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Minecraft in Language Teacher Education: Acceptance and Integration in Practice

By

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
Department of Language, Literacy, Ed.D., Exceptional Education, and Physical Education
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Chapter One: Welcome to Our Virtual World

Introduction

No matter the classroom context, the broader social context of the world changed with the pandemic's influence on humanity and technology. New emerging technologies against the backdrop of a life-or-death health crisis temporarily normalized rapid development and created an unprecedented need for new technology. The purpose of this qualitative inquiry is to better understand the reflections, perceptions, and reasons teachers give for *why* they accept virtual worlds, specifically Minecraft Education Edition, and how they integrate it into their classroom practices and how they do it.

I utilized the multimodal materials generated during a course on technology in Foreign Language Education (FLE), to explore pre-service teachers who chose to accept and integrate virtual worlds into their coursework through a series of academic works. Covