resources for instruction, it is increasingly important that teachers are equipped to use this technology to support students in learning real-world skills. Various organizations, agencies, practitioners, and scholars have agreed on the importance of preparing students for the 21st century and beyond. Several of these experts have articulated definitions and frameworks for the requisite skills and their instruction (International Society for Technology in Education [ISTE], 2017; Kean et al., 2013; Partnership for 21st Century Skills, 2011; Saavedra & Opfer, 2012; U.S. Department of Education [USDOE], 2020). Common among these 21st century skills are critical thinking and problem solving, communication, collaboration, creativity, and innovation (National Education Association [NEA], 2017.). These skills can be most effectively taught and learned through the use of more constructivist pedagogies in environments that effectively integrate technology (Brantley-Dias & Ertmer, 2014; Saavedra & Opfer, 2012).

Educators nationwide have been pressured in today's classrooms to adopt circumstances far beyond anything they were trained to do, especially pertaining to using technology to conduct class and communicate instructions to their students. Therefore, although the student and educator may inhabit different contexts that shape their identities and influence their beliefs about the technological world, the student must feel they can ask the educator for help troubleshooting and navigating the technologically enhanced and online world during their unique time together.

Moreover, a report published by Digital Promise in 2019 revealed 60%–70% of frontline workers have job-limiting foundational skills; and although about 10% of workers pursued educational opportunities, over half of those who did, reported those experiences were "only somewhat useful or not useful" (Constantakis, 2019, p. 2). Specifically, regarding where education and training might be missing the mark, consider 60% of occupations are now at least 30% automatable; yet, digital resilience and upskilling are still relatively new concepts to the adult and student learning conversation (Digital US, 2020; McKinsey Global Institute, 2017). SkillRise, an ISTE initiative, released a report in November 2020 that examined the constructs that helped define academic and professional readiness. In the literature review, ISTE stated with job factors like automation and artificial intelligence, the requirements for a successful career are changing (ISTE, 2020). Artukovich (2023) highlights the significance of Social Emotional Learning (SEL) skills in a world enhanced by artificial intelligence (AI) in a recent article published by the Learning Accelerator. With the advent and advancement of AI tools such as ChatGPT, there is a greater need for students to possess exceptional communication, collaboration, problem-solving, critical thinking, adaptability, and resilience skills. As the world of AI operates at a rapid pace, these skills are essential for students to succeed. Therefore, to instill the next generation with the right skills, educators and students need a chance to cultivate this digital resilience or readiness, awareness, and confidence to try new technologies and adapt to changing digital skill demands. Future readiness relates to the capacity to solve problems and navigate digital transformations (Digital US, 2020).

In regard to the student's ability to build a responsible, efficacious online behavior, the student must find refuge in the educator's knowledge base and have open two-way conversations regarding expectations and tools they might be asked to use in their future college and career. There can and should be an urgency as it pertains to the approach to help students consider the human side of technology, such as their interactions and learning with their teachers and peers every day—specifically, noncognitive constructs or soft skills that make up the profile of a lifelong learner and active member of society. The virtual world is no longer just a collection of websites; it is now a place where some of the most important human interactions take place. Everybody is now a part of a digital community, which places norms and expectations on behavior for success (ISTE, 2020). There is not a single content area that should carry this burden alone, nor a single subject area that would struggle to find connections between the importance of tackling these issues in the best interest of the student. Therefore, this study looked at student interactions with teachers, teacher presence, self-management of learning, and academic self-efficacy in online and technologically enhanced activities as it pertained to their satisfaction and intention to continue to use tech-based learning for their own use. The author bolstered this study by separately intaking information from the educators to gauge their knowledge of their own technological surroundings and how comfortable they felt about using tech for their own professional learning.

Purpose of Study

Digital technology was used to continue learning while the United States battled the recent COVID-19 global pandemic to avoid losing multiple years of learning (Darolia, 2022; Hess & Leal, 2001). Even with internet firewalls and security barriers, students with access to high-speed internet had more materials and people available at their fingertips than ever before and could access resources from the comfort of the classroom or the couch. Along with that convenience, students could also act anonymously and could have a misguided belief their digital footprint would not follow them through their lives into career and college. Therefore, times have changed, and the simple definition of citizenship—what is referred to as digital citizenship—is becoming one and the same. Fennewald (2018) stated in an EdSurge article that citizenship knows no boundaries, the lessons taught to students outside of the digital arena apply to the online world and vice versa. Key elements of digital citizenship encapsulate the makeup of academic self-efficacy and self-management when students learn online or use virtual tools to push their understanding further. And thus, technology has been considered a critical component and an integral part of high-quality education (Ertmer & Ottenbreit-Leftwich, 2010; Lawless & Pellegrino, 2007).

Understanding technology and integrating it into the classroom is one of the essential teaching skills for highly skilled educators. Research has established one of the most critical factors in determining successful and effective technology integration in the classroom is certain teacher-related attributes (Baylor & Ritchie, 2002; C.-H. Chen, 2008; Chandra et al., 2020; Inan & Lowther, 2010). For example, numerous studies found technology use in the classroom has been directly related to a teacher's perspective and positive attitudes toward technology across K–12 and higher education settings (Bai et al., 2021; H.-R. Chen & Tseng, 2012; Inan & Lowther, 2010; Ritzhaupt et al., 2012; Robinson, 2003). Up to this point a majority of these studies were focused on the teacher or the instructor point of view. These studies have left a gap for future studies to examine the student side of things; as such, I examined the thought process and perspective of the students for this study.

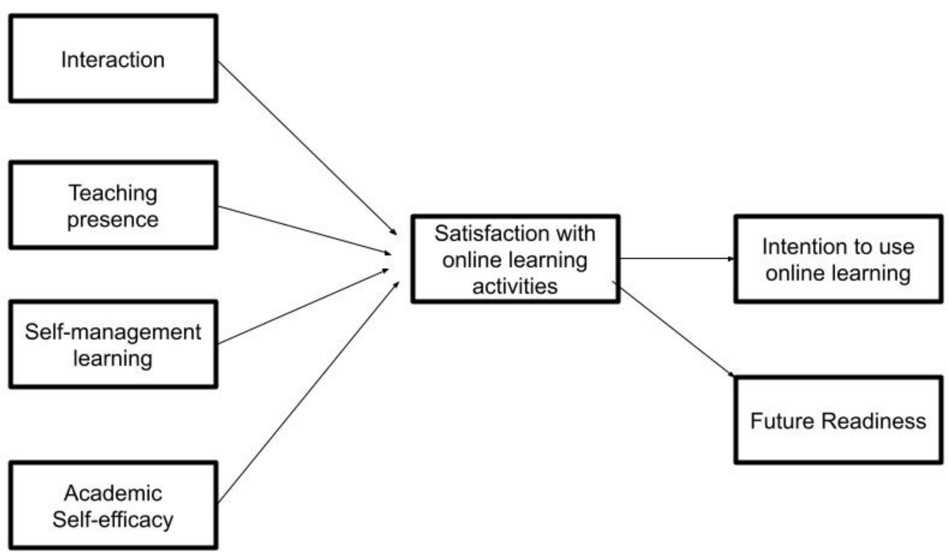
In current U.S. classrooms, one of the major hurdles for students in gaining experience with technology is their teacher's comfort level and experience with using technology hardware and software available to them. Based on the data they collected from 2,000 students around the world, a recent white paper published by Microsoft Education (2022) about the shifts in needs of workers by 2030 reported young people with high aspirational goals expect more from their teachers in the veins of creativity, problem solving, and the "use of technology" (p. 26). They also wanted more time learning and developing the social and emotional skills that will help them navigate a future that would be profoundly social (Microsoft Education, 2022). To develop a globalized technologically enhanced socialization skill set, today's students would not only need a social-emotional curriculum and personalized learning, but also, they would need a multifaceted ecosystem of stakeholders to build their skills and attitudes toward the future and what technology will mean for their success (Microsoft Education, 2022). Therefore, the author examined how secondary students' perceptions of their teachers' technology presence and interaction with them, as well as their own self-management and self-efficacy in an online learning environment might influence their satisfaction, intention to use and future readiness toward technology.

Theoretical Foundations and Key Constructs of the Study

The study was built on the premise that students cannot develop their knowledge and positive perception of technology in the classroom in isolation. Instead, their future readiness to engage with technology for academic and professional purposes is dependent on a myriad of teacher- and student-related factors. The author provides an overview of the theoretical foundations that inform the understanding of the key constructs to be examined in this study. By linking students' satisfaction with the education online or web-based activities and by exploring their intention to use them in the future to their academic self-management and self-efficacy (see Figure 1.1), this study provides value for future research and how schools, districts, and states plan lessons that include edtech.

Figure 1.1

Paths for the Hypothesized Model



Note. Adapted from "Antecedents and Consequences of College Students' Satisfaction With Online Learning," by N.-H. Um & A. Jang, 2021, *Social Behavior and Personality: An International Journal*, *49*(8), 1–11. (https://doi.org/10.2224/sbp.10397)

Teacher–Student Interaction

Moore and Kearsley (1996) suggested interaction is the most important component of student engagement, be it in traditional face-to-face or in online learning settings. Interaction in distance learning is deemed to have the following three dimensions (Moore, 1989). First, *learner–learner interaction* refers to two-way reciprocal communication between learners. An instructor may or may not be present. In this dimension of interaction, learners can actively exchange their ideas and give feedback to others (Anderson, 2003; Moore, 1989). Second, in *learner–content interaction*, the learner elaborates on and reflects upon the subject matter or the content of the course. Thus, this feedback interaction is a one-way process (Moore, 1989). Third, in the *learner–instructor interaction*, the learner interacts with the course instructor in two-way communication (Moore & Kearsley, 1996).

In a distance learning environment or online learning among these three dimensions, the learner–instructor interaction is the most important factor for predicting students' learning satisfaction (Thurmond, 2003). Battalio (2007) and Bolliger (2004) found the learner–instructor interaction was the strongest predictor of student satisfaction in both undergraduate and graduate online courses. In this study, the author anticipated a similar significant positive correlation between student–teacher interactions and student's satisfaction with online learning activities.

Teaching Presence

Presence refers, in general, to "a person's sense of being in a place and belonging to a group" (Joo et al., 2011, p. 1656). In looking for predictors of student learning outcomes or performance, researchers have examined teaching presence, social presence, and cognitive presence (Anderson et al., 2001; Shea et al., 2003). Among these three types of presence, teaching presence in particular has drawn a great deal of attention, especially in the context of online education. Anderson et al. (2001) defined *teaching presence* as teachers designing, facilitating, and providing direction of cognitive and social processes so that their students realize “personally meaningful and educationally worthwhile learning outcomes” (p. 8). Teaching presence has three subdimensions (Anderson et al., 2001). First, *instructional design and organization* refers to preparation of the course content and, thus, includes outlining the online course content, process, and overall structure, and carrying out assessments. Second, *facilitating discourse* means promoting a learning environment conducive to an active learning process, such as keeping up students’ interest, motivation, and engagement. Third, *direct instruction* refers to using pedagogical expertise and subject content to enable students to construct their own knowledge.

By focusing specifically on teacher presence in online learning activities, Caskurlu et al. (2020) found a strong positive relationship between teaching presence and learner satisfaction. Their results stand along with other studies to show in fully online courses, each of the three dimensions of teaching presence predicted student outcomes (Caskurlu et al., 2020; Khalid, 2014). Based on these findings, the author anticipated a similar significant positive correlation between teaching presence and student’s satisfaction with online learning activities.

Student Factors

In today’s digital age, K–12 students are required to navigate an ever-expanding landscape of technology to support their academic success. As such, developing academic self-efficacy and self-management skills has become increasingly essential for students to effectively use technology as a tool for learning. Academic self-efficacy refers to the belief in one’s ability to perform tasks related to academic success, but self-management involves the ability to manage one’s time, attention, and emotions to achieve academic goals (Bong, 2008). In this context, the intersection of technology with these skills presents a unique challenge and opportunity for K–12 students. This paper will explore the importance of academic self-efficacy and self-management for K–12 students using technology and provide strategies to support their development.

Academic Self-Efficacy

Self-efficacy denotes an individual’s belief in their capability when engaging in or performing a task (Bandura, 1977). Bandura (1997, 2004) suggested that initiation of and persistence in engaging in a task is influenced by self-efficacy. Thus, it is assumed self-efficacy and persistence have a positive relationship. In an online education context, *academic self-efficacy* is defined as the confidence of the learners in their learning and performance. Artino (2007), Meece et al., 1988; Meece et al. (2006), and Pintrich (1999) all found self-efficacy was positively related to students’ self-regulation and academic performance. In addition, academic self-efficacy is known to be related to social interaction (Shea & Bidjerano, 2010, 2012, 2013; Um & Jang, 2021). Research has also indicated self-efficacy is a powerful predictor of academic behaviors such as cognitive competencies, academic achievement (Bong, 2008), effort, persistence (Schunk & Zimmerman, 2006), and cognitive-strategy use (Pajares, 1996; Zimmerman, 2000; Zimmerman & Pons, 1986). Although no study has directly examined student’s self-efficacy and their satisfaction with online learning, based on the findings from previous studies, the author anticipated a similar significant and positive correlation between student's self-efficacy and satisfaction with online learning in the current study.

Academic Self-Management of Learning

Self-management of learning refers to students' ability to engage in autonomous, self-regulated learning, such as taking the initiative and responsibility for their own learning and exercising self-discipline (Wang et al., 2009). One of the first uses of the term "self-management" appeared in reference on the rehabilitation of chronically ill children; Creer et al. (1976) alluded to self-management when a patient was an active participant in their treatment (Bandura, 1977; Creer et al., 1976; D'Zurilla, 1986; Gaskill & Woolfolk, 2002). The term has evolved and pertains closer to the responsibility one has to day-to-day management, including eating healthy, exercising, and taking vitamins; an example of self-management in a current problem-based scenario would be a contemporary student who needs to self-regulate their remote career or manage a hybrid school environment (Lorig & Holman, 2003). Researchers have often used the term self-management of learning interchangeably with self-directed, independent, or autonomous learning (Regan, 2003), and these descriptions align with commonly used definitions of self-regulated or self-management of learning in research (Cox et al., 2019; Kuhn, 2015; Shechtman & Yaman, 2012; Zimmerman, 2000).

Previous studies have found self-management of learning has a critical influence on students' learning outcomes (Abar & Loken, 2010; C.-C. Chen, 2002; Lounsbury et al., 2009). High levels of self-managed learning have led to higher academic achievement (C.-C. Chen, 2002) and a better cumulative grade point average (Lounsbury et al., 2009). Researchers have also reported students who have strong self-management of learning demonstrate an intrinsic motivation to learn; thus, there is a strong relationship between their learning outcomes and satisfaction (Ahmad & Majid, 2010). Hence, a plausible assumption is students with higher (vs. lower) levels of self-management of learning will be more satisfied with online learning.

Satisfaction With Learning Online and Intention to Use Technology

When it comes to evaluating the goals of both traditional face-to-face learning courses and online learning courses, researchers should consider cognitive and affective factors. Regardless of the learning platform, the course grade is often regarded as an indicator of student achievement. Kuo et al. (2014) suggested a topic worth investigating is student's subjective feelings, such as satisfaction with their learning, which can be gauged by how students perceive their learning experiences and the value of a course. Prior research has found student satisfaction was correlated with persistence, course quality, (course) retention, and student success (Allen & Seaman, 2008; Koseke & Koseke, 1991; Moore & Kearsley, 1996; Noel-Levitz Inc., 2011). Dziuban et al., 2004) concluded students were more likely to evaluate courses and instructors with satisfactory ratings if they believed their professors communicated effectively, facilitated, or encouraged their learning, organized the courses effectively, showed interest in students' learning and progress, and demonstrated respect for students. Marsh and Roche (1997) developed a model for defining student perceptions of satisfaction in terms of several factors: learning value, instructor, enthusiasm, rapport, organization, interaction, coverage, and assessment. Although few studies have directly examined the association between student's satisfaction with online learning in traditional U.S. K–12 classrooms specifically in secondary education and their intention to continue engaging in online learning, it is probable their satisfaction with their online learning experience will lead to increased intention to use online learning.

Satisfaction With Learning Online and Future Readiness

Adolescent college and career readiness go beyond what is collected in assessments like the National Assessment of Educational Progress (NAEP). The NAEP reading and mathematics assessment measures student knowledge and skills related to those subjects and how students apply their knowledge in problem-based situations (National Center for Education Statistics, n.d.). Assessments like these though do not test students in real-life scenarios. It is not a judgment on how prepared they are for success in a corporate position or even in a college classroom. Students and future members of society will need to be ready to handle technology as a part of their daily life. The *skills gap* refers to the gap between skills people currently have, and the skills needed to do work now and, in the future (Levesque, 2019).

The nature of work is changing fast, and emerging technologies have required certain skills from the workforce. Beyond creativity and communication, critical thinking, and collaboration, future workers will need to know how to take advantage of problem-solving skills in the framework of computational thinking (ISTE, 2016). These problem-solving abilities do not need to derive from computer science classes alone, but using the computational thinking framework says students can learn the skills while participating in inquiry-based instruction, small group learning activities, exploration, role playing, and creativity. Along with direct instruction in web development, human computer interaction, programming, computing, and data analysis (Digital Promise, nd).

Very few studies have examined the relationship between student's satisfaction with learning online in the K–12 setting in the United States and the student's perception of their future academic/career readiness in the U.S. secondary school the author explored this relationship in this study.

In sum, the author sought to understand how teacher factors, such as teaching presence, teacher–student interactions, and student factors, such as self-efficacy and self-management of learning, might have influenced student's satisfaction with learning online. In addition, the author explored how these teacher and student factors might have directly influenced student's future intention to use technology on their own and future academic and career readiness or indirectly through their satisfaction with learning online.

Other Relevant Background Information

Although this study did not directly examine the relationship between teacher and student technology use, the author thought it was important to collect background information related to teacher knowledge, experience, and attitude toward technology as these factors could influence their teaching presence and interactions with their students in online learning (Robinson, 2003).

Teacher's Technology Use and Perception

The first part of the questionnaire for educators was derived from research started by Hogarty and her colleagues in 1999–2000; the research involved delineating relevant domains for the constructs of interest, "item construction and pilot, large-scale field testing, and the validation of instrument scores using factor analytic and correlational methods" (Hogarty et al., 2003 p. 142). They made a thorough examination of the indicators of successful integration of technology (hardware and software) in the classroom in concert with the development of the major domains of the questionnaire. The domains fell into four broad categories: “integration; support; preparation, confidence, and comfort; and attitude towards technology use” (Hogarty et al., 2003, p. 142). Once Hogarty et al. established these domains, they created survey items based on existing validated instruments related to educational technology integration.

Ritzhaupt et al. (2012) used a research-based path modeling approach and examined the effects of teacher characteristics, school characteristics, and contextual characteristics on classroom technology integration and teacher use of technology as a mediator of student use of technology. They collected data from 732 teachers from 17 school districts and 107 schools in the state of Florida. Results showed a teacher’s level of education and experience teaching with technology positively influenced their use of technology (Ritzhaupt et al., 2012; Zhao & Frank 2003). Technology integration in the classroom explains how frequently students use technology in the school setting.

Inan and Lowther (2010) examined factors affecting teachers’ integration of laptops into classroom instruction. The study examined a host of demographic characteristics, availability of computers, proficiency with tech, teacher beliefs, teacher readiness, support, and its influence on technology integration in the classroom. Their study included 1,382 public school teachers from Tennessee. Their results demonstrated that age negatively influences computer efficacy, and that teacher belief, readiness, and proficiency positively affect technology integration in the classroom (Inan & Lowther, 2010). The basis for considering these factors in the teacher survey is to acknowledge that certain demographic or background information can help contextualize the discussion of the findings about student experience.

Teacher's Technology Acceptance

The technology acceptance model (TAM) is used to model technology acceptance in education (Scherer et al., 2019). The model theorizes, with the assistance of web-based or online educational technology tools for both in-class instruction and also educator's professional development, teaching and learning are no longer restricted by time or place (Gamrat et al., 2014, Scherer et al., 2019; Yesilyurt et al., 2016). The availability of online learning for students combines learning new topics to push their learning forward while also training them on using the internet. It enables these learners to develop their knowledge by selecting what they need at the time and the ability to go at their own pace (i.e., self-management). By taking advantage of web-based or online educational technology, school districts can save time and lower the overall operation production costs (H.-R. Chen & Tseng, 2012; Powell & Barbour, 2011; Sridhar, 2005).

The significance of teachers' technology acceptance is also highlighted in the technological pedagogical content knowledge (TPCK) and substitution augmentation modification redefinition (SAMR) frameworks; both of which describe and target the use of technology to enhance student learning. These frameworks posit educators are never actually educated in educational technology because neither the devices nor the internet existed at their current level when these educators were first becoming teachers. Thus, educators need to make constant changes to their teaching practices by integrating technology into their classrooms. If teachers are to engage in pedagogical innovation, they need to be prepared with knowledge beyond what is essential for operating in current classrooms (Koehler et al., 2011; Nies, 2012). However, research has continued to find even in teacher preparation programs that promote integrating technology in the classroom for active student learning, the use of educational technology has mainly been limited to producing, presenting, and gathering informational research (Becker et al., 1999; Graham, 2011). Understanding and examining the effect of integrating technology into classrooms is imperative due to the amount of time children and young adults are spending on their devices and online inside and outside the classroom. As enrollment in online education courses and hybrid models continues to increase, and remote work is becoming more common, online learning not only creates opportunities, but also presents challenges for learners, educators, and school administrators (Alshare et al., 2011; Hodges et al., 2020; Senner, 2015).

This study gauged teachers' technology acceptance by collecting some background data such as their perceived availability of technology for their classrooms, amount of professional development support available to them, their years of teaching, and their own online professional development experience. Collectively, the author explored how these background factors might have affected teacher's behavior including their online teaching presence and their interaction with students in online learning.

Significance of the Study

Many studies that have explored similar topics did not focus on secondary school settings; they have primarily focused on the perspective of teachers or students in higher education or have taken place outside of the United States (e.g., Bai et al., 2021; Lawless & Richardson, 2002; Shen et al., 2013; Solimeno et al., 2008; Um & Jang, 2021). This focus has limited the generalizability of the findings to U.S. students. Moreover, very few studies have connected students' current experience or satisfaction with learning online with their future intention to use technology or future academic/career readiness.

As such, this study addresses several gaps in current literature by examining how secondary students in the United States perceive their online learning activities and how their experience might predict their future intention to use technology and future academic/career readiness. Findings from this study have the potential to inform decisions about program development and intervention that could improve students' interactions with technology, enhance their self-management skills and sense of self-efficacy so they could feel prepared to use higher-level problem solving and develop other skill sets required for college or their future career.

It should be noted a key difference between this study and past studies was the type of online learning environment the author examined. Past studies have typically examined courses that were fully online (Lawless & Richardson, 2002; Moore et al., 2011; Shen et al., 2013; Um & Jang, 2021). Following the COVID-19 global pandemic, the U.S. K–12 schools have returned to in-person learning; thus, a blended model of expectations has pertained more to students' interactions with technology. In this blended learning environment, some activities use technology and others are taught in a traditional, paper pencil lecture style. Thus, how students navigate and adapt in this blended environment through their self-management skills and self-efficacy was novel and interesting to explore.

Limitations

There were several potential limitations associated with this study. In terms of sample and sampling, secondary-aged students may not be developmentally ready to understand or connect how important the use of technology in the classroom is to their future well-being. The pool of educators who took the survey after a couple of very tough years due to the pandemic may have been skewed. Several educators left the profession after the spring of 2021 and the spring of 2022 because of the trauma and stress they endured during the pandemic (Walker, 2022). Those who remained in the profession might have always been the most tech-savvy of the bunch, which would impact the student experience. Another limitation is that some of the data collected were from new teachers. New educators have not had time to teach in a classroom yet; they might present a feeling about using technology in the classroom before having time to teach, which would influence the student's experience. This study used a convenience sampling method. A nonprobability sampling limits the generalizability of the results (Bhattacherjee, 2012).

A limitation of the survey method was the reliance on self-report data (Gall et al., 2006). Participants (students and teachers) who opted in to take the survey might have represented a certain perspective or reflect a higher level of engagement. Another limitation was the project primarily focused on school context; thus, it was not feasible to know how student's use of technology outside of classroom (e.g., time at home with their parents or connecting with their surrounding community services) might shape their sense of self-efficacy, self-management of learning, or satisfaction with online learning. Finally, most of the measures in this study were either developed by me or adapted from previous studies that have not been broadly validated across contexts.

Another limitation involves the application of technology for different uses. Students or teachers may use technology in the classroom for nonacademic purposes. For example, students might use technology for personal use. However, in this study, the author referred to online and web-based activities in which technology was developed or used to reinforce academic content and as a support to face-to-face instruction. It was challenging to ascertain to what extent students' overall satisfaction with learning online, future intention to use technology or future readiness could be attributed to academically oriented technology use or just general usage.

Chapter 2 Literature Review

In Chapter 2, the author introduced the purpose and rationale for understanding secondary students' future intentions to use technology and future academic/career readiness. The author hypothesized various teacher and student-related factors influenced students' satisfaction with learning online based on the conceptual and empirical evidence provided in previous studies. Furthermore, the author sought to extend the conceptual framework in this study (see Figure 4.1) by examining how students' satisfaction with learning online may subsequently shape their future intention to use technology and future readiness. In this chapter, the author discussed various theoretical frameworks (e.g., social-emotional learning and digital citizenship) for understanding key concepts in this study to illuminate how teacher-related variables (e.g., teacher–student interaction, teaching presence) and student-related variables (e.g., self-efficacy and self-management of learning) may affect students' abilities to learn and their perception about their current online learning experience.

Intention to Use Technology and Future Readiness

As technology use in careers expands, educators and education policymakers have agreed technology can be a powerful tool to transform learning, advance relationships, and reinvent approaches to collaboration (Office of Educational Technology, 2017). The conceptual framework for learning emphasizes students are continually evolving to be future ready. The approach of including accessible features for both students and teachers from the beginning of the development process is known as *universal design for learning* (UDL). By using principles and research base of UDL as the standard, the approach would serve as a commonly accepted framework around designing for accessibility while keeping the end result in mind (Office of Educational Technology, 2017).

However, the future is ever changing for students. Therefore, the focus should be more on adapting the education systems to fit a new learning model. The Future Ready Schools organization adopted the structure for digital learning visioning, planning, and implementation focused on student-centered learning (All4Ed, 2022; Learner-Centered Principles Work Group of the American Psychological Association's Board of Educational Affairs, 1997). The framework emphasizes collaborative leadership and innovation. All content focuses on seven key areas the spokes of the framework are made up of the following: personalized professional learning, robust infrastructure, budget and resources, community partnerships, data and privacy, use of space and time, and curriculum instruction and assessment (All4Ed, 2022; Learning Forward, 2011). All these areas or gears are centered on the learner or student. Although this framework does not seem different to those in a typical K–12 system in the United States, it is about adapting and evolving the system in small ways.

Students also achieve deep learning when they successfully construct knowledge and then retain the constructed knowledge for the purpose of bringing benefits to themselves and society (All4Ed, 2022). As classrooms look toward the future, learning lessons are constructed around educational goals; students or learners take center stage, whereas teachers become facilitators of student learning. Knowledge is not seen as something "out there" that faculty can transfer from themselves to students; only knowledge students construct actively can be said to represent deep learning (Barr & Tagg, 1995; Lo, 2010; Warburton, 2003). Online learning and distant education instructional practices have changed greatly and so have the expectations held of teachers in those spaces. Thus, regardless of how much subject-matter expertise a faculty member possesses, there can be no assumption of student learning in the absence of effective facilitation of the learning process (Bauman et al., 2005; U.S. Department of Education, 2006; Wellman, 1999; Williams et al., 2005). Teachers and instructors can achieve this new role by reaching for a couple of key elements for their students—one of those is to set learning outcome goals that are consistent with student-centered lifelong learning; and second, teachers can design learning environments that promote active and deep learning (Barr & Tagg, 1995; Karagiorgi & Symeou, 2005; Lai, 2018; Lo, 2010). Students can use this active and deep learning on their own using technology, but educators must facilitate that deep learning by demonstrating their own technological facilitation and expertise.

Research around social and emotional knowledge, student motivation, and intention to use technology cannot ignore the sometimes contradictory ideas of engineering and community-based app and software development on the internet. Brown's (2008) work revealed how the Internet has connected to children in school and has demonstrated such a contradiction. Although the concepts of engineering can seem a solo, and sometimes even a soulless, experience where a human only interacts with a computer screen, John Seely Brown posted that engineering is more of a community based online creation. This model is very similar to current remote working environments where people in an organization are working from different places in the world but are all contributing to the same goals via the internet.

Specifically, John Seely Brown's (2008) collection of writings, lectures, and recorded seminars have looked toward the future and the digital setting of the academic world. In the forward of “Creating a Culture of Learning,” Brown examined knowledge and the learning process by using technology as the world becomes more complex an interconnected at a lightning-fast pace because almost every serious social issue requires an engaged public that is not only traditionally literate, but adept in a new, systemic literacy. This new literacy requires an understanding of different kinds of feedback systems, exponential processes, and the unintended consequences inherent in evolving social systems.

The unrelenting velocity of change means many skills have a shorter shelf life, which suggests much learning needs to take place outside of traditional school or university environments (Brown, 2008). Brown (2008) is not a traditional educational theorist; rather, he is a technological economist and futurist who looks at ideas and perspectives and how business and social constructs will fit or be broken by the introduction of technology. Brown argued current methods of teaching and learning will not likely suffice to prepare students for the lives they will lead in the 21st century. He suggested to help accommodate the ever-growing population of learners and their diverse set of needs, the focus must be on refining teaching, mentoring, and coaching, which are essential as the lines of producers and consumers of content have begun to blur. The internet has not only opened doors for people to access new information, but also it has allowed access to people from around the world, giving the opportunity to communicate and become globally connected. According to Brown, creating a culture of community based to create deeper understanding requires multiple modes of learning; two of those modes include (a) social learning based on the premise that understanding content is socially constructed through conversations about that content and (b) grounded interactions around problems or actions. These modes of learning are focused not so much about what people learn but on how learning happens. The second—perhaps even more significant—aspect of social learning involves not only "learning about" the subject matter but also "learning to be" a full participant in the field (Brown, 2008, p. xii). Brown further explained similar groups will self-identify and gather on the internet in the digital age, which has created a global platform that has vastly expanded access to all sorts of resources including formal and informal educational materials. The internet has also fostered a new culture of sharing, in which content is freely contributed and distributed with few restrictions.

Trends in education sometimes reflect a change in the very meaning of student learning. Student learning denotes changes over time—as society changes and as the academy identifies new needs. Today, for the futuristic 21st century and beyond, an ideal education aspiration for what and how students will learn includes not only discipline-based content but also critical thinking skills and communication skills that correlate with the digital world that will play a larger role in students' academic success and career and college readiness (Christensen et al., 2008; Lo, 2010; National Leadership Council for Liberal Education and America's Promise, 2008).

A recent white paper published by Microsoft Education (2020) stated that by 2030, the ways people interact, socialize, and work will drastically change. According to the American Psychological Association, Coalition for Psychology in Schools and Education (2015), "teaching and learning are intricately linked to social and behavioral factors of human development, including cognition, motivation, social interaction, and communication" (para. 2). As the learning process in PreK–12 is intricately interpersonal to both teacher–student and peer connections, these relationships are essential for building healthy social-emotional development. As these events also happen in the online space, online learning activities happening in the classroom are a place to experiment successfully in a controlled social environment. In the following sections, the researchers further discuss the literature pertaining to the social and behavioral factors likely to influence student satisfaction with learning online, motivation to continue using technology in the future, and their perception of their academic and career readiness.

Understanding Teacher Factors Through the Community of Inquiry Framework

The community of inquiry framework (CoI) has roots in collaborative constructivist by nature as it posits there is a root element of learning: social interaction (Garrison, 2017). As such, connection between the teacher and the learner must be encouraged for learning to take place (Garrison, 2017; Shea P., 2011, Shea & Bidjerano, 2010, 2012, 2013). The CoI framework consists of three key elements: (a) teaching presence, (b) social presence, and (c) cognitive presence (Anderson et al., 2001; Shea et al., 2014). According to Garrison (2017), *teaching presence* typically refers to instructor's design and organization of the course, facilitation of the class discourse, and direct instruction to enhance learning in the virtual learning environments (VLEs). *Social presence* may include open communication, group cohesion, and/or personal relationships—elements that pertain to social interactions and collaboration that help students develop a sense of self and of others in the online learning environment. *Cognitive presence* refers to using triggering events, exploration, integration, and resolution as the arc of activities to guide students through the learning process. Various studies have found a positive correlation between the three elements and student satisfaction with online learning (e.g., Akyol et al., 2009; R. Lee et al., 2020), especially when all the elements are present (Akyol et al., 2009; Garrison & Arbaugh, 2007).

Martha Cleveland-Innes and Prisca Campbell (2012) address the topic of emotional presence among educators in online learning environments. Despite the growing popularity of online learning, the process of transitioning to this new mode of education for both teachers and students remains largely unexplored (Cleveland-Innes & Campbell, 2012). While new technologies are often presumed to simplify tasks, they require the development of new skills which may evoke an emotional response and impact the online learning experience. Although there is existing knowledge on the influence of emotions on learning, research on emotions in the context of online learning is lacking (Cleveland-Innes & Campbell, 2012).

Although the CoI framework has been broadly useful, it should be noted most of the research on the effect of CoI elements took place in a fully online learning context. For this study, the author focused on the elements of teacher presence and teacher–student communication, which includes design and organization, facilitating discourse and direct instruction, and seeking to understand how these teacher factors could contribute to a satisfactory learning outcome (Anderson et al., 2001; Shea & Bidjerano, 2010, 2012).

Teacher Student Interaction and Teaching Presence

Learning is situated in multiple social contexts, and, as such, learners are a part of social spheres; one such context is the classroom. These classrooms are a part of a larger social construct of schools, neighborhoods, communities, and society. By appreciating the potential influence of these constructs on learners, teachers can enhance the effectiveness of instruction and communication across contexts (e.g., between teachers and students; P. C. Lee & Stewart, 2013; National Education Association, 2017). Teachers who are aware of the potential influence of the classroom's social context on learners and the teaching–learning process can facilitate effective communication with and between students and thereby affect learning (Trickett & Rowe, 2012), thus adding in the contemporary element of online learning activities and how the interactions between students and teachers are by nature in a virtual world; yet still, teacher presence and interaction with the learner affect learning. By simulating these exchanges in the K–12 environment, students have another chance to experience what they might be expected to know as they enter college and career. In these online learning spaces, the conversations are written or recorded, online postings are sequential, and there are traceable records of the conversation flow; these online learning environments provide learners with wait-time and encourage reflective learning in both on-task and post task interactions (Hara et al., 2000; Hara & Kling, 1999; Tolmie & Boyle, 2000). The research in primary and secondary education (Corbett et al., 1997; Larreamendy-Joerns & Leinhardt, 2006; Lovett & Greenhouse, 2000; Mandinach & Cline, 2000; Schofield et al., 1990) has suggested, as a consequence of the implementation of computer-assisted instruction and intelligent tutor systems, classrooms may become more student-centered with teachers who naturally shift away from traditional roles as lecturers and sole authorities to embrace roles as facilitators and mentors engaged in shared problem solving with students (Derry & Lajoie, 1993; Larreamendy-Joerns & Leinhardt, 2006).

In the past, retention of online learners in higher education has been problematic: the dropout rates of online learners have been disproportionately high compared to students enrolled in traditional course settings (Bolliger, 2004). Research has identified three factors that can improve student satisfaction in online learning settings: (a) instructor variables, (b) technical issues, and (c) interactivity (Bolliger, 2004). Students may experience feelings of isolation in distance courses compared to prior face-to-face educational experiences (Shaw & Polovina, 1999). The instructor is the main predictor in student satisfaction (Bolliger, 2004; Finaly-Neumann, 1994; Williams & Ceci, 1997). Student satisfaction has a strong positive correlation with instructor's performance, particularly with their availability and response time (DeBourgh, 1999; Hiltz, 1993). Instructors must be perceived as available if students have questions and must be flexible (Moore & Kearsley, 1996). The instructor is not only a facilitator of learning but also a motivator for the student.

As Moore and Kearsley (1996) mentioned, there are three important types of interaction in online learning: (a) learner–content, (b) learner–instructor, and (c) learner–learner. In an online learning space, instructors should facilitate all types of interactions in their virtual or web-based learning activities with students when possible and appropriate. Students also have the opportunity to communicate how well they are functioning. Teachers can support students already at very high levels of functioning to achieve even higher levels by facilitating their interaction with more advanced peers or with instructors and by using advanced learning material (American Psychological Association, Coalition for Psychology in Schools and Education, 2015). As schools and businesses offer remote options, these opportunities to push cognition forward on a more personalized level demonstrate even more importance for students to get a chance to practice communicating their level of understanding in a classroom setting that has elements of virtual interactivity.

There has been some debate about whether a separate element should put more emphasis on the learner presence in online courses (Hayes et al., 2015; Shea et al., 2012, 2013; Shea & Bidjerano, 2010, 2012). Shea et al. (2012) reported, “teaching presence and social presence have a differential effect on cognitive presence, depending upon learner’s online self-regulatory (self-management) cognitions and behaviors, i.e., their learning presence” (p. 2). Other studies have also examined the possible addition of the learner presence element (Hayes et al., 2015; Shea et al., 2012; Shea & Bidjerano, 2010, 2012). Miller et al. (2014) performed a study to confirm the validity of the teaching presence construct and found students were able to distinguish between direct instruction and facilitating discourse, which contrasted with studies (e.g., Shea et al., 2012) that reported a lack of student ability to recognize these as distinct indicators. Arbaugh (2014) did not suggest the addition of a separate presence but did report student behaviors that were operationalized in the study as social presence were the only predictor that significantly predicted all three outcome variables: course grades, perceived learning, and delivery medium satisfaction.

Other Relevant Frameworks for Understanding Teacher Factors

A teacher’s knowledge, experience, and attitude toward technology are likely to influence their teaching presence and interactions with their students in an online learning environment (Robinson, 2003). Although this study did not directly examine the relationship between teachers’ and students’ technology use, information related to teachers' current knowledge, experience, and attitude toward technology was collected to contextualize understanding of students' experience and perception of learning online.

Teacher Technology Integration Models

The basis of the study was derived from teachers integrating technology into the classroom and then students gaining more access and practice to be successful. The technological pedagogical content knowledge (TPCK) and substitution augmentation modification redefinition (SAMR) provided frameworks for describing and targeting the use of technology to enhance learning (Angeli & Valanides, 2009). These frameworks were created on the pretense of educators who were never actually educated in educational technology because the devices nor the internet did not exist at the level they are now. These educators now need to change their teaching practices by integrating tech into their classrooms. If teachers are to engage in pedagogical innovation, they need to be prepared with knowledge beyond what is essential for operating in current classrooms (Koehler et al., 2011; Nies, 2012).

Technology Use and Perception

The Technology Uses and Perception Survey (TUPS) is a validated instrument; Ritzhaupt et al. (2017) explored validity evidence and appropriate uses of the revised TUPS designed to measure in-service teacher perspectives about technology integration in K–12 schools and classrooms. The revised TUPS measures 10 domains, including access and support, preparation of technology use, perceptions of professional development, perceptions of technology use, confidence and comfort using technology, technology integration, teacher use of technology, student use of technology, perceived technology skills, and technology usefulness (see Appendix A). Ritzhaupt et al. collected data from 1,376 teachers from one medium-sized school district in the state of Florida and conducted a variety of psychometric analyses. They broke down the internal structure analysis, correlation analysis, and factor analysis with these data. The results demonstrated data collected from the TUPS were best used as descriptive, granular information about reported behaviors and perceptions related to technology rather than treated as a series of 10 scales. Ritzhaupt et al. performed internal structure analysis, correlation analysis, and factor analysis with the data. They used Pearson correlations as indicators of criterion validity in that the theoretical relationship between the scale framework was compared to the observed interactions. For example, the relationship between scores on teachers' use of technology and scores on student use of technology was expected to be positive and moderate to large based on theory, so deviations from this expectation indicated a discrepancy between what was believed to be measured and what was actually measured on these scales (Ritzhaupt et al., 2017).

Ritzhaupt et al. (2012) used a research-based path modeling approach and examined the effects of teachers' characteristics, school characteristics, and contextual characteristics on classroom technology integration and teacher use of technology as a mediator of student use of technology. They collected data from 732 teachers from 17 school districts and 107 schools in the state of Florida. Results showed a teacher's level of education and experience teaching with technology positively influenced their use of technology (Ritzhaupt et al., 2012). Technology integration in the classroom explained how frequently students used technology in the school setting.

In the past, TUPs data have provided essential information about the current teacher use and perceptions of technology (Ritzhaupt et al., 2012). The results could be used to collect baseline data for special initiatives, inform technology purchase decisions, identify professional development needs, and facilitate coaching in the use of instructional technology (Ritzhaupt et al., 2012). In a world turned upside down due to the COVID-19 global pandemic, these elements help inform the investigator how to proceed with the data. It is important to set a new baseline after educators have been so thoroughly submerged in integrating technology into the classroom.

For this student educators will be asked the following using the parts of the TUPS survey (a) what teachers' perceptions are about the role of technology in the classroom, (b) the educator's comfort and confidence with technology in general, (c) the educator's experience with technology pedagogy, (d) the educator's experience with various specific technologies, (e) the frequency they use those technologies, and (f) the frequency with which their students use those technologies. The survey sections include:

- Demographic and background information
- Technology access and support
- Preparation for technology use

These questions establish demographic information and access data for contextual information.

Technology Acceptance Model

The second part of the questionnaire in this study for the teachers used the technology acceptance model (TAM). Consistent with previous studies, the research design for this current study included six dimensions: (a) motivations to use, (b) computer anxiety, (c) internet self-efficacy, (d) perceived usefulness, (e) perceived ease of use, and (f) behavioral intentions (H.-R. Chen & Tseng, 2012; Jonsson, 2005; Joo et al., 2000; Ong et al., 2004; Venkatesh & Davis, 2000). The questionnaire was completed as a web-based survey where participants were invited via email; the tool allowed for secure login. The participants could save their status as they completed the survey. For this study, the TUPS and TAMS were completed by K–12 educators who were invited via email.

Slight revisions were made to the items in the TUPS and TAM questionnaire language to accommodate changes in information and communication technology and pedagogical practices; however, all changes were very minor in nature. For example, adding the word "graduate" under the section "Preparing for Technology Use" allowed for those who had participated in most undergraduate programs focused on educational technology. The items included dichotomous response items (e.g., female), nominal (e.g., math, English), ordinal (master's), standard Likert scale items ranging from *strongly agree* to *strongly disagree*, and five elements extent of use scale (i.e., *not at all*, to *a small extent*, to *a moderate extent*, to *a great extent*, to *entirely*). In the TAM questions, the use of "web-based" was changed to "online," and the term "in-service education" was changed to "professional development education."

Understanding Student Factors Through Social Emotional Learning and Digital Citizenship Frameworks

In their seminal paper "Social and Emotional Learning: Promoting the Development of All Students," Zins and Elias (2006) laid the foundational work that helped guide the development of the collaborative for academic, social, and emotional learning (CASEL) framework and standards for social-emotional learning (SEL). Zins and Elias (2006) stated:

> Genuinely effective schools—those that prepare students not only to pass tests at school but also to pass the tests of life—are finding that social-emotional competence and academic achievement are interwoven and that integrated, coordinated instruction in both areas maximizes students' potential to succeed in school and throughout their lives. (p. 1)

Various definitions exist for SEL. Jones and Doolittle (2017) identified three core SEL domains: cognitive regulation (e.g., planning, problem solving), emotional processes (e.g., identifying, expressing, and regulating one's emotions), and social/interpersonal skills (e.g., prosocial interactions); whereas CASEL model emphasizes five domains: (a) self-awareness, (b) self-management, (c) social awareness, (d) relationship management, and (e) responsible decision making (Jones & Doolittle, 2017). The Washington State Office of Superintendent of Public Instruction (OSPI) SEL workgroup (Mueller, 2019) defined *SEL* as a process in which people build a skill set in "managing emotions, setting goals, establishing relationships and making responsible decisions" (para. 1) to be more successful in school. In this sense, the Washington State OSPI was more closely aligned with the CASEL framework.

To implement SEL effectively and equitably, schools need a personalized approach as each student and staff member comes into the conversation and learns at different points on the SEL continuum (Schwartz et al., 2022). At the school level, the SEL workgroup highlighted the need to create environments that support students' development of SEL skills. To create such an environment, schools must emphasize equity and use principles of universal learning design to ensure meaningful access and opportunity for every student. Additionally, SEL should be strategically developed as part of an integrated system of support in all schools (Mueller, 2019). Those schools that wish to implement SEL programs as part of sustainable school-wide programming are encouraged to examine the latest guide on implementation by the CASEL, which is one of the leading organizations that studies the impact of SEL on academic achievement and establish the statewide SEL standards (Devaney et al., 2006). Through research practice and policy, CASEL has worked collaboratively to advance SEL for preschool through high school students across the country.

In 2016, CASEL announced a 2-year Collaborating States Initiative (CSI), which was funded by the Robert Wood Johnson Foundation. This initiative allowed CASEL to partner with eight states to develop a statewide implementation of SEL. Washington was one of the states chosen to participate in this statewide standard study, although it did not receive any funding to participate in the study. As these programs grew, each state anticipated seeing its own SEL expectations and standards adapted, extended, and modified for their local needs.

Benefits of SEL

Research has shown that SEL curriculum and programs in schools support better performing and more positive school communities (e.g., Durlak et al., 2011; Zins & Elias, 2006). Based on a review of 179 handbook chapters, 91 research syntheses, and surveys of 61 national experts, Zins and Elias (2006) came across 28 categories of influences on learning. They found 8 of the 11 most influential categories involved social and emotional factors such as student–teacher social interactions, classroom climate, and peer group relationship. Subsequently, Zins and Elias established a guide for future SEL research and practice. SEL programs that consider current school resources and make an effort to strengthen them have increased the odds of successful program implementation and sustainability.

Similarly, Voltmer and von Salisch (2017) found associations between students' emotional knowledge and their academic performance. Specifically, they examined the associations between children's emotional knowledge (i.e., recognition of emotions in faces and knowledge of external and internal causes for others' emotions) and three dimensions of school success (i.e., academic performance, peer acceptance, and school adjustment) across 49 studies with 6,903 participants (aged 3–12 years) and analyzed 185 effect sizes in three meta-analyses. The mean effect sizes for the associations between emotional knowledge and academic performance, peer acceptance, and school adjustment ranged from small to moderate, respectively. Among middle-class children, however, associations between emotional knowledge, academic performance, and peer acceptance were stronger. The results of these meta-analyses demonstrated a robust overall relationship between emotional knowledge and school success by underlining the contribution of social and emotional development to school success and the need to better understand the pathways and mechanisms of these associations through further research.

In 2016, Castro and colleagues at the North Carolina State University published "EUReKa! A Conceptual Model of Emotion Understanding." These scholars attempted to create a comprehensive conceptual framework in the field of emotion understanding. In this framework, their criterion fell into 56 existing methods of emotion understanding to highlight current gaps and future opportunities for assessing emotion understanding across the lifespan. For example, Castro et al. (2016) noted emotion understanding in adults typically refers to their abilities to monitor and represent their inner states, differentiate emotions in oneself and others, and understand the social and moral functions of emotions. Among children, however, emotion understanding is defined quite differently and without many interlocking aspects. Thus, Castro et al. (2016) began to create a comprehensive conceptual framework that helps researchers recognize measurement shortcomings both theoretically and empirically.

> A child's emotion knowledge is comprised of:
> five skill sets that incorporate information regarding: (1) internal and external causes of emotions, (2) the qualities of emotions, including the structure, timing, and sequencing of emotion, (3) consequences and functions of emotions, (4) cultural rules and norms, and (5) management of emotions including the breadth of and most appropriate strategies available for a given situation. (Castro et al., 2016, p. 7)

After setting up the conceptual framework for emotional knowledge, the authors searched for studies in recent history (2001–2014) for research done on the topic of emotional knowledge (Castro et al., 2016). This research is where the 56 instances of similar criteria were found and established as a possible framework for a lifespan.

Castro et al. (2016) defined *emotion understanding* as "expertise in the meaning of emotions" (p. 258), including the higher-order abilities of emotion recognition and emotion knowledge. The three foci of emotion understanding included how well adults understand their own emotions (i.e., self), how well they understand emotions in a specific other (e.g., parent, spouse, coworker, or child; i.e., other), and how well they understand emotions in the general population (e.g., someone they do not know). In this conceptual framework, emotion recognition uses visual and auditory cues across a variety of modalities (i.e., face, body, and voice; Castro et al., 2016). The authors provided examples from the emotional response (e.g., gift-giving and awareness in a parent's or spouse's voice), which could have possibly signaled the availability of new emotional information. In other words, emotional awareness not only encompasses the ability to notice the shift in emotions but also the ability to interpret the meaning appropriately. Castro et al. explained it is essential for students to work together or at least be able to see each other to decipher those social cues—a skill that is critical to the development of their social emotional knowledge and understanding.

Besides the emphasis on emotional awareness and understanding, the current academic environment in U.S. public schools has also called for the development of self-management and self-efficacy skills in students to help them navigate potential failures or difficult situations (Washington State OSPI, 2019). For example, when students' actions are not watched carefully in the classroom, but they avail themselves of unmonitored information and sometimes anonymous untraceable actions online; thus, it is important these behaviors are discussed and explored openly in the school context.

Digital Citizenship Standards

Today's students must be prepared to thrive in a constantly evolving technological landscape. The International Society for Technology in Education (ISTE) standards for students are designed to empower a student's voice and ensure that learning is a student-driven process (ISTE, 2017). Every set of standards the ISTE has created has included elements of digital citizenship. The ISTE standards for students have evolved over time and with research. These lists of guiding principles are ever changing and evolving. Starting in 1998, "Learning to Use Technology" was released. "Using

Technology to Learn" was added in 2007, and the latest iteration, "Transformative Learning with Technology," came in 2016.

In the 2016 version, ISTE's key definition of *digital citizenship* for students was stated as such: Students understand the privileges, obligations, and possibilities that come with being part of a globally interconnected digital community, and they behave and set an example in manners that are ethical, legal, and secure.

> Other criteria include: 2a Students cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world; 2b Students engage in positive, safe, legal, and ethical behavior when using technology, including social interactions online or when using networked devices; 2c Students demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property; and 2d Students manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online. (ISTE, 2018, paras. 7–11)

In 2b, ISTE also defined *ethical behaviors* as interactions that align with one's moral code (e.g., preventing or not engaging in cyberbullying, trolling, or scamming; avoiding plagiarism; supporting others' positive digital identity). Moreover, in the new student standards, there also exists a criterion labeled "empowered learner," which asks students to "use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways" (ISTE, 2018, 1c). To succeed in this standard, students must use technology to seek feedback; ISTE (2018) further explained *empowered learner* means to find digital or human feedback (e.g., via spell-check and grammar check tools, online search, and learning analytics programs that measure how time is spent on a program or identify specific challenge areas, collaborative spaces that allow others to give feedback, reaching out to experts for input).

Integration of SEL and Digital Citizenship

By exploring the ISTE standards deeply, the author found a clear melding between behavior curriculum and educational technology in the classroom. The combination of social-emotional and digital citizenship learning guides and lesson plans was not established as essential until recently. Common Sense Education (2019) has created a curriculum called "Digital Citizenship & Social and Emotional Learning; Navigating Life's Digital Dilemmas" with the following guiding principles: (a) promoting digital citizenship means empowering students to think critically, behave safely, and participate responsibly in the digital world; (b) SEL skills are crucial to managing these digital issues with perspective; and (c) SEL skills can be integrated into any classroom to further make good decisions at home, at school, in communities, and in the workplace. Common Sense Education (2019) went ahead and took a practical approach to real-life situations that students face online every day. A key aspect of their digital citizenship curriculum is thinking critically when faced with digital situations. By navigating these dilemmas, a child builds character and will hopefully result in them not standing back when someone is being bullied online or in person. The curriculum that Common Sense Education (2015) put together helps teachers connect challenging digital dilemmas to social and emotional skills through discussion questions, lessons, and digital tools that target key SEL skills and build students' character. One of those such dramas or dilemmas is the "My Digital Life Is Like. . . . What is the role of digital media in our lives?" that explains a situation where students often use phones or other devices without even thinking about it. By paying closer attention to how and how much they use digital media, teachers can help students find better balance in their lives by challenging students to truly consider how digital media adds to or takes away from their overall quality of life (Common Sense Media, 2015, 2019). These real-life scenarios set up a way for students to have tough conversations about issues they might be facing inside and outside of school.

Relevance of SEL and Digital Citizenship to the Study

In Washington State, where this study took place, expectations for a SEL curriculum have been built into law. The OSPI released a brief with benchmarks entitled "Addressing Social Emotional Learning in Washington's K–12 Public Schools" in 2016, which set a statewide framework for SEL guidelines. In 2015, the Washington legislature directed OSPI to come together to produce "comprehensive benchmarks" for "interpersonal and decision-making knowledge and skills of social and emotional learning" (p. 2). The legislature intended to fortify and change systems to build the professional and societal future readiness of the students (Mueller, 2019). The language of the law

> reaffirms the work of Washington Learns and other educational task forces that have been convened over the past 4 years and their recommendations to make bold reforms to the entire educational system to educate all students to a higher level; to focus on the individualized instructional needs of students; to strive toward closing the achievement gap and reducing dropout rates; and to prepare

> students for a constantly evolving workforce and increasingly demanding global economy. (RCW 28A.150.198 Finding—Intent—2009 c 548)

Although the five prioritized SEL domains (i.e., self-awareness, self-management, social awareness, relationship skills, and responsible decision making) listed in both the Washington OSPI guidelines and the CASEL model are all important and relevant, the author focused primarily on the core SEL skills related to self-awareness, self-management, and responsible decision making in the academic domain for this study. Specifically, the author was interested in examining whether students have the capacity to motivate themselves, persevere, and see themselves as capable—attributes closely related to the concept of self-efficacy, and whether students have the abilities to regulate their own emotions, thoughts, behaviors, and engage in effective problem solving and decision making, which are skills related to self-management of learning (Mueller, 2019). The author focused on these two concepts for two reasons. Although social interactions with peers are crucial, and these indicators are included in all SEL curriculum, it may be challenging to track or record a student's social interactions due to the nature of this project. The focus of the study was online learning at the secondary level where peer-to-peer nonacademic socialization may not have occurred or was difficult to distinguish from academic collaboration in the classroom context. Thus, the author was concerned the study may not have provided a meaningful platform for measuring SEL skills related to social awareness or relationship skills. The second concept the author focused on was peer influence and peer acceptance, as these elements are at a heightened sensitivity during this period of a student's life. Although the quality of socialization may affect a student's general motivation, it is hard to directly connect individuals' social awareness or relationship skills to their future intention to use technology for academic and career purposes (Orben et al., 2020). On the other hand, self-efficacy and self-management in learning skills can be taught or enhanced through direct instruction, modeling, support and classroom organization and structure (Galinsky, 2010; Wolters, 2011; Zimmerman, 2000). Thus, the author intended to stay in the bounds of online learning activities used in the classroom and pedagogical practices the teacher could adopt (e.g., teaching presence) to enhance student's self-efficacy and self-management skills for the future.

Teacher and Student Factors Associated With Students' Satisfaction With Learning

The COVID-19 global pandemic raised significant challenges for the education community worldwide. A particular challenge was the urgent and unexpected change from previous face-to-face learning to an emergency remote environment (Senner, 2015; U.S. Department of Education Office for Civil Rights, 2021). Almost all K–12 educators and students had a simultaneously unique shared experience. When it comes to evaluating the effectiveness of traditional face-to-face learning courses and hybrid and online learning courses, researchers should consider cognitive and affective factors. Regardless of the learning platform, the course grade is often regarded as an indicator of student achievement or success; however, Kuo et al. (2014) suggested a topic worth investigating is student's subjective feelings (e.g., satisfaction with their learning), which can be gauged by how students perceive their learning experiences and the value of a course.

Student satisfaction can be defined as the student's perception pertaining to the learning experience and perceived value of the education received while attending an educational institution (Astin, 1993). Satisfaction is an important intermediate outcome

(Astin, 1993) as it can influence students' intrinsic and extrinsic motivations (Chute et al., 1999; Donohue & Wong, 1997), which is an important psychological factor in academic success (Learner-Centered Principles Work Group of the American Psychological Association's Board of Educational Affairs, 1997).

In traditional face-to-face classroom settings, factors associated with student satisfaction are (a) student characteristics, (b) quality of relationships with faculty, (c) curriculum and instruction, (d) student life, (e) support services, (f) resources, and (g) facilities (Astin, 1993; Bean & Bradley, 1986; Bolliger, 2004). Yet, distance and online learners may never visit a physical campus location and may have difficulty establishing relationships with faculty and fellow students. Researchers who study distance learners must understand and account for these differences when investigating student satisfaction. Numerous research studies have provided conceptual and empirical evidence for the associations between teacher-related, student-related factors and student's satisfaction with learning in person or online (Bolliger, 2004; Thurmond 2003). The findings are summarized as follows.

Teacher Factor—Teacher–Student Interaction and Teacher Presence

According to Thurmond (2003), the interaction between the teacher-student is the most crucial factor in predicting a student's satisfaction with distance learning or online courses. This was supported by Battalio (2007) and Bolliger (2004), who found that the teacher-student interaction was the most significant predictor of student satisfaction in both undergraduate and graduate level online courses. Moore and Kearsley (1996) also emphasized the importance of interaction in student engagement, both in traditional face-to-face and online learning settings. In distance learning, interaction can be divided into three dimensions, as suggested by Moore (1989). The first dimension is learner-learner interaction, where students can exchange ideas and feedback with each other, with or without the instructor's presence. The second dimension is learner-content interaction, where learners reflect and elaborate on the course content in a one-way process. The third dimension is teacher-student interaction, where learners communicate with the course instructor in a two-way process. Therefore, based on previous research, it is expected that there will be a positive correlation between student-teacher interaction and student satisfaction with online learning activities in the current study.

Several studies have highlighted the importance of teacher presence in online learning activities for predicting student satisfaction (Shea et al., 2003, Shea & Bidjerano, 2009). Caskurlu et al. (2020) found a strong positive relationship between teaching presence and learner satisfaction in fully online courses, with each of the three dimensions of teaching presence predicting student outcomes. Similarly, based on previous research, the current study is expected to show a significant positive correlation between teaching presence and student satisfaction with online learning activities. Teaching presence is one of three types of presence that have been examined as predictors of student learning outcomes or performance. Teaching presence involves teachers designing, facilitating, and directing cognitive and social processes so that students can achieve meaningful and worthwhile learning outcomes (Anderson et al., 2001). This type of presence has three subdimensions: instructional design and organization, facilitating discourse, and direct instruction. Instructional design and organization involve the overall design and planning of the online course, including outlining the content, process, and structure of the course, and carrying out assessments.

Facilitating discourse refers to promoting a learning environment that encourages active learning processes, such as maintaining student interest, motivation, and engagement. Direct instruction involves using pedagogical expertise and subject content to enable students to construct their own knowledge.

Student Factor—Academic Self-Efficacy and Self-Management of Learning

Self-efficacy refers to an individual's belief in their ability to perform a task or engage in an activity, and it is suggested that self-efficacy influences task initiation and persistence (Bandura,1997, 2004). Academic self-efficacy, in particular, is defined as learners' confidence in their learning and performance, and previous studies have found that it is positively related to self-regulation, academic performance, and social interaction (Artino, 2007; Meece et al., 1988; Meece et al., 2006; Pintrich, 1999). Moreover, self-efficacy is a powerful predictor of academic behaviors such as cognitive competencies, academic achievement, effort, persistence, and cognitive-strategy use. Although schools must address potential harmful effects of modern technology, self-management of learning has been found to have a critical influence on students' learning outcomes and higher levels of self-managed learning lead to higher academic achievement and satisfaction (Abar & Loken, 2010; C.-C. Chen, 2002; Lounsbury et al., 2009). Self-management of learning refers to students' abilities to engage in autonomous, self-regulated learning, such as taking initiative and responsibility for their own learning and exercising self-discipline (Wang et al., 2009). This concept is often used interchangeably with self-directed, independent, or autonomous learning (Cox et al., 2019; Kuhn, 2015; Shechtman et al., 2013; Zimmerman, 2000).

Satisfaction With Learning Online and Future Intention to Use Technology

Although satisfaction with learning has often been examined as an outcome variable, it does not necessarily have to be the end point. Prior research has found student satisfaction in higher education is correlated with other outcomes including student's persistence, student's perception of course quality, (course) retention, and student success (Allen & Seaman, 2008; Koseke & Koseke, 1991; Moore & Kearsley, 1996; Noel-Levitz Inc., 2011).

Dziuban et al. (2004) concluded students were more likely to evaluate courses and instructors with satisfactory ratings if they believed their instructors communicated effectively, facilitated or encouraged their learning, organized the courses effectively, showed interest in students' learning and progress, and demonstrated respect for students. Marsh and Roche (1997) developed a model for defining student perceptions of satisfaction in terms of several factors: learning value, instructor, enthusiasm, rapport, organization, interaction, coverage, and assessment. Although no studies have directly examined the association between student's satisfaction with online learning activities in traditional U.S. K–12 classrooms. Specifically in secondary education and linking it to their intention to continue engaging in online learning for their own benefit, it is probable their satisfaction with their online learning experience will lead to increased intention to use online learning tools. Plus connecting it all to future-readiness is an aspect that unique to this study. Avsec et al. (2014) examined the use of open learning (OL) to increase student success, specifically asking students about achievement and satisfaction as it related to OL of robotics. The authors did look at the student factors like self-efficacy and self-regulation of learning yet they did not take into consideration the teaching factors, nor did they relate it back to intention to use or future readiness.

Satisfaction With Learning Online and Future Readiness

The nature of work is changing fast, and emerging technologies have required certain skills from the workforce. Beyond creativity, communication, critical thinking, and collaboration, future workers need to know how to take advantage of problem-solving skills in the framework of computational thinking (ISTE, 2016). Adolescence college and career readiness go beyond what is collected in assessments like the National Assessment of Educational Progress (NAEP). The NAEP reading and mathematics assessment measures student knowledge and skills related to those subjects and how students apply their knowledge in problem-based situations. However, assessments like these do not test students' competency in real-life scenarios; they do not judge how prepared students are for success in a corporate position or even in a college classroom. Students and future members of society need to be ready to handle technology as a part of their daily lives. The skills gap refers to the gap between skills people currently have and the skills needed to do work now and, in the future (Levesque, 2019).

The integration of computational thinking with social emotional learning (SEL) in classrooms has several benefits for K-12 students in the US, especially in terms of future readiness and the future of work (Learning.com, 2021). Computational thinking, which involves breaking down complex problems into manageable parts and developing algorithms to solve them, can help students develop critical thinking and problem-solving skills, collaboration, communication, and perseverance (Learning.com, 2021). By incorporating computational thinking into SEL activities such as coding and project-based learning, teachers can help students build these essential skills. The article emphasizes that these skills are crucial for success in a technology-driven world and for preparing students for the future of work. Therefore, K-12 students in the US must be equipped with the necessary skills to thrive in a rapidly evolving job market, and integrating computational thinking into SEL can help them achieve that goal (Learning.com, 2021).

To the best of my knowledge, very few studies have examined the relationship between secondary level student's satisfaction with learning online in the K–12 setting and their perception of their future academic/career readiness in the United States. The author explored this relationship in this study.

Gaps in Current Research and Proposed Path Model

One of the gaps in current research is the dearth of research related to secondary students' perceptions and experiences of learning online. This limitation is due in part to the current design of secondary classrooms in the United States. A hybrid or flipped classroom model, where students interact both in-person and online on a daily basis, has only been made possible in recent years because students and teachers would need consistent and adequate access to computers and reliable internet (National Governors Association, 2021). As a whole, secondary students in the U.S. K–12 system have not had the opportunity to use technology for an extensive period of time while in school until the COVID-19 global pandemic, when almost all students had to switch to emergency remote learning (MDR Education, 2021; U.S. Department of Education, Office for Civil Rights, 2021). As such, their experience level with learning online has been generally low. Thus, it is not surprising most research studies have centered on fully online higher education courses in or outside of the United States (e.g., Bai et al., 2021; Lawless & Richardson, 2002; Shen et al., 2013; Solimeno et al., 2008; Um & Jang, 2021). Studies that have examined K–12 students' perceptions of learning online in the United States were conducted in fully online learning environments (e.g., Gray & Diloreto, 2016).

The other gap in current research is that past studies have centered on the teachers' or instructors' perspectives (Bai et al., 2021; H.-R. Chen & Tseng, 2012; Inan & Lowther, 2010; Ritzhaupt et al., 2012; Robinson, 2003), which often do not take into consideration the students' perceptions of their experience learning online. As research has shown, student-related factors influence their satisfaction with learning and other outcomes (e.g., persistence, retention) in higher education; this, it would be important to examine student's perspective on the secondary level as well (Boyd et al., 2022).

I addressed these gaps in this study by extending the links between teacher factors, student factors, and students' satisfaction with the educational online or web-based activities to their future intention to continue using technology and their perceived future academic and career readiness (see Figure 1.1). A better understanding of the pathway or mechanism can hopefully provide value for future research and intervention in terms of how schools, districts, and states can enhance and leverage different teacher and student components to promote student's continued engagement with edtech and future readiness.

Summary of Research Questions and Hypotheses

Based on the conceptual and empirical connections presented in prior studies, the author had the following hypotheses and sought to answer the following research questions in this study:

- Hypothesis 1: There will be a statistically significant and positive correlation between teacher–student interactions and student's satisfaction with online learning activities.
- Hypothesis 2: There will be a statistically significant and positive correlation between teaching presence and student's satisfaction with online learning activities.
- Hypothesis 3: There will be a statistically significant and positive correlation between self-management of learning and student's satisfaction with online learning activities.
- Hypothesis 4: There will be a statistically significant and positive correlation between academic self-efficacy and student's satisfaction with online learning activities.
- Research Question 1: Will student's satisfaction with online learning activities be associated with their future intention to continue using technology?
- Research Question 2: Will student's satisfaction with online learning activities be associated with their perceived future academic and career readiness?

- Research Question 3: Will any of the teacher- or student-related factors directly or indirectly influence student's future intention to continue using technology through their satisfaction with online learning activities?
- Research Question 4: Will any of the teacher- or student-related factors directly or indirectly influence student's perception of their future academic and career readiness through their satisfaction with online learning activities?

Chapter 3 Method

Research Design

This research was a nonexperimental, correlational survey design that used a convenience sample in which student participants provided survey data at one point in time regarding their perceptions of teacher's presence in online learning, teacher–student interactions, student's own academic self-efficacy, and academic management of learning in online and technologically enhanced activities. The hypothesized outcome variables were students' satisfaction with learning online, their intention to continue using tech-based learning for their own use, and their perception of their technological readiness around academic and career/professional issues. Surveys were an excellent vehicle for measuring a wide variety of unobservable data, such as people's preferences (i.e., technology), attitudes (i.e., toward using technology), beliefs (i.e., about new technology), and behaviors (i.e., implementing tech in the classroom; Bhattacherjee, 2012).

Population, Sampling, and Data Collection

The population of interest was secondary-aged students in the United States. A convenience sampling method was used to select schools in Washington state as the sampling frame for this study. To increase representativeness of the sample and external validity, the researchers intended to collect data from schools with demographics that are similar to the larger K–12 population of the United States.

Inclusion criteria were secondary-aged students enrolled in middle or high schools during the 2022–2023 school year in Washington state of the United States. All students who participated in this study had access to a number of different types of hardware (e.g., desktop, laptops, tablets) and had regular access to fast uninterrupted internet service.

For the teacher survey, the purpose was to collect some background information, including teachers' knowledge of what technology was available to them and their students and their years of teaching experience. The background questions were adapted from the Technology Uses and Perception Survey (TUPS). Although teacher's perception and use of technology were not the main variables of interest in this study, their perception and acceptance of web-based professional learning systems may have shaped the way they interacted with their students and their online teaching presence. In recent years, digital technology has been used while the United States battled the COVID-19 global pandemic to avoid losing multiple years of learning. Even with internet firewalls and security barriers, students with access to high-speed internet had more materials and people available at their fingertips than ever before, and they could do it all from the comfort of the classroom or the couch. And thus, technology has been considered a critical component and an integral part of high-quality education (Ertmer & Ottenbreit-Leftwich, 2010). Lawless and Pellegrino (2007) argued an understanding of technology is now one of the essential teaching skills for highly skilled educators. Thus, the revised version of the technology acceptance model (TAM; Venkatesh & Davis, 1996) was used to assess teacher's motivation to use technology, computer anxiety, and internet self-efficacy. In addition, the following demographic information was gathered from teacher participants: (a) gender, (b) ethnicity, (c) years taught, (d) subject taught, (e) age of those teaching, and (f) which grade levels they taught.

Approval was sought from the institutional review board (IRB) to collect data. Students and teachers from two unrelated public schools, one in Pierce County and one in Kitsap County, were invited to take part in the student survey between mid-February 2023 and early March 2023. The free and reduced lunch data for the Pierce County school participating in this study were as follows: 65.7% of the student population participated in the free and reduced lunch programs in the 2021–2022 school year (Washington State Office of Superintendent of Public Instruction, 2022). For the Kitsap County school that participated, only 36.5% of the student body participated in the free and reduced lunch programs offered by the state and district (Washington State Office of Superintendent of Public Instruction, 2022). See more about the student participants on the next page.

Data were purposefully collected near the midyear to capture students' and teachers' attitudes after they had spent time together to reorient themselves to a traditional school setting after being remote. Parents were asked to give informed consent for their children to participate in the anonymous survey, whereas students gave assent to participate. Students in both schools were introduced to the study through the announcement made by their administrator or teachers and completed the electronic survey directly and privately. The complete survey packet comprised some demographic questions and a set of measures that assessed their perceptions of (a) their interactions with teachers in online environments, (b) their teacher's presence in online environments, (c) their own academic self-management, (d) their own academic self-efficacy, (e) their satisfaction of learning in online and technologically enhanced activities, (f) their future intention to continue to use tech-based learning for their own use, and (g) their perception of their future academic and career readiness as it pertains to technology. The average time spent on the student survey according to SurveyMonkey analytics was 6 minutes.

Teachers were introduced to the teacher survey via an information letter and completed the survey directly and privately. The teacher survey took an average of 7 minutes to complete. Once the educator or student finished the survey, they received a confirmation email. The data in this study were collected and stored using the SurveyMonkey web-based system of collection.

Participants/Sample Characteristics

Student Participants

The initial sample included 320 student participants. An attention check question in the student survey was included to see if the student participant was reading the questions to differentiate participants who were reading the questions from those who were not reading the questions and randomly selecting a response. Out of 320 students, 125 did not pass the validation check question where they were instructed to select a particular response to see if they were reading the question, yielding a final sample of 195 students (157 from the Pierce County school and 38 from Kitsap County) and a 61% response rate.

The demographic characteristics of the student participants are summarized in Table 3.1. The gender breakdown was Female (43%; n = 84), Male (41%; n = 80), Gender Variant/Nonconforming (4.6%; n = 9), Other (please specify; 6%; n = 12) and Prefer Not to Answer (5%; n = 10). In terms self-identified ethnicity, the majority identified as White (36%; n = 70), followed by Hispanic or Latino, (22%; n = 43), two or more ethnic groups (19%; n = 37), Asian or Asian American (9%; n = 17), Black or

African American (6%; $n = 11$), Native Hawaiian or Other Pacific Islander (4%; $n = 8$), and American Indian or Alaska Native (1%; $n = 2$). Most of the student participants were from middle school grades (seventh or eighth; 69.3%; $n = 135$) and the remaining students were from high school grades (ninth, 10th, and 12th graders 30.7%; $n = 60$). Students from the eleventh grade were noticeably missing in this sample because they were unable to take part in the study due to other academic obligations (e.g., SAT preparation) around the time of survey.

Table 3.1

Descriptive Statistics for Demographic Variables for Student Data (N = *195)*

Variable	Percent
Gender	
Cis female	43 (84)
Cis male	41 (80)
Other (did not identify with labels provided)	6 (12)
Prefer not to answer	5 (10)
Gender variant/nonconforming	4.6 (9)
Ethnicity	
Asian or Asian American	9 (17)
American Indian or Alaska Native	1 (2)
Black or African American	6 (11)
Hispanic or Latino	22 (43)
Native Hawaiian or Pacific Islander	4 (8)

Variable	Percent
White or Caucasian	36 (70)
Identify with two or more ethnic groups	19 (37)
Grade level	
Middle School	
Grade 6	0 (0)
Grade 7	27 (26)
Grade 8	43 (83)
High School	
Grade 9	.5 (1)
Grade 10	18 (35)
Grade 11	0 (0)
Grade 12	12 (24)

In terms of access to technology, only 1% (*n* = 2) of students identified that they had no technology available to them. More than half (55%; *n* = 108) of the students said they had two or more technology options available to them in schools. Specifically, the combination they selected was (a) the one-to-one digital devices provided to them by the school or district that they can take home, and (b) they have access to the shared digital devices like computers on wheels (COWs). The rest of the participants responded as follows: just one-to-one digital devices that are provided by the school/district and they get to take home was (33%; *n* = 64); have access to the one-to-one digital devices and computers on wheels (COWs; 5%; *n* = 9); have access to the shared digital devices, meaning desktops in the classroom (3%; *n* = 6), or have access and are able to use their own device that they bring from home to use In the classroom (3%; *n* = 6).

Teacher Participants

The 32 teachers who completed the survey all came from two different public schools one in Pierce County and the other Kitsap Country (see Table 3.2). The gender breakdown was Female (61%; *n* = 20), Male (39%, *n* = 12), as Goldstein (2019) states in her work this is typical for the educator population in the United States. The average age of the participants was 39.55 (18–24, 6%, *n* = 2; 25–34, 22%, *n* = 7; 35–44, 31%, *n* = 10; 45–54, 25%, *n* = 8; 55–64, 16%, *n* = 5; 65+, 0%, *n* = 0). The highest degree that these educators hold is predominantly a master's degree (81%; *n* = 25), followed by a bachelor's degree (16%; *n* = 5), and a doctorate's degree (3%; *n* = 1). Over half of the educator sample identified as White or Caucasian (68%; *n* = 21), and the remaining sample identified as Hispanic or Latino (13%; *n* = 4), two or more ethnic groups (13%; *n* = 4), Black or African American (3%; *n* = 1), and descriptive data showed that most of the teacher participants had more than 6 years of teaching experience (90.33%; *n* = 28) and only a few had less than 1 year (9.89%; *n* = 3). The detailed breakdown is as follows: 6–16 years of teaching experience (61%; *n* = 19), with 17–25 years (26%; *n* = 8), and 28–40 years of teaching experience (3%; *n* = 1). The subjects these educators teach are as follows: Art/Music (3%; *n* = 1), English/Language Arts/Reading (6%; *n* = 2), Foreign Languages (10%; *n = 3*), Math (16%; *n = 5*), Library Science (3%; *n* = 1), Science, (3%; *n* = 1), PE/Health (10%; *n = 3*), Social Studies/History, (6%; *n* = 2), Other and None of the above (16%; *n = 5*), then the rest of them teaches two or more subjects (26%).

Slightly over half of the teachers (54%; *n* = 17) only worked with middle grades (6th–8th graders, the remaining teachers (46%; *n* = 14) taught or worked with middle and high school students (i.e., between 6th and 12th graders).

Table 3.2

Descriptive Statistics for Demographic Variables for Teacher Data

Variable	Percent (*n)*
Gender	
Cis Female	62.5 (20)
Cis Male	37.5 (12)
Age	
18–24	6.2 (2)
25–34	21.9 (7)
35–44	31.2 (10)
45–54	25.0 (8)
55–64	15.6 (5)
65+	0.0 (0)
Education	
Bachelors	15.6 (5)
Masters	82.2 (26)
Doctorate/PhD	3.1 (1)
Ethnicity	
Asian or Asian American	6.2 (2)

Variable	Percent (*n*)
Black or African American	3.1 (1)
Hispanic or Latino	18.7 (6)
White or Caucasian	81.2 (26)
Other	3.1 (1)
Total years of teaching	
Less than 1	9.3 (3)
1–5	0.0 (0)
6–16	59.4 (19)
17–27	28.1 (9)
28–40	3.1 (1)
Total years of teaching tech	
Less than 1	10.3 (3)
1–5	6.9 (2)
6–16	72.4 (21)
17–27	10.3 (3)
28–40	0.0 (0)

Survey Measures

Mean score for each construct/variable was calculated by averaging scores across all items of that measure. Higher scores indicate stronger magnitude of the construct (e.g., high perceived teacher's presence). Cronbach's alpha coefficient was calculated for all measures to assess their internal consistency (Cronbach, 1947).

Student Perception of Teacher–Student Interaction

In assessing their levels of interaction, participants rated four statements on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A sample item was "I had frequent positive and constructive interactions with the instructor in this online class." The scale was developed by Eom and Ashill (2016), who measured students' interaction with instructors in online class. Cronbach's alpha in their study was .84. The alpha coefficient in the current study was .88.

Perception of Teaching Presence

Teaching presence is one of the subscales in the community of inquiry (CoI) framework developed by Shea et al. (2003). The measure was comprised of six items rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A sample item was "The instructor clearly communicated important course goals and course topics." In the original study, the measure was used to assess teaching presence in a face-to-face context. For this study, the author modified the prompt to assess teaching presence in the online learning context. Cronbach's alpha in the original study was .89. The alpha coefficient in the current study was .88.

Academic Self-Management

The study adopted items for self-managed learning from a study by Richardson and Price (2003). The measure consisted of four items rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A sample item was "When it comes to learning and studying, I am a self-directed person." Cronbach's alpha in Richardson and Price's (2003) study was .86. The alpha coefficient in the current study was .83.

Academic Self-Efficacy

The academic self-efficacy measure (Fan & Williams, 2010) was comprised of five items rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A sample item was “I am sure that I can do an excellent job on my tests.” Cronbach’s alpha was .90. The alpha coefficient in the current study was .91.

Satisfaction With Learning Online

To assess satisfaction with online learning, I used a 4-item measure developed by Eom and Ashill (2016). The four items were rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A sample item was “I am happy with the way my teachers have integrated learning online in my classes.” Cronbach’s alpha was .80. The alpha coefficient in the current study was .88.

Intention to Use Online Learning

Intention to use online learning was assessed with a 3-items measure and rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*; Malhotra & Galletta, 1999). Items were modified for use in this study. A sample item was “In the future, I intend to use online learning activities to assist in my own learning.” Cronbach’s alpha in Malhotra and Galletta’s study was .81. The alpha coefficient in the current study was .85.

Future Readiness

The future academic and career readiness measure was specifically written by the researcher for this study and included eight items, rated on a 7-point Likert scale, and ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). Items were added as a basis for future research and included measures that pertained to critical thinking, creativity, collaboration, communication, and problem solving of the skills laid out by the NEA (National Education Association [NEA], 2017). Sample questions included, "I feel ready to troubleshoot my own technological issues" and "I feel ready to collaborate with others academically and professionally while learning online." The Cronbach's alpha in the current study was .92.

Teacher Measures

To shed light on the educators teaching and interacting with the students, teachers were also asked to fill out a questionnaire with a total number of 19 questions. The measures in the questionnaire were adapted from both the TAM and the TUPS, which were previously used to characterize the nature of technology use in the classroom (H.-R. Chen & Tseng, 2012; Welsh et al., 2011). The original TAM and TUPS were used to measure teacher perceptions of their own experiences with online professional development, perceptions of technical support in a school, the frequency of teacher and student use of technology, and the integration of technology into the classroom. The TUPS also included other relevant criteria (e.g., the teacher's content area, pedagogy, and experience). The TUPS was first developed at the Florida Center for Instructional Technology from 2003–2005 and updated in 2011 (Harmes et al., 2000; Hogarty & Kromrey, 2000; Welsh et al., 2011). Fostering learning environments with increasingly authentic instruction is necessary to prepare students for authentic assessments of real-world skills. The TUPS provided a framework to situate technology in instructional settings and to maintain a central focus on students.

The subscales from the TAM included motivation to use, computer anxiety, internet self-efficacy, perceived usefulness, and perceived ease of use. The Cronbach's alpha for these subscales ranged from .89 to .92, indicating a high level of reliability (H.-R. Chen & Tseng, 2012; Jonsson, 2005; Joo et al., 2000; Ong et al., 2004; Venkatesh & Davis, 2000). The Cronbach's alpha in the current study was .89.

The items on the original TUPS were separated into eight sections that were related to the integration of computers and technology in schools. For this study, 3 of 8 sections from the TUPS: (a) demographic and background information, (b) technology access and support, and (c) preparation for technology were used. Hogarty et al. (2003) found that each subscale had levels of reliability between .74 to .92. The Cronbach's alpha in the current study was .84.

Data Analysis Plan

Demographic information and all study variables (e.g., mean, standard deviation, range) were performed by using IBM SPSS Statistics 28 software. The skewness and kurtosis of the mean score distribution for each variable were checked. The participant demographic and background characteristics were described in earlier sections.

To address the first four specific hypotheses and the first two general research questions, Pearson's correlation was conducted to determine the bivariate correlation between all of the hypothesized independent and dependent variables: student-teacher interaction, teaching presence, academic self-management, academic self-efficacy, satisfaction with learning online, future intention to use tech-based learning for their own use, students' perception of their technological readiness around academic and career/professional issues, Pearson's correlation variables must meet three main assumptions. These assumptions include: (a) the variables investigated are interval or ratio level (i.e., they are continuous), (b) there is a linear relationship between the two variables, (c) and there should be no significant outliers (Laerd Statistics, 2018). If there was concern with normality of the data, nonparametric Spearman's correlation could be used because it did not require the assumption of normality.

Then to control for Type I/Type II errors, a power analysis for correlation was performed in G*Power Version 3.1.9.6 (Faul et al., 2007). To achieve a medium effect size (r = .3) and 80% power, which is considered acceptable for social science research, a total sample size of 85 was required for a correlation study. The current study sample size met this requirement.

To answer the last two research questions about direct and indirect influence, mediation analyses were performed using PROCESS 4.0 (Hayes, 2022), which is a macro addition to SPSS. Bootstrapping procedures were used to test the mediation analyses. Five thousand bootstrap samples were used to calculate the 95% bias-corrected confidence intervals of the conditional indirect effect of the mediator—satisfaction with learning online. Confidence intervals that did not contain zero indicated a significant indirect effect.

Finally, three separate multiple regression analyses were run to examine how the four predictors (i.e., teacher–student interaction, teaching presence, academic self-efficacy, and self-management) as a model accounted for the variance in students' satisfaction with learning online, intention to use technology, or future readiness. To control for Type I/Type II errors for this analysis, a power analysis was performed in G*Power Version 3.1.9.6 (Faul et al., 2009). To achieve a medium effect size (f^2 = .15) with alpha level of .05 and 80% power, given four predictors, a total sample size of 200 student participants was required. The final student sample size was close to this expectation.

Chapter 4 Results

The purpose of this chapter is to summarize the results of the quantitative data analyses and to address the following hypotheses and research questions:

- Hypothesis 1: There will be a statistically significant and positive correlation between teacher–student interactions and student's satisfaction with online learning activities.
- Hypothesis 2: There will be a statistically significant and positive correlation between teaching presence and student's satisfaction with online learning activities.
- Hypothesis 3: There will be a statistically significant and positive correlation between self-management of learning and student's satisfaction with online learning activities.
- Hypothesis 4: There will be a statistically significant and positive correlation between academic self-efficacy and student's satisfaction with online learning activities.
- Research Question 1: Will student's satisfaction with online learning activities be associated with their future intention to continue using technology?
- Research Question 2: Will student's satisfaction with online learning activities be associated with their perceived future academic and career readiness?
- Research Question 3: Will any of the teacher- or student-related factors directly or indirectly influence student's future intention to continue using technology through their satisfaction with online learning activities?

- Research Question 4: Will any of the teacher- or student-related factors directly or indirectly influence student's perception of their future academic and career readiness through their satisfaction with online learning activities?

Preliminary Analyses and Results

Student and teacher participants' demographic information (e.g., gender, ethnicity, grade levels) and background information (e.g., access to technology) were described in Chapter 3.

Basic Descriptive Statistics for Student and Teacher Data

Mean, standard deviations, and range for all teacher measures are summarized in Table 4.1. Teacher data served to contextualize the understanding of the student data. Hence, the basic descriptive statistics (e.g., mean, standard deviations, range) for the Technology Use and Perception Survey (TUPS) and technology acceptance model (TAM) measures are summarized in Table 4.1. The data provided by teachers in the study were mostly complete, with only one scale—the TAM scale that measured teacher technology use motivation—that contained missing data. To address this issue, the missing value analysis function in IBM SPSS (2020) was used to fill in the missing values for this scale. To minimize the impact of missing data, some researchers use arithmetic mean imputation, which involves replacing the missing values with the average score of the available cases (Enders, 2010).

Table 4.1

Descriptive Statistics for Study Variables for Teacher Data

Study variables	*N*	*M* (SD)	Range
Tech skills acquired (TUP)	31	2.85 (0.590)	1–5
Tech support (TUP)	31	4.62 (1.432)	1–7
Benefits of tech professional development (TUP)	31	2.59 (0.903)	1–5
Use motivation (TAM)	31	3.31(0.905)	1–7
Computer anxiety in classroom (TAM)	31	2.32 (1.34)	1–7
Internet self-efficacy (TAM)	31	2.04 (1.73)	1–7
Perceived usefulness (TAM)	31	5.01 (1.31)	1–7
Perceived ease of use (TAM)	31	5.16 (1.46)	1–7

Missing Values for Student and Teacher Data

Data analyses were conducted in IBM SPSS 26.0. Missing data were evaluated using the patterns described by Enders (2010). The author took advantage of SPSS's missing value analysis tool. The IBM SPSS missing value analysis is a tool used to address missing data in a dataset. It allows researchers to understand the patterns of missing data and use various imputation techniques to fill in the missing values. This tool is particularly useful for datasets where missing data can affect the results of the analysis or lead to biased conclusions. By using this tool, researchers can better analyze their data and draw more accurate conclusions (IBM Corp., 2020).

Out of the 195 student participants who completed the survey and passed the attention check, six participants had some data missing in their collected data but overall, this percentage was very small. With the tabulated patterns, only one participant had missing responses for multiple variables/measures. Similarly, a missing data analysis was done on the teacher data, and one participant came up with any case of missing data. Again, this percentage of missing data was a very low.

Although researchers strive to collect complete sets of data, missing data are an inevitable occurrence that can disrupt the integrity of statistical analyses (Field, 2013). The reasons for missing data are numerous and can range from participants unintentionally skipping questions on long questionnaires to equipment failure. To mitigate the impact of missing data, some researchers turn to arithmetic mean imputation, which involves replacing missing values with the arithmetic mean of the available cases (Enders, 2010). Although this approach may seem appealing, its efficacy has been called into question by some methodologists, who have traced its origins back to Wilks in 1932 (Enders, 2010). Ultimately, researchers must weigh the potential benefits and drawbacks of various imputation techniques when confronted with missing data in their research (Enders, 2010.) Because the percentage of missing values was very small in both datasets, the missing values were replaced by using series mean substitution—one of the imputation methods available in SPSS.

Descriptive Statistics for Teacher's TAM and TUPS DATA

The educators in the sample significantly disagreed when asked if they experienced anxiety in using technology either in the classroom or for their own professional development. Results regarding computer anxiety in the classroom (*M* =

2.32) were firmly in the disagree range. For internet self-efficacy (*M* = 2.04), it was even stronger as it pertained to their feelings of confidence to use technology tools they had in their classrooms. This group also adhered to the use of technology (*M* = 5.01) for their own use and the ease of use for advancing their studies using technology (*M* = 5.16), which meant they collectively *somewhat agreed* or *agreed* they were willing to replace other methods of professional development or advancements and take it online.

Main Analyses

Correlation Analysis

Several assumptions needed to be met to run a Pearson's correlation. First, the dataset must have contained continuous variables that were scaled. Second, to test the assumption of normality, skewness of the distribution should be between -2 and +2 (George & Mallery, 2010), and the kurtosis of the distribution should be between -7 and +7 (Byrne, 1994, 2010) to indicate normal univariate distribution. All study variables in this study fell within these limits (see Table 4.2). The assumption of normality was also assessed using the Kolmogorov-Smirnov (K-S) test, which the author was able to ascertain the data should follow a normal distribution (Field, 2013).

Table 1.2

Student Study Variables Means, Standard Deviations, Kolmogorov-Smirnov (K-S), Skewness, Kurtosis

Variable	*n*	Mean (SD)	K-S *p* value	Skewness	Kurtosis
Teacher interaction	195	5.04 (1.28)	< .001	-0.759	0.521

Teacher presence	195	5.31(1.02)	< .001	-0.515	0.253
Self-management of learning	195	4.58 (1.35)	< .004	-0.454	-0.287
Academic self-efficacy	195	4.86 (1.32)	.002	-0.734	0.517
Satisfaction with online learning activities	195	4.47 (1.47)	< .001	-0.705	0.093
Future intention to use technology	195	4.95 (1.45)	.054	-1.04	0.728
Future readiness	195	5.04 (1.16)	< .001	-0.642	0.588

The K-S normality assumption was violated ($p < .001$) for teacher interaction, teacher presence, self-management of learning, academic self-efficacy, satisfaction with online learning activities, future intention to use technology, and future readiness. However, as Field (2013) explained, the central limit theorem means as "sample sizes get larger the assumption of normality matters less because the sampling distribution will be normal regardless of what our population data look like" (p. 184). Furthermore, Field cautioned against using the K-S or Shapiro-Wilk (S-W) tests for normality when dealing with large sample sizes because even small deviations from normality can result in statistically significant results using the K-S or S-W tests, which can be misleading. Instead, Field recommended using graphical methods, such as histograms and normal probability plots, to visually assess the normality of large datasets. See Figures 4.1–4.7 for the Q-Q plots for the study variables. A visual check suggested *z* scores (data points) generally follow a straight line and fall on the theoretical (normal) distributions, with slightly heavier tails (i.e., higher kurtosis value) for the distributions of future intention and future readiness.

Figure 4.1

Q-Q Plot: Teacher Interaction

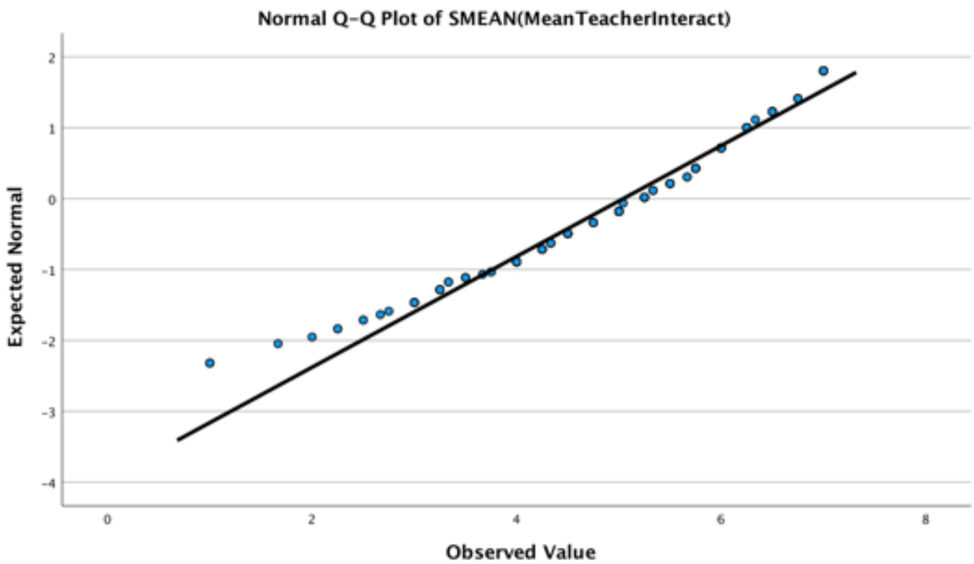


Figure 4.2

Q-Q Plot: Teacher Presence

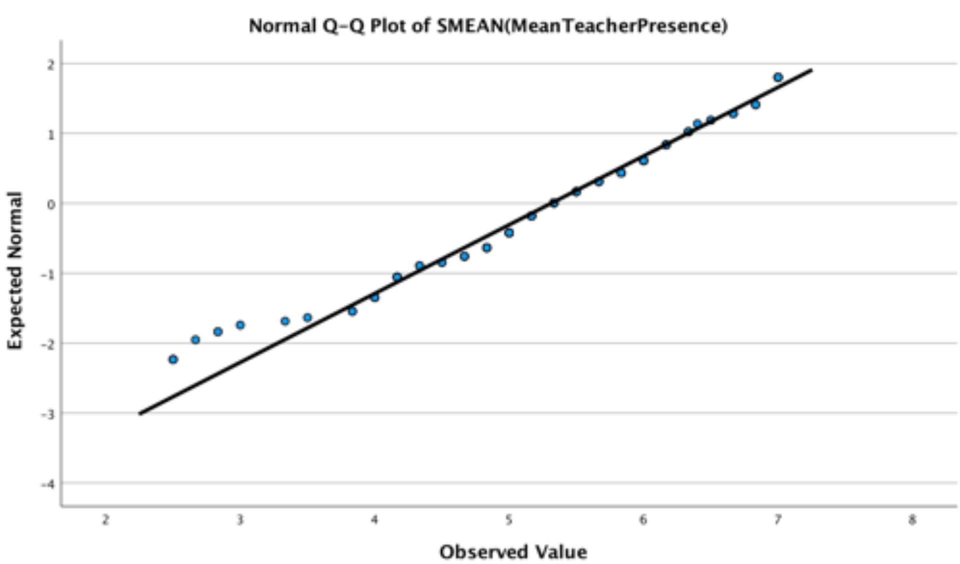


Figure 4.3

Q-Q Plot: Self-Management of Learning

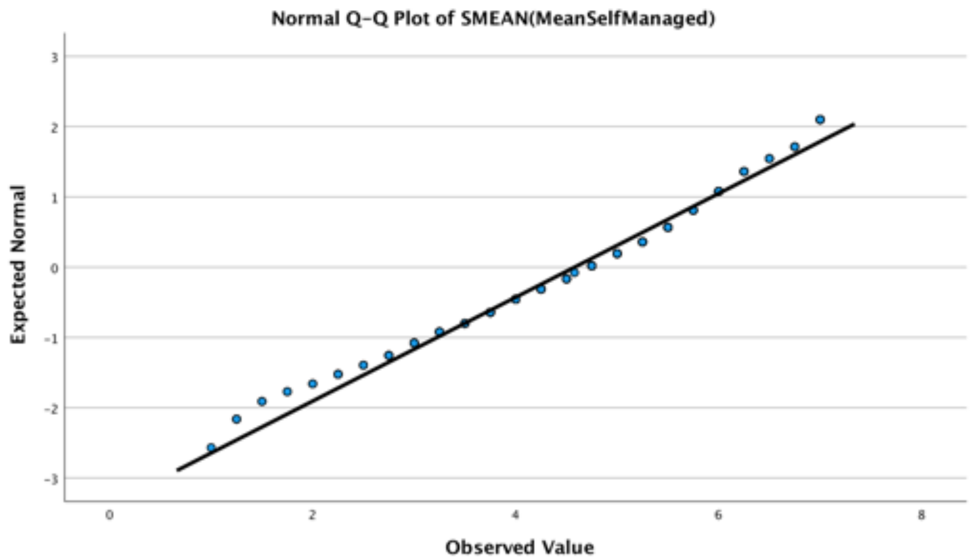


Figure 4.4

Q-Q Plot: Academic Self-Efficacy

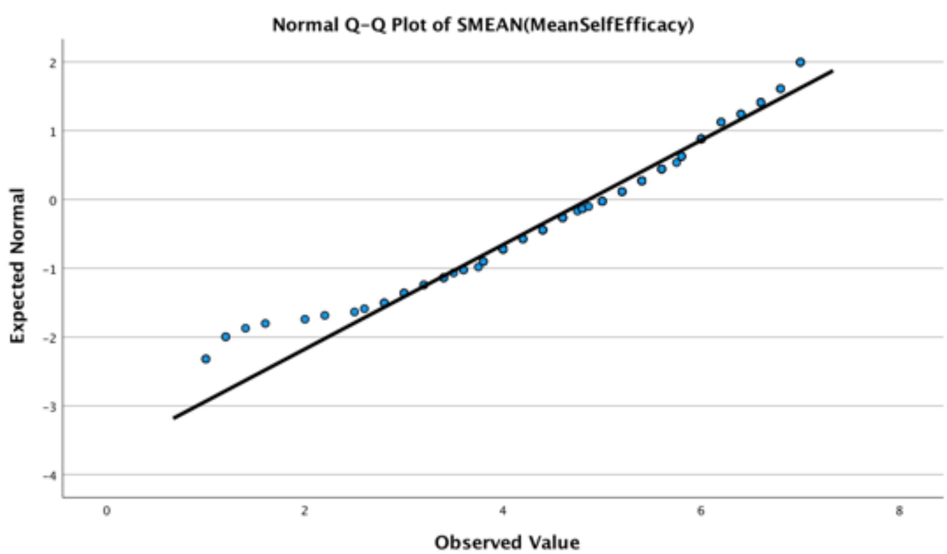


Figure 4.5

Q-Q Plot: Student Satisfaction

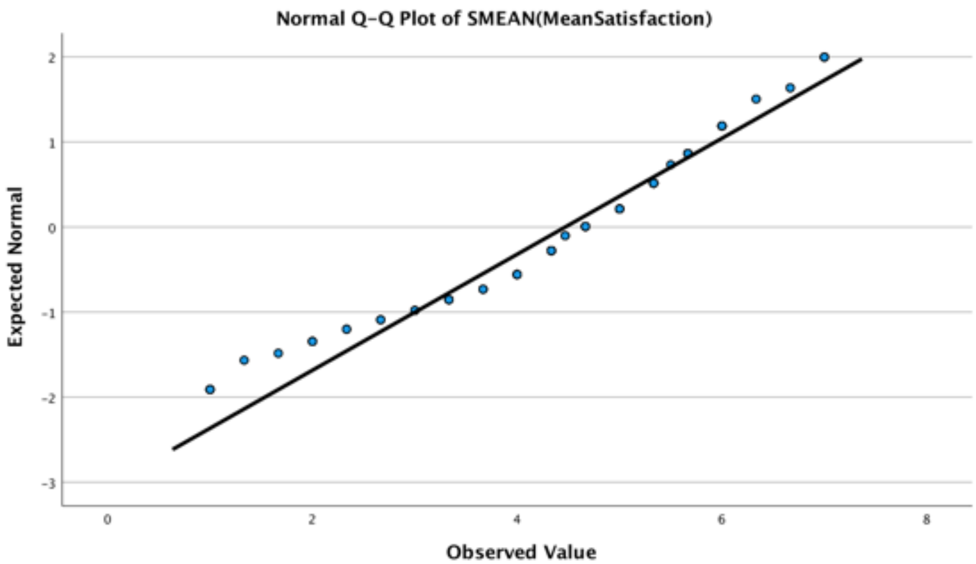


Figure 4.6

Q-Q Plot: Students' Future Intention to Use Technology

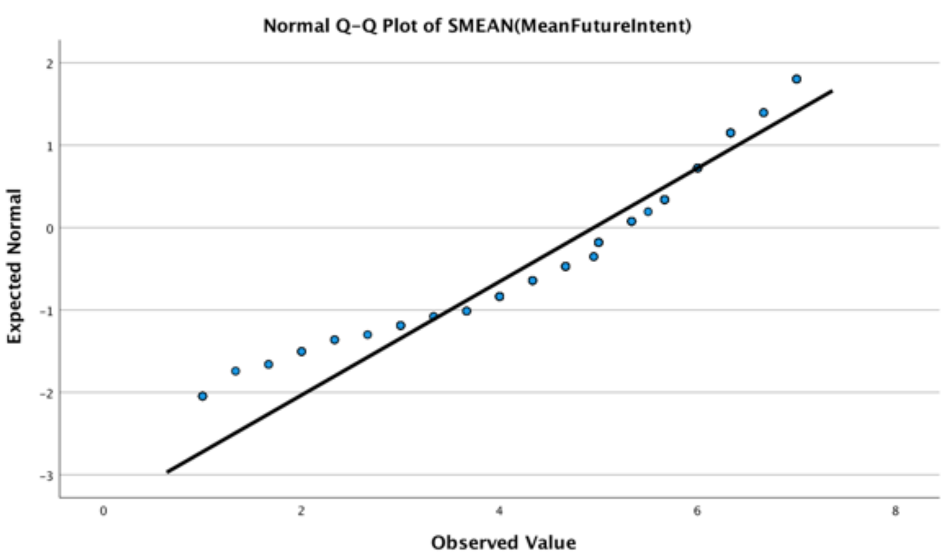
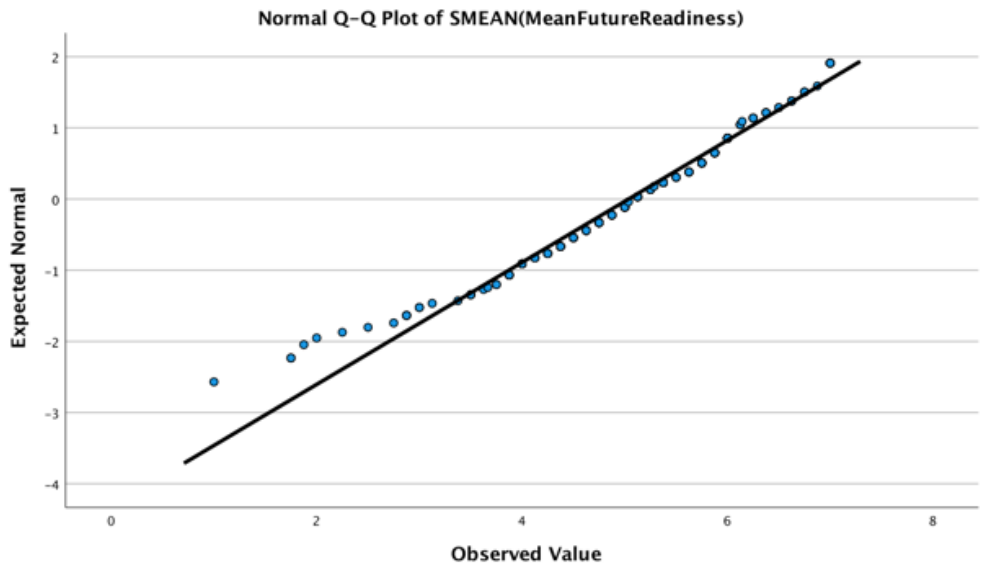


Figure 4.7

Q-Q Plot: Student Future Readiness



Because the skewness and kurtosis were within normal limits, the author ran Pearson's correlation. The descriptive statistics and the correlations among study variables are summarized in Table 4.3.

Table 4.3

Means, Standard Deviation, Cronbach Alpha, Intercorrelations Among Measures

Measure	*M* (SD)	Range	*α*	1.	2.	3	4.	5.	6.	7.
1. Teacher interaction	5.04 (1.28)	1–7	.87	-	.65***	.59***	.46***	.42***	.51***	.48***
2. Teacher presence	5.31 (1.02)	1–7	.87		-	.58***	.51***	.36***	.53***	.46***
3. Academic self-efficacy	4.86 (1.32)	1–7	.91			-	.75***	.55***	.76***	.62***
4. Self-management of learning	4.58 (1.35)	1–7	.82				-	.54***	.64***	.52***
5. Student future intention to use	4.95 (1.45)	1–7	.85					-	.60***	.71***
6. Student future readiness	4.95 (1.45)	1–7	.92						-	.54***
7. Student satisfaction with online learning	4.47 (1.47)	1–7	.88							-

Note: *indicates p < .05. ** indicates p < .01. *** indicates p < .001

The article “Interpreting the Magnitudes of Correlation Coefficients” by Hemphill (2003) pertained to interpreting Pearson correlation coefficients in the social sciences. It provided guidance on how to interpret the magnitudes of correlation coefficients, which were commonly used in social science research to describe the strength and direction of relationships between variables. Hemphill explained the concept of correlation and its properties, including the range of possible values (-1 to +1) and that it only described the linear relationship between variables.

Hemphill (2003) also provided a practical guide for interpreting the strength of correlation coefficients based on their absolute value. For instance, he suggested correlation coefficients that ranged from .10–.29 were small, .30–.49 were moderate, and .50 or higher were strong. The article also discussed the limitations of using correlation coefficients, such as the potential for spurious correlations and the fact that correlation did not imply causation.

Additionally, Hemphill (2003) offered some considerations for interpreting correlation coefficients in social science research, such as the significance of examining the distribution of variables, the potential influence of outliers, and the importance of considering the context and theoretical implications of the correlation. Overall, the article provided a useful guide for researchers and students in the social sciences who need to interpret correlation coefficients in their work.

Based on Table 4.3, there was a statistically significant moderate correlation between teacher interaction in online learning environments and satisfaction of those online learning activities, $n = 195$, $r = .488$, $p < .001$. With this result, the author found evidence to reject the null hypothesis; Hypothesis 1 was supported.

For the second hypothesis, there was a positive statistically significant moderate correlation between teacher presence in online learning environments and student satisfaction with online learning activities, $n = 195$, $r = .458$, $p < .001$. Therefore, the null hypothesis was rejected; Hypothesis 2 was supported.

In examining the third hypothesis, the author found there was a positive statistically significant strong correlation ($r = .522$, $p < .001$) between student's self-management of learning and student's satisfaction with learning online. Thus, the null hypothesis was rejected; Hypothesis 3 was supported.

Finally in exploring the fourth hypothesis, Pearson's correlation analysis revealed a positive, statistically significant, and strong correlation between student's academic self-efficacy and their satisfaction with learning online ($r = .624$, $p < .001$). Thus, the null hypothesis was rejected; Hypothesis 4 was supported.

The first nondirectional research question was: Will student's satisfaction with online learning activities be associated with their future intention to continue using technology? Correlation analysis indicated a statistically significant, positive, and strong correlation ($r = .705$, $p < .001$) between student's satisfaction of online learning activities and their future intention to use technology.

The last correlation analysis addressed the second research question, which was: Will student's satisfaction with online learning activities be associated with their perceived future academic and career readiness? Correlation analysis suggested a statistically significant, positive, and strong correlation ($r = .542$, $p < .001$) between the two variables.

Regression Analysis and Mediation Analysis

Assumptions of Regression Analysis

Prior to data analysis, the data were screened for outliers, missingness, and normality. Of the 195 student participants who completed the survey and passed the attention check, only a small percentage of six participants had some missingness in their collected data. Among these missing values, only one participant had missing responses for multiple variables/measures. Similarly, for the teacher data, only one participant had any missing data. Although missing data can be disruptive to statistical analyses, it is a common occurrence that can arise from various reasons such as participants unintentionally skipping questions or equipment failure (Field, 2013). To address missing data, researchers may turn to techniques such as arithmetic mean imputation, which involves replacing missing values with the mean of the available cases. However, the efficacy of this approach has been questioned by some methodologists (Enders, 2010). Researchers must carefully consider the potential benefits and drawbacks of various imputation techniques when addressing missing data in their research. In this study, because the percentage of missing values was very small in both datasets, the missing values were replaced using the series mean substitution imputation method available in SPSS (Enders, 2010; Field, 2013).

Independence. Essential to the assumptions of multiple regression, *independence* suggests the errors of estimation remain independent from one another—in that a residual from one data point must not relate to that of another data point (Field, 2013). To test this assumption, the author conducted the Durbin-Watson test. The results indicated the values in the data set were independent, thus the assumption was not violated.

Linearity. This assumption suggests the relation between the independent variable and the dependent variables is linear in nature. To test this assumption, the author visually examined data by using scatterplots to ascertain a best-fitting line, which ensured data did not follow a cubic or quadratic path. The predictor variables in this study were teacher and student factors (e.g., student's perception of teacher interaction and teacher presence in online learning environments, student's academic self-efficacy and self-management of learning). The outcome variables were student's satisfaction with learning online, student's future intention to use technology, and future technological readiness around academic and professional issues. Data points appeared linear, random, and evenly dispersed around estimates, thus this assumption was not violated.

Homoscedasticity. This assumption holds the variance of residual is constant across all independent variables (Field, 2009). The author tested homoscedasticity by creating scatterplots of the independent variables in relation to each of the dependent variables by student satisfaction with learning online. Data appeared evenly dispersed around the best fitting line, thus this assumption was not violated.

Normality. Normality occurs when the residual distribution of the outcome variable is normally distributed (Field, 2009). Additional examination of the binary independent variable is recommended (Field, 2013). Skew, kurtosis, histograms, and Q-Q plots were all conducted and interpreted to test the normality of the data. During a visual inspection of the histogram, the author found a slightly nonnormal distribution; however, I did find a bell-shaped curve. In an additional analysis of skew and kurtosis, the author found data did not cross statistical thresholds (i.e., skew did pass the thresholds of +/- 2 and kurtosis +/- 7). Finally, the author inspected data through Q-Q plots that demonstrated *z*-scores fell along the diagonal line.

Multicollinearity. This assumption posits that predictors do not have elevated covariance between them (Field, 2013). The author assessed multicollinearity through a correlation analysis (see Table 4.3) and found no predictors were correlated ($r > .80$), thus the assumption was not violated.

Next, the author examined the third research question, which was: Will any of the teacher- or student-related factors directly or indirectly influence student's future intention to continue using technology through their satisfaction with online learning activities? The author used a simple linear regression analysis to test if student perception of teacher's interaction (with them), teacher's presence, their own self-management and self-efficacy significantly predicted students' future intention to use or learn with technology. Results indicated the overall model was statistically significant. The four predictors explained 35% of the variance, $F(4, 190) = 25.47$, $p < .001$ (see Table 4.4). Out of the four predictors, only student self-management ($\beta = .279$, $p = .002$) and student self-efficacy ($\beta = .273$, $p = .006$) significantly predicted student's future intention to use technology. None of the teacher variables were statistically significant.

Table 4.4

Regression Results Using Students' Future Intention to Use Technology as the Criterion

Predictor	*b*	*SE*	*b* 95% CI [LL, UL]	beta	*p*	*r*	Fit
(Intercept)	1.522	.461	0.614, 2.431		.001		
Teacher interaction	0.170	.093	-0.013, 0.353	.15-	.068	.416	
Teacher presence	-0.050	.117	-0.280, 0.181	-.035	.669	.363	
Student management	0.300**	.096	0.111, 0.488	.279	.002	.534	
Student self-efficacy	0.301**	.109	0.087, 0.515	.273	.006	.550	
							R^2 = .349 ***

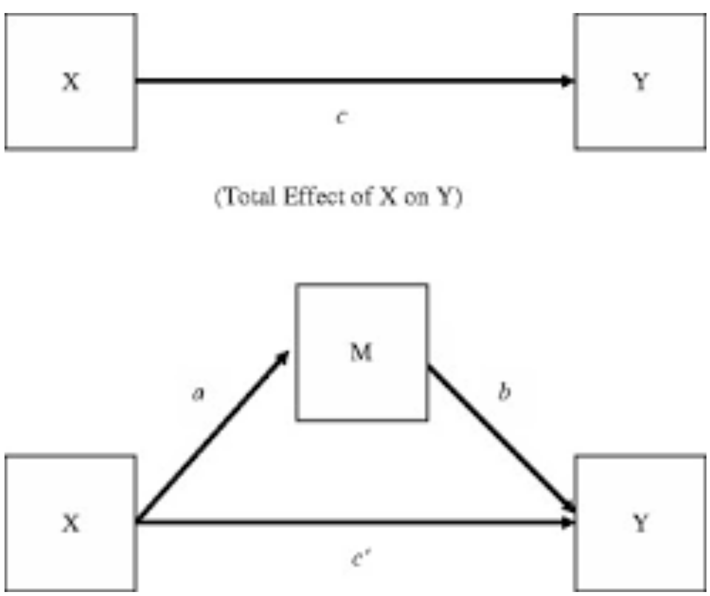
Note. A significant *b*-weight indicates the beta-weight is also significant. *B* represents unstandardized regression weights. Beta indicates the standardized regression weights. *R* represents the zero-order correlation. LL and UL indicate the lower and upper limits of a confidence interval, respectively.

*indicates $p < .05$. ** indicates $p < .01$. *** indicates $p < .001$

I used mediation analysis to address the second part of the question about whether these variables indirectly predicted students' future intention to use technology through students' satisfaction with learning online. According to Baron and Kenny (1986), four steps are needed to establish mediation effect: (a) the causal variable (X) is correlated with the outcome (Y) using X as the predictor and Y as the criterion variable in the regression equation, which is illustrated by Path c in Figure 4.8; (b) the causal variable (X) is correlated with the mediator (M) with X as the predictor and M as the criterion in the regression equation, which is illustrated by Path a; (c) the mediator (M) should affect the outcome variable (Y), with M as the predictor and Y as the criterion variable in the regression equation, which is illustrated by Path b; and finally (d) the effect of X on Y after accounting for M should be zero for a complete mediation, or reduced for a partial mediation, which is illustrated by Path c.

Figure 4.8

Path Diagram for the Single Mediator Model



The author used a simple linear regression analysis to test if students' perception of teacher's interaction (with them), teacher's presence, their own self-management and self-efficacy significantly predicted students' satisfaction with learning online. Results indicated the overall model was statistically significant (see Table 4.5). The four predictors explained 42% of the variance, $F(4, 190) = 34.35$, $p < .001$. However, only student self-efficacy ($\beta = .417$, $p < .001$) significantly predicted student's satisfaction with learning online. As such, only student self-efficacy was entered into the mediation analysis as the causal variable (X) with satisfaction as the mediator (M), and the future intention to use technology as the outcome variable (Y).

Table 4.5

Regression Results Using Students' Satisfaction With Online Learning as the Criterion

Predictor	*b*	SE	b 95% CI [LL, UL]	beta	*p*	*r*	Fit
(Intercept)	.310	.439	-0.557, -1.18		.481		
Teacher interaction	.173	.088	-0.001, 0.348	.151	.051	.488	
Teacher presence	.902	.111	-0.128, 0.312	.064	.412	.458	
Student management	.117	.901	-0.063, 0.297	.108	.200	.522	

Predictor	*b*	SE	b 95% CI [LL, UL]	beta	*p*	*r*	Fit
Student self-efficacy	.465***	.104	0.261, 0.669	.417	< .001	.624	
							R^2 = .420 ***

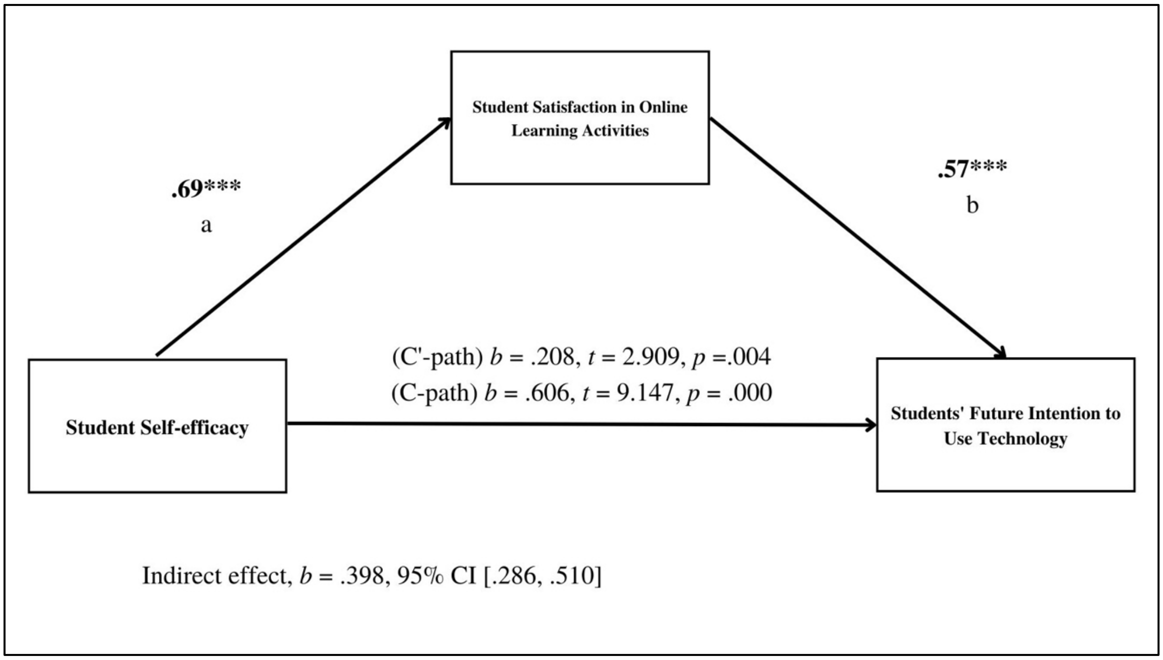
Note. A significant *b*-weight indicates the beta-weight is also significant. *B* represents unstandardized regression weights. *Beta* indicates the standardized regression weights. *R* represents the zero-order correlation. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively.

*indicates $p < .05$. ** indicates $p < .01$. *** indicates $p < .001$

Preacher and Hayes's (2004) PROCESS Macro 4.2 was used to run the mediation analysis. The analysis revealed a statistically significant indirect effect of student's self-efficacy on their future intention to use technology through student's satisfaction with learning online, *b* = 0.398; [BC] 95% CI [0.286, 0.510]. Because the direct effect of student's self-efficacy on their future intention to use technology was still statistically significant, *b* = 0.208; [BC] 95% CI [0.067, 0.349], this analysis was a partial mediation (see Figure 4.9).

Figure 4.9

Unstandardized Regression Coefficients From the Mediation Model Testing the Effects of Student Future Intention to Use Technology Through Student Satisfaction



Note. C = total effect of student self-efficacy and student satisfaction in online learning environments on students' future intention to use technology. C' = direct effect student self-efficacy on students' future intention to use technology. Estimates are based on N = 195

Finally, the author examined the fourth research question, which was: Will any of the teacher- or student-related factors directly or indirectly influence student's perception of their future academic and career readiness through their satisfaction with online learning activities? The author used a simple linear regression analysis to test if students' perception of teacher's interaction, teacher's presence, their own self-management, and self-efficacy significantly predicted students' future technological readiness. Results indicated the overall model was statistically significant. The four predictors explained

59.5% of the variance, $F(4, 190) = 69.75$, $p < .001$. Out of the four predictors, only student self-management (β = .152, $p = .032$) and student self-efficacy (β = .558, $p < .001$) significantly predicted student's future technological readiness. None of the teacher variables were statistically significant (see Table 4.6).

Table 4.6

Regression Results Using Students' Future Technological Readiness as the Criterion

Predictor	*b*	*SE*	*b* 95% CI [LL, UL]	beta	*p*	*r*	Fit
(Intercept)	1.221	.292	0.646, 1.797		< .001		
Teacher interaction	0.42	.059	-0.073, 0.158	.047	.471	.416	
Teacher presence	0.113	.074	-0.033, 0.259	.099	.128	.363	
Student management	0.131*	.061	0.011, 0.250	.152	.032	.534	
Student self-efficacy	0.494***	.069	0.358, 0.629	.558	< .001	.550	
							R^2 = .595***

Note. A significant *b*-weight indicates the beta-weight is also significant. *B* represents unstandardized regression weights. *Beta* indicates the standardized regression weights. *R* represents the zero-order correlation. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively.

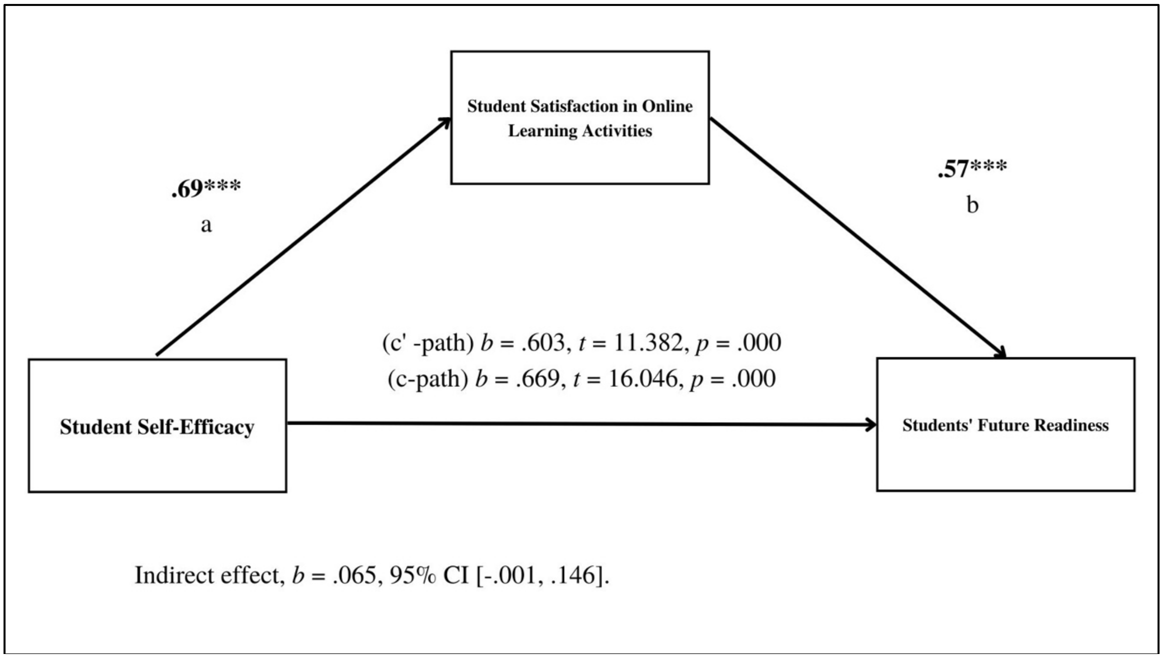
*indicates $p < .05$. ** indicates $p < .01$. *** indicates $p < .001$

The author used Hayes and Preacher's (2004) PROCESS Macro 4.2 again to examine the mediating role of student's satisfaction with learning online. Because student self-efficacy was the only significant predictor of student's satisfaction with learning online in the regression model (see Table 4.5), only student self-efficacy was entered as the causal variable (X) with satisfaction as the mediator (M) and the future readiness as the outcome variable (Y).

Results showed the indirect effect of student's self-efficacy on their future technological readiness *through* student's satisfaction with learning online was not significant, $b = 0.066$; [BC] 95% CI [-0.002, 0.146]. The direct effect remained statistically significant, $b = 0.603$; [BC] 95% CI [0.499, 0.708]. In other words, satisfaction with learning online did *not* significantly mediate the effect of student's self-efficacy on their future technological readiness (see Figure 4.10).

Figure 4.10

Unstandardized Regression Coefficients From the Mediation Model Testing the Effects of Student Future Technological Readiness Through Student Satisfaction



Note. C = total effect of student self-efficacy and student satisfaction in online learning environments on students' future readiness. C' = direct effect student self-efficacy on students' future readiness with technology. Estimates are based on $N = 195$

Chapter 5: Discussion

The aim of this research was to adapt a theoretical model about student satisfaction with learning online in the higher education context (Um & Jang, 2021) to examine secondary level (i.e., middle and high schools) students' online learning experience in the United States. Specifically, the previous model identified instructor- and student-related factors that contribute to a well-designed and attended online college course and determined if they were linked to college student's satisfaction, and thereby future intention to use technology. In addition to satisfaction with learning online and future intention to use technology, the author added student perceived future technological readiness around academic and professional/career issues as an outcome variable in the present study. The author applied the adapted model to secondary students in the Pacific Northwest and incorporated the future readiness measure specifically developed for this study. Middle school students were included in the study due to their shared experience of emergency remote online teaching during the COVID-19 global pandemic, and the quick adoption of one-to-one devices and new software in classrooms at all ages. This study used a nonexperimental survey design with a nonrandomized student sample from two school districts in Washington State. Specifically, the author investigated the correlational relationships among teacher-related factors such as students' perception of teacher presence, students' perception of interaction with their teachers, student-related factors such as students' self-reported self-manage and self-efficacy, and students' self-reported satisfaction with learning online, future intention to use technology, and future technological readiness around academic and professional/career issues. Furthermore, the author explored the mediating effects of student satisfaction on students' future intention to use technology and future-readiness.

Overall findings suggested teacher- and student-related factors are significantly associated with a student's satisfaction with learning online, future intention to use technology, and future readiness. Furthermore, student satisfaction was shown to be a significant mediator that accounted for the relationship between student self-efficacy and their future intention to use technology; however, student satisfaction did not significantly mediate or account for the relationship between student self-efficacy and their future readiness. In this study, the author also examined the technology engagement of teachers who were currently teaching the student participants. Teachers were surveyed regarding their confidence and motivation to use technology for their own professional growth and whether they incorporated technology in the classroom for the benefit of their students. All these findings are discussed further in the following sections. Study strengths, limitations, implications for future research and practices are considered and presented in this chapter.

Role of Teacher Factors in Student Satisfaction, Future Intention and Readiness

Correlation analysis found significant correlations of moderate to large effect size between students' perception of teacher presence and interactions with them and student's satisfaction with learning online, student's future intention to use technology, and future readiness (see Table 4.3). These results generally aligned with the effect of teacher interaction on student satisfaction reported by Um and Jang (2021) in their research on fully online college courses in South Korea. Um and Jang found student satisfaction with online learning was positively related to their interactions with the instructor and their perception of teacher's presence in fully online courses.

Research has consistently shown teachers play a crucial role in promoting student readiness for future learning and success. According to the U.S. Department of Education Office of Educational Technology (2017), teacher quality is the single most important school-related factor in student achievement. In the context of technology integration, teachers can have a significant impact on student readiness by modeling technology use, providing feedback and support, and creating a positive learning environment. Teachers play a crucial role in promoting student readiness for future learning and success through their modeling, feedback, and support. By using Bandura's (1977) social learning theory as a framework, teachers can create a positive learning environment that encourages experimentation and risk-taking with technology, reinforces positive behaviors, and fosters collaboration and peer learning. Ultimately, this environment can lead to increased student readiness and success in using technology as a tool for learning and communication.

Findings from this study highlighted the potential for educators in online learning settings to enhance student engagement by providing timely feedback, encouraging student inquiry, and facilitating small group discussions (Battalio, 2007; Bolliger, 2004; Moore & Kearsley, 1996). Additionally, the findings reinforced the notion presented in Chapter 1 that expertise in technology and its appropriate integration into the classroom is a fundamental teaching skill for proficient educators. Studies have identified teacher-related characteristics as crucial determinants of successful and effective technology integration in educational settings (Baylor & Ritchie, 2002; C.-H. Chen, 2008; Inan &

Lowther, 2010). Khalid (2014) argued effective teaching requires a combination of factors, including subject knowledge, pedagogical content knowledge, classroom management, feedback and assessment, communication skills, and continuous professional development by collaborating with colleagues. In addition to these areas of competency, educators also need to continually build their competency and confidence in using technology to be able to fully interact with their students inside and outside of the classroom. The U.S. Department of Education Office of Educational Technology (2016) provided guidelines and resources on how to prepare 21st-century educators to effectively integrate technology into their teaching in a meaningful way that enhances student learning and engagement, including a variety of technology tools—tools such as learning management systems like Canvas or Schoology, communication and collaboration tools like Canva or Mural, or even video conferencing tools like Zoom or Google Meets. Teachers are also expected to create resources to deliver instruction, assess student learning, provide feedback, and communicate with students and parents (National Center for Education Statistics, 2003; U.S. Department of Education Office of Educational Technology, 2021).

The concept of assessing technology skills was emphasized by the U.S. Department of Education Office of Educational Technology (2021); teachers should assess their own skills and knowledge and those of their students to determine the level of support and instruction needed. In the present study, the author collected anonymous teacher data on their motivation and intention of—and confidence in—using technology, which help shed light on student participants' generally high ratings of perceived teacher presence and teacher–student interactions (see Table 4.3).

Results suggested the teacher participants were generally experienced, highly educated, and had several years of experience teaching with technology (average was around 9.47 years). Yet, when the author examined their self-reported Technology Uses and Perceptions Survey (TUPS), and how their answers fit in the technology acceptance model (TAM) scales, the author found there was still some anxiety and lack of confidence when using technology (see Table 4.1). Most of their responses to the question about the variety of options for the acquisition of technology skills and knowledge fell in the categories of “learning as a part of undergraduate or graduate coursework,” “in-service courses or workshops,” “independent learning,” “interaction and coaching by colleagues,” and “interaction and coaching by others.” About 30% (n = 9) of educators said they had never learned from distance learning courses like massive open online courses (MOOCS). Interestingly, 41% (n = 13) of educators stated they had at least one part-time technology integration specialist, but another large group (41%, n = 13) said they were not sure whether they had technology support, which demonstrated they may not have known if they had help on site that went beyond trouble-shooting hardware issues. Moreover, when asked which type of technological professional development would be most beneficial, 50% (n = 16) of educators said introductory skills would not be beneficial at all, whereas over 30% of the (n = 14) teachers stated technology professional development in instructional applications and training on applications used by students would be beneficial to a great extent or entirely.

When the author examined the educator response to the TAM measures, the overall anxiety level in using classroom technology was in the low range. On the other hand, this sample of educators had a higher level of use of technology for their own use and felt at ease in using technology to advance their studies; they were willing to replace other methods of professional development to do it online for their own professional development (see Table 4.1).

Role of Student Factors in Student Satisfaction, Future Intention, and Readiness

Correlation analysis revealed the strongest associations with student satisfaction in online learning activities were intention to use technology in the future (r = .705, p < .001) and academic self-efficacy (r = .624, p < .001). There were also strong positive associations between self-management of learning and student's satisfaction with learning online. Self-management of learning was a predictor of students' satisfaction in online learning activities even after returning from fully remote online classes. These results implied students must have control or agency over their educational choices and paths. This implication can be interpreted as giving students the autonomy to make decisions that will impact their learning. It also suggested students who can self-manage their learning were likely to achieve better learning outcomes. This claim was supported by research conducted by Abar and Loken (2010), C.-C. Chen (2002), and Lounsbury et al. (2009). As U.S. K–12 education has attempted to prepare students for career and college readiness in a post-COVID era, students who switch between in-person and online learning face new challenges compared to those faced by remote workers who work from both the office and home. This comparison highlights the need for students to adapt to different learning environments and maintain their learning goals, despite changes in their learning environment.

I created and added the measure of student technological future readiness in the present study. Although this measure may not have been complete, it did hit several elements listed as 21st century skills: critical thinking, problem solving, communication, collaboration, creativity, and innovation (National Education Association [NEA], 2017.). The scale achieved a high Cronbach alpha ($\alpha = .92$), which suggested items in the scale measured the same underlying construct or dimension, and they were highly correlated with each other (Cronbach, 1951; Field, 2013). It also indicated the scale was reliable and consistent in measuring student future-readiness as it pertained to academic technology use. If it was used again with a different population, it should produce consistent and replicable results over time (Laerd Statistics, 2018).

In terms of student factors, correlation analysis showed academic self-efficacy was the strongest correlate of future technological readiness, followed by self-management of learning and satisfaction with learning online. In a post-COVID remote learning experience, students have been required to immerse themselves in technology (U.S. Department of Education, 2020). This shared event allowed students even at a younger age to know the beginning cognitive experience of a remote worker or even what it means to manage one’s time as an adult with less supervision. Thus, technology has become increasingly integrated into both academic and professional environments, and students who are confident in their abilities to learn and use technology effectively will be better prepared for the demands of these environments (SkillRise, 2020). Furthermore, by developing strong self-efficacy and self-management skills, students can better prepare themselves for the challenges of academic and professional technology usage, and ultimately increase their chances of being future ready and then demonstrate success in these domains (U.S. Department of Education, 2020).

Findings from this study, although similar to those of Um and Jang's (2021) study, also revealed unique and different patterns. For example, in Um and Jang's study, teacher-related factors surfaced as the most important components linked to student satisfaction. Yet, in this study, not only were the student-related factors (e.g., their academic self-efficacy and self-management of learning) positively and significantly associated with their satisfaction with learning, but they were also positively and significantly associated with their future intention to use technology and future-readiness. Furthermore, when all factors were accounted for—as in the regression analysis—only student factors were significant predictors of student's satisfaction with learning online, future intention to use technology, and future-readiness (see Tables 6, 7, and 8)—none of the teacher factors remained significant predictors. Although it is difficult to make broad generalizations about the education systems in South Korea and the United States because of the diverse educational practices and policies that vary by regions and institutions, it is possible some of the observed differences are due to cultural factors.

The COVID-19 global pandemic accelerated the adoption of online learning in both countries, which have led to a range of experiences and challenges for students and educators (Arnett, 2021). In both countries, the expertise and knowledge of the educator have been important and have been attributed to a highly effective teacher (Khalid, 2014). Teachers and professors in the United States and South Korea have served as facilitators of learning by providing lectures, guidance, feedback, and assessments. In online courses, instructors must also play an active role in designing and delivering course materials, providing timely and personalized feedback, and fostering a sense of virtual community and online engagement among students (Bolliger, 2004; Tucker, 2017). But in South Korea and other Asian countries, there has been a strong emphasis on education and academic achievement. Teachers have been highly respected and seen as authority figures (Choi & Park, 2013; Park, 2009). In higher education, students have been expected to be highly motivated to achieve; South Koreans have been taught that the most powerful means to achieve upward social mobility and economic prosperity is academic success (Choi & Park, 2013; Park, 2009). Because of the perceived authority and status of the teachers and college professors, South Korean students may rely more on their instructors for guidance and support than U.S. students, especially in online courses where communication and interaction may be more challenging (DeWaelsche, 2015).

In the United States where the education tends to be more decentralized, a greater emphasis has been placed on student autonomy and individualism (McGuire, 2007). In secondary education, the hybrid and blended models of teaching may provide U.S. students with even more flexibility and independence in their learning (U.S. Department of Education Office for Civil Rights, 2021); however, this teaching does not mean students are completely self-sufficient. Teachers particularly in U.S. secondary education still play a crucial role in providing guidance, instruction, and feedback (Khalid, 2014). Therefore, students or human factors end up influencing their belief in success, satisfaction, and ability. Other studies have found these human factors influence their beliefs regarding success (Artino, 2007; Shen et al., 2013; Um & Jang, 2021). As mentioned in Chapter 1, it is important to consider social-emotional learning (SEL) benchmarks (Mueller, 2019) when using technology in education. As technology plays a significant role in students' daily lives, teaching and meeting digital citizenship standards

(ISTE, 2018) are essential. Because technology is integrated into most modern professions, it is vital to provide opportunities for students to build confidence and skills necessary for success in the future. This effort will ensure students feel prepared for life after graduation and can fully engage in online learning activities.

The Mediating Role of Student Satisfaction

The indirect relationship between student self-efficacy and future intention to use technology can be explained by the satisfaction model of the TAM (Jonsson, 2005; Malhotra & Galletta, 1999). The study by Malhotra and Galletta (1999) was the foundational basis for the intention to use scale with the student instrument. They were influenced by TAM, which proposed satisfaction with an academic experience positively influenced the intention to use or achieve in the future (Jonsson, 2005). Therefore, if students have high self-efficacy (i.e., the belief in their ability to use technology effectively), they are more likely to persist even in the face of setbacks and have a positive experience with the technology, which in turn increases their satisfaction with it and their intention to use it or succeed in the future (Doménech-Betoret et al., 2017).

On the other hand, the relationship between self-efficacy and readiness may not be as strongly influenced by satisfaction. *Readiness* refers to the individual's perceived preparedness to adopt a technology and use it in a singular manner without assistance (U.S. Department of Education, 2016). This definition may be more related to their knowledge or skills rather than their satisfaction with the technology. For example, a student may have high self-efficacy or confidence in attempting a particular technology (e.g., social media); but, if they lack the necessary knowledge or skills, they may not feel ready to use the tools related to academic success (Thotz, 2021). In this case, their readiness to use the technology in the future may not be influenced by their satisfaction with it.

One possible behavioral health model that can help explain the relationship between satisfaction and behavioral intention is the theory of planned behavior (TPB). TPB, proposed by Ajzen in 1985, articulates that attitudes, subjective norms, and perceived behavioral control all influence behavioral intention, which in turn predicts actual behavior (Teo et al., 2016). Satisfaction with a technology may be considered a part of the attitude component of the TPB, which can positively influence behavioral intention. However, perceived behavioral control, which includes knowledge and skills, may have a stronger influence on readiness to adopt a technology regardless of satisfaction (Teo et al., 2016). Yet again, Teo et al.'s (2016) study was conducted on teachers and their intention to use and how to connect those behavioral intentions.

Therefore, by tying it closer to the typical student experience in the U.S. secondary classrooms, it may end up being a combination of teachers engaging in TPB and then students engaging in Bandura's (1977) social learning theory. Social learning theory suggests people learn by observing the behavior of others and the consequences of those behaviors (Bandura, 1977, 1997, 2004). Accordingly, students can acquire new knowledge and skills by modeling the behavior of others—either through direct observation or by watching the consequences of others' actions (Bandura, 1977, 1997, 2004). As a result, students could observe teachers or peers performing well while using technology, and it will motivate them to take it up for their own learning and advancements.

Moreover, this study highlighted the importance of observation, modeling, and reinforcement of these technology skills in students to promote their future use of technology in online learning environments and for their own learning pursuits (Bandura, 1977, 1986, 1997, 2004). The study focused on the student factors of academic self-efficacy and self-management of learning and how those variables aligned with the broader concept of digital citizenship and SEL, which encompassed the responsible use of technology for learning and communication (Ertmer & Ottenbreit-Leftwich, 2010; Lawless & Pellegrino, 2007). As noted in Chapter 1, academic self-efficacy refers to the belief in one's ability to perform tasks related to academic success, but self-management involves the ability to manage one's time, attention, and emotions to achieve academic goals. These self-perceived thoughts and behaviors are reinforced by Bandura's (1986, 1997) social cognitive theory, which posits a central component of an individual's beliefs in their ability to perform a task can affect their behavior, motivation, and overall well-being. These skills are crucial for students to navigate the ever-expanding landscape of technology and effectively use it as a tool for their own learning. This study's findings highlight the importance of hiring and training educators who can effectively use technology as student self-management of learning, academic self-efficacy, and satisfaction with online learning activities are all factors that are directly and indirectly connected to students' future intention to use such technology (Khalid, 2014). Teachers with experience who can model and provide feedback when they present technology in innovative manners can leave their students motivated and satisfied so they want to use technology in the future (Bandura, 1997; Thotz, 2021).

The intersection of technology with these skills presents a unique challenge and opportunity for K–12 students. To effectively use technology for learning, students need to develop their academic self-efficacy and self-management skills. Strategies to support the development of these skills could include providing students with opportunities to practice time management and goal setting and encouraging them to seek out resources and support when needed. Overall, the study's findings and my discussion of academic self-efficacy and self-management have highlighted the critical role that technology plays in education and the need for students to develop skills necessary to use technology effectively (Bong, 2008).

I specifically examined the nonstatistically significant results of Research Question 4—examining student satisfactions as the mediation factor between the student and teacher factors and future-readiness. Further examination of the direct correlational relationships have placed strong relationships directly between student future readiness and academic self-efficacy ($r = .76$, $p < .001$); therefore, more research could be done to examine the correct mediating factor that is linked to future readiness. As explained earlier in Chapter 1, satisfaction is linked to intrinsic motivation (Ahmad & Majid, 2010).

All items in the study were examined on a 7-point Likert scale that ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). Motivation did not necessarily connect to preparedness to accomplish a task; as such, the students in this study may have had high academic self-efficacy ($M = 4.86$, $n = 195$) and were generally satisfied with their online learning ($M = 4.47$, $n = 195$). However, that finding did not necessarily mean class satisfaction was the reason for a high level of self-perceived future-readiness ($M = 4.95$, $n = 195$). In the full model, the four predictors explained 59.5% of the variance, $F(4, 190) =$

69.75, $p < .001$. Out of the four predictors, only student self-management ($\beta = .152$, $p = .032$) and student self-efficacy ($\beta = .558$, $p < .001$) significantly predicted a student's future technological readiness.

No previous research has investigated the mediating effect of student self-satisfaction on the connection between student and teacher factors and student future readiness. However, Um and Jang (2021) did look at future intention to use online learning. The findings of this study suggested students who experience more self-perceived confidence when interacting with technology (i.e., self-efficacy and self-management) or satisfaction with online learning may experience high levels of future intention to use technology or future readiness regardless of teacher factors. The relationship might help explain the lowest correlation ($r = .36$, $p = < .001$) between student future intention to use technology and teacher presence in online learning environments. Specifically, the teacher presence and interaction in these spaces may not be as important when it comes to future-readiness or future intention of use or student satisfaction as their interactions with their peers and their own pursuits and exploration with technology in the classroom. When considering these findings in the scope of the full model, the variance explained by these interactions between academic self-efficacy and future intention to use through satisfaction has important K–12 implications. This finding may suggest children with higher self-perceived self-efficacy may have more intention to use technology because they had a satisfactory online technologically enhanced class experience. Perhaps allowing for an option for continued study where more satisfaction data are collected can demonstrate the same connection to the intention to use. Future intention to use technology for their own advancement could be linked to lifelong learning (SkillRise, 2020).

Study Strengths

There were several strengths to note in this study. One strength was the characteristics and size of the sample. Most extant research has examined self-perception, and these factors (i.e., teacher interaction and presence in online learning activities, academic self-efficacy, self-management of learning, future readiness, future intention to use technology, and student satisfaction in online learning activities) have been explored in college-age students, young adults, or teachers and professors. To the best of my knowledge, few or no studies have examined self-perceptions and experiences pertaining to online learning and technological future-readiness among teenagers (13–18 years old). Very few research studies have been able to examine secondary students' online learning experience—partly because students in this age range did not typically have a shared experience in using technology for academic pursuits until the COVID-19 global pandemic and the quick shift to emergency online learning.

Additionally in this study, the author included teachers and students from two disconnected counties in Washington State with ethnic and socioeconomic diversity and thereby enhanced the generalizability of the findings to the general student population in Washington State. Finally, although the final sample size was significantly smaller—out of 320 students who filled out the survey, 125 did not pass the attention check question—a sample size of 195 still accorded robust data and statistical significance. The 61% response rate was higher than the average online survey research (Wu et al., 2022). It is important to note the author included middle schoolers in the data on purpose to create real-time interventions and remediation in instructions before graduation. However, students of that age (12–14) sometimes may not have a mature or introspective approach toward answering a survey. By having a built-in attention check question, the author was able to ensure participants were reading the questions and survey responses were not random.

Another unique contribution of this study was the future technological readiness scale the author developed. The scale consisted of eight items and yielded a high internal reliability indicated by its Cronbach's alpha coefficient of .92. The scale showed the highest agreement between items compared to all other instruments the author used in this study. High Cronbach's alpha values suggest participant responses across a set of questions are consistent (Field, 2013). In Chapter 2, the author discussed the thought process behind the questions the author used in this scale, which were derived from the NEA's 21st-century skills and included critical thinking, problem solving, communication, collaboration, creativity, and innovation. The author applied these elements to real-life classroom scenarios in which teachers interact with technology and allowed students to rank their own perceptions of their abilities and strengths. The future technological readiness scale has the potential to be implemented among a larger group of students in future research.

Limitations

Even though there were several strengths in my study, there were also several limitations the reader should consider when interpreting the results. My initial thought was to correlate teacher data with student data; yet, in the United States, students do not only have one teacher in middle school and high school. They usually move between six to seven different educators throughout the day. Also, after remote learning due to the COVID-19 global pandemic, it would be even more difficult to connect the student's current self-perceptions to their current teachers and not to their learned experience during that shared scenario with the teachers they had in the previous year. Thus, in this present study, The author only examined student perceptions. Moreover, the sample was limited to students from public secondary schools in the state of Washington, which may not represent the broader student population in the United States. The student body in the sample was more diverse than the national census, with only 36% identifying as White or Caucasian compared to the national percentage of 75.8% (U.S. Census Bureau, 2021). Although this diversity was valuable in many respects, it does suggest caution should be exercised when generalizing the results of this study to other populations. Additionally, schools the author sampled not only had more ethnically diverse students, but they also had access to one-to-one devices with more than half of students who said they had two or more technology options available to them in schools. Future research could address these limitations by collecting data from a variety of schools with student demographics and technology infrastructure that are more representative of the general student population of the United States, which would allow researchers to compare student perspectives and experiences across different contexts.

Another limitation of the present study was that it was modeled after studies created with fully online courses in a higher education context; however, many middle and high school students in the United States were currently working in hybrid or blended classroom models. Furthermore, student perception of learning online could have been significantly affected by outside influences such as community, parents, or self-learned experiences via social media. Therefore, it would be beneficial for future studies to include more questions about outside-of-school influences on students' self-efficacy or intention to use online learning platforms.

Another limitation of this study was that scale items were modified and adapted to make questions more relevant for students who were not in fully online courses and who may not have been at a college-level reading level. However, this modification may not have gone far enough and may have contributed to some students failing the attention checking question, which made it difficult to determine the cause of their lack of attention without qualitative data. If the reading material was beyond their reading level, they could have gotten confused and decided to just to give up; or it may have been that students of that age (12–14) sometimes may not have a mature or introspective approach toward answering a survey (Castro et al. 2016; Patton, 2002; Voltmer & von Salisch, 2017).

Implications for Practice

Through this research study, the author made significant contributions to the existing literature on technology use for academic purposes by investigating collective secondary students' perception of satisfaction with online learning activities, future intention to use technology for their own advancement, and academic and professional future-readiness. The study showed a clear connection between teacher-related and student-related factors (e.g., teacher interaction and presence in online learning activities, academic self-efficacy, and self-management of learning) and class satisfaction levels among U.S. based middle and high school students. Specifically, the way students perceived virtual interactions with their teachers, teacher presence in online learning spaces, their own academic self-efficacy, and self-management of learning were all important factors that affected their level of satisfaction at statistical significance with the class. In other words, these elements impacted how well students believed the class went, and their satisfaction was closely linked to motivation. As previous research has shown, intrinsic motivation to learn strongly influences learning outcomes (Ahmad & Majid, 2010). It also adds to the conversation regarding the importance of intertwining elements of SEL and digital citizenship for deliberate, direct in-class instruction (ISTE, 2018; Washington State OSPI, 2016). U.S. students at this age (13–18) who are in the seventh to 12th grade level are not typically given the same end-of-term satisfaction and evaluation survey that takes place in colleges and universities. Perhaps asking them about their perceptions on satisfaction may not change the class schedules, but it could lead to interventions with students as they move to the next grade.

Therefore, special consideration should be focused on improving SEL benchmarks to include digital citizenship and digital wellness. Educators may require specific types of professional development to expand their thoughts into these spaces that will affect their students' academic and professional readiness (Thotz, 2021). Furthermore, in the present study, the author found the strongest correlations were among academic self-efficacy, academic self-management, and academic and professional technological future-readiness. These findings stress the need for further interventions geared toward students who are academically struggling to build up their self-perceived technological confidence. As teachers build up their confidence in math or English, they also need to build up their ability to use technology side-by-side. Otherwise, the notion that the next generation can be self-proclaimed “bad at tech” will be a limiting factor for their career and college choices (SkillRise, 2020).

In addition to discussing the implications for what students should learn and develop, the author considered adding one implication for teacher training and professional development. As educators should have another research study to point to that can back the inclusion of SEL and digital citizenship into direct instruction in every class. Not only that but due to the recent politicization of SEL in certain states it might be worthwhile exploring using digital citizenship and digital wellness frameworks in how to talk about these life skills.

The Fordham Institute (2021) promotes social-emotional learning (SEL) as a way to foster students' emotional, social, and academic development. SEL includes a set of skills and competencies that enable individuals to manage their emotions, build positive relationships, and make responsible decisions. To achieve SEL goals, the article suggests the incorporation of digital citizenship, which includes teaching students how to use technology in a safe, ethical, and responsible way (Fordham Institute, 2021). The article suggests that digital citizenship can be used as a tool to teach SEL skills such as self-awareness, empathy, and responsible decision-making. In K-12 education, digital citizenship can be taught alongside SEL to help students navigate the digital world while also developing the necessary soft skills for success in the 21st century and beyond.

Implications for Future Research

Another implication of this study on future research is the change from Um and Jang’s (2021) study, where the teacher factors (i.e., interaction and presence in online courses) had the strongest correlation coefficients with satisfaction. In this study, the student factors had stronger correlational relationships with satisfaction. The impact was that in these younger people, their self-perception and self-confidence mattered even more than the teacher's work (Um & Jang, 2021). These results could be connected to cultural differences, which could be an option for continued research. As stated in Chapter 1, the other important factor for these data was that most of the previous studies on this topic have focused on the teacher or instructor's point of view, which left a gap in examining the students' perspective at these younger ages. Therefore, the author aimed to explore the students' thought process and perspective on the matter in this study. One of the essential teaching skills for highly skilled educators is to understand technology and integrate it into the classroom. According to research, teacher-related attributes are critical factors in determining successful and effective technology integration in the classroom (Baylor & Ritchie, 2002; C.-H. Chen, 2008; Inan & Lowther, 2010). Studies have found a teacher's positive attitudes toward technology and perspective play a direct role in the use of technology in K–12 and higher education settings (Bai et al., 2021; H.-R. Chen & Tseng, 2012; Inan & Lowther, 2010; Ritzhaupt et al., 2012; Robinson, 2003).

Future research should seek to better understand the variance not accounted for in the model. There may be unknown mechanisms at play that could help better tailor interventions and advance the understanding of study variables such as parental support systems (i.e., parents, friends, club exposure to technology), race/ethnicity, socioeconomic status, gender, and available technology at home. Future research should also consider or examine if positive student perceptions of the study variables link to academic success (i.e., GPA, graduation rates, SAT scores, acceptance into college). Consideration of these variables' impact may be essential for teachers to provide better interventions and support for the needs of underserved and marginalized populations of students to begin a successful technologically enhanced academic journey particularly in light of recent emergency remote changes. Furthermore, research should continue to expand the understanding and appreciation of the necessity of technology use and practice in the U.S. K–12 classroom and the importance it plays in the lives of students.

The author would also consider adding one more implication for future research—if this present study was a cross-section study, the author wonders what a longitudinal research design would achieve. Someone can develop a curriculum or intervention and follow the students over years to compare pre- and post-change in students' future intention and technological readiness.

Conclusion

The present study's primary goal was to investigate the connections among secondary student factors (i.e., academic self-efficacy and self-management of learning), teacher factors (i.e., teacher interaction and teacher presence in online learning activities), student satisfaction in online learning activities, student future intention to use technology for their own advancement, and their technological academic and professional future-readiness. Findings from this study have added to the literature concerning the relationship between SEL and digital citizenship. It has also incrementally pushed the conversation forward regarding the need for more teacher technological professional development in online applications students use for their own academic and professional growth, as teachers are the conduit for classroom experience for students. The results of this study differed somewhat from previous research, which has indicated younger students in the United States have a different perception of their own learning with technology than higher education students in South Korea. Specifically, adult students in fully online courses in South Korea were found to be more reliant on their instructors for success, which then effected their future intention to use technology—this finding contradicted findings among U.S. secondary students. In this study, secondary students clearly linked their own self-efficacy and self-management with success, future intention to use technology, and future readiness. These findings shed light on the fact that students who struggled with self-efficacy or self-management also tended to struggle with technology, which affected their future intention to use technology and future readiness. Teachers can help mediate these self-imposed limitations by focusing on developing students' self-efficacy and self-management skills while they interact with technology in class.

An additional aim of the study was to investigate the mediating effects of student's satisfaction with learning online on the relationship between student and teacher factors and future intention to use technology or future readiness. However, the mediation analysis was only applied to better understand the effect of student academic self-efficacy on future intention to use technology or future readiness; the rest of the factors were not significantly associated with student's satisfaction with learning online when all other factors were taken into account.

Overall, these results have highlighted the need for early direct and constant SEL curriculum tied to students' use and interaction with technology. Career and college readiness for the future does include these technological factors and, in a postpandemic interconnected world, it is even more crucial for students to explore these factors early and often.

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Appendix A: Instruments and Measures

Teacher Questionnaire - Teachers Using Technology Survey

1 Gender

- Female
- Male
- Gender Variant/Nonconforming
- Prefer Not to Answer
- Other (please specify)

2 Total years of teaching experience

- Less than 1 year
- 1–5 years
- 6–16
- 17–27
- 28–40
- More than 40

3 What is your age?

- 18–24
- 25–34
- 35–44
- 45–54
- 55–64
- 65+

4 What is the average number of students per class?

- Under 5
- 6–10
- 11–20
- 21–30
- 30–40
- Over 40

5 How many years have you been using technology in your classroom for instruction?

- Less than 1
- 1–5
- 6–16
- 17–27
- 28–40
- More than 40

6 What subject area(s) do you teach?

- None of the above
- Art / Music
- Business / Economics
- Computer Science / Programming
- Communications / Journalism
- English Language Arts / Reading
- ELL / ESOL
- Foreign Languages
- Math

- Library Science
- Science
- Media/Technology
- PE / Health
- Social Studies/History
- Career and Vocational Education
- Special Education
- Other (please specify)

7 What grade level(s) do you currently teach?

- None of the above
- PreK - 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- Other (please specify)

8 What is your highest degree earned as of today?

- High School Diploma
- Associates
- Bachelors

- Masters
- Doctorate/PhD
- Other (please specify)

9 Ethnicity

- Prefer not to answer
- American Indian or Alaska Native
- Asian or Asian American
- Black or African American
- Hispanic or Latino
- Native Hawaiian or other Pacific Islander
- White or Caucasian
- Other (please specify)

10 Select to what extent you have acquired technology skills from the following sources.

Scale: Not at all, To a small extent, To a moderate extent, To a great extent, Entirely

- As a part of my undergraduate or graduate coursework
- In-service courses or workshops (e.g., PSESD)
- Independent learning (e.g., online tutorials or books)
- Distance learning courses (e.g., MOOC)
- Interactions and coaching by colleagues
- Interaction and coaching by others (e.g., friends, family)

11 Please indicate the level of technology that is available for you to use with your students in your school/classroom. Check all that apply:

- We have shared digital devices in the classroom (e.g., desktop computers).
- We have one-to-one digital devices in the classroom and students can take devices home.
- We have shared one-to-one access to digital devices in the classroom (e.g., shared carts of laptop computers are available for our classroom).
- We have scheduled one-to-one access in another location (computer lab, media center, etc.).

12 How many technology integration specialists does your school have, if any?

- None of the above
- At least one full-time dedicated tech integration specialist designated to my school.
- At least one part-time tech integration specialist or split between schools.
- At least one teacher on special assignment (TOSA) is dedicated to technology integration at my school.
- My school/district provides no tech specialist for assistance with technology integration.
- Other (please specify)

13 Select the one response that best describes the technology support at your school/district.

<u>7-point Likert-type scale</u>

1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, 7 = strongly agree

- I have adequate access to a technology specialist.
- The technology specialist adequately assists me in solving technical problems with hardware and/or software.
- The technology specialist is committed to helping teachers find solutions.
- The technology specialist responds promptly to my requests for assistance.
- The technology specialist models techniques to integrate technology into my teaching.
- The technology specialist provides professional development.
- The technology specialist adequately assists me in planning and implementing the use of technology in my teaching.

14 To what extent would the following types of technology-related professional development be beneficial to you?

Scale: Not at all, To a small extent, To a moderate extent, To a great extent, Entirely

- Introductory technology skills
- Professional productivity (e.g., grade books, calendar, LMS, collaborative tools)
- Instructional applications (e.g., presentation, digital content creation)

- Training on applications used by students
- Specialized training on the pedagogy of technology integration (e.g., TPACK or SAMR)

15 When it comes to completing professional development through an online system:

7-point Likert-type scale

1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, 7 = strongly agree

- Online learning or e-learning is less constrained by spatial limitations.
- Online learning or e-learning is not constrained by time.
- I can fully control the pace of online learning or elearning.
- I am worried that I do not know how to make the computer finish the things I want to do.
- I feel troubled regarding some work that can only be completed by using a computer.
- When I face error messages on the computer, I do not know what to do.
- I feel scared operating products related to computers and technology.

16 When it comes to the use of technology in the classroom:

7-point Likert-type scale

1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, 7 = strongly agree

- I am worried that I do not know how to make the computer finish the things I want it to do.
- I feel anxious when some tasks can only be completed by using a computer.
- When I face error messages on the computer, I do not know what to do.
- I feel scared operating products related to computers and technology

17 Report on your ability to use the Internet:

<u>7-point Likert-type scale</u>

1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, 7 = strongly agree

- I am sure that I can connect to the web pages I want to browse.
- I am positive that I can use the Internet to download the information I need.
- I am confident that I can use the mouse or tap the screen to click on the web pages I need.
- I believe I can accurately use a search engine to search for information.
- I am confident that I can use internal tools the school/district expects me to use (e.g., email, LMS, grading)

18 What are your thoughts on professional development using online learning or e-learning systems:

<u>7-point Likert-type scale</u>

1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, 7 = strongly agree

- Advancing my studies through online learning or e-learning systems helps my learning be more efficient.
- Advancing my studies through online learning or e-learning systems allows me to acquire the information I want to acquire.
- Advancing my studies through online learning or e-learning systems is helpful to my work or learning.
- Advancing my studies through online learning or e-learning systems improves my learning ability.

19 What are your thoughts on future professional development use via online learning or e-learning systems?

<u>7-point Likert-type scale</u>

1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, 7 = strongly agree

- In the future, I would use or continue to use online learning or e-learning systems to engage in professional development.
- I am willing to use online learning or e-learning systems to replace other methods of professional development.
- In the future, I would prefer online learning or elearning to enable professional development.

Appendix B: Student Questionnaire

Future-Readiness With Online Learning Student Survey

1 Gender

- Female
- Male
- Gender Variant/Nonconforming
- Prefer Not to Answer
- Other (please specify)

2 What grade are you in?

- 6 - 12

3 Ethnicity

- White or Caucasian
- Black or African American
- Hispanic or Latino
- Asian or Asian American
- American Indian or Alaska Native
- Native Hawaiian or other Pacific Islander
- Other (please specify)
- None of the above

4 For the following items, please indicate the level of technology that is available for you to use in school. Check all that apply:

- I use the shared digital devices (e.g., desktops in the classroom).

- I use the one-to-one digital devices provided by the school or district (e.g., laptop or tablet) that I can take home during the school year.
- I have access to shared one-to-one digital devices in the classroom. (e.g., shared carts of laptop computers are available for our classroom).
- I use digital devices in another location (e.g., computer lab, media center, library).
- I have my own digital device from home that I bring to school (e.g., laptop, tablet, smart phone).
- None of the above

5 For the following scenarios, please answer honestly regarding your interactions with your teachers in online and virtual spaces.

<u>7-point Likert-type scale</u>

1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, 7 = strongly agree

- I have frequent positive and constructive interactions with my teacher(s) in online learning environments.
- I have a high level of positive and constructive interactions with my teacher(s) in the online learning environments.
- Positive and constructive interactions between me and my teacher(s) in online learning environments help improve my learning outcomes.

- Positive and constructive interactions between me and my teacher(s) is an important to my learning.

6 For the following items, please share your views on how your teachers demonstrate and communicate different aspects of your course in person and online.

<u>7-point Likert-type scale</u>

1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, 7 = strongly agree

- Overall, my teachers clearly communicate important course outcomes (for example, provided digital and paper documentation of course goals).
- Overall, my teachers clearly communicate important course topics (for example provided clear and accurate course overviews online and in person).
- Overall, my teachers provide clear instructions on how to participate in course learning activities (for example, they provide clear instructions on how to complete course assignments both online and in person successfully).
- Overall, my teachers clearly communicate important due dates and time frames for learning activities that help me keep pace with my courses (for example, providing a clear and accurate course schedule, due dates, and more, both in-person and digitally).
- Overall, my teachers help me take advantage of the online environments (edtech tools) to assist my learning (for example,

provide clear instructions on how to participate in online discussions or post material in your LMS).

- Overall, my teachers help me to understand and practice the kinds of behaviors acceptable in online learning environments (for example, digital citizenship and polite forms of online interaction).

7 Share your thoughts on how you manage your classwork and homework online.

<u>7-point Likert-type scale</u>

1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, 7 = strongly agree

- When it comes to learning and studying online, I am a self-directed person.
- Experience with online learning have increased my study habit skills (e.g., better able to plan ahead and keep track of deadlines and due dates).
- When engaged in online learning I know how to apply feedback and correct my mistakes.
- I feel confident about tackling unfamiliar problems online. I know where to go for help or how to solve the problem myself.

8 In this section, please share your thoughts on how prepared you feel to be effective when presented with digital learning material.

<u>7-point Likert-type scale</u>

1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, 7 = strongly agree

- I am certain that I can navigate the most challenging content presented through digital material (interactive examples, videos, online learning activities, and research).
- I am positive that I can understand the most complex class/course assignments presented in digital materials (videos, online learning activities, research, interactive examples).
- I am confident that I can do an excellent job on any assignment I have to complete and submit online.
- I am positive that I can master the skills being taught in my class/course where digital materials are presented and I must use the internet.
- I am sure that I can do an excellent job on test and exams that include online elements.
- We use this statement to see if you are still participating. So, for this statement, please select "somewhat disagree"

9 In this section, please share your feelings about learning online and virtual materials you've used in your classes.

<u>7-point Likert-type scale</u>

1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, 7 = strongly agree

- I am happy with the way my teachers have integrated online learning in my classes.

- I would recommend the online learning activities I’ve used in my classes to other students.
- I am very satisfied with the online learning opportunities at my school.

10 Please share your thoughts on using technology for your future learning.

<u>7-point Likert-type scale</u>

1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, 7 = strongly agree

- In the future, I intend to use online learning tools to assist in my own knowledge development.
- In the future, I am willing to use online learning to enhance other methods of learning (e.g., online videos, tutorials, study materials).
- In the future, if I need to teach myself something, I would choose online learning (e.g., online videos, tutorials, study materials).

11 Finally, please share your feelings about how prepared you are for the future.

<u>7-point Likert-type scale</u>

1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, 7 = strongly agree

- I feel ready to tackle a variety of challenging tech tools when submitting projects (e.g., videos, podcasting, website creation).
- I feel ready to troubleshoot my own tech issues.
- I feel ready to pick up and use a new piece of hardware (e.g., computer, tablet, or laptop).

- I feel prepared to try new software (e.g., apps, operating systems, LMSs, online tools).
- I feel ready to collaborate with others academically and professionally while learning online.
- I feel ready to explore innovative options for addressing my academic or professional challenges.
- I feel prepared to critically analyze information that is presented to me online.
- I’m certain I will be able to master the skills to use new technology on my own.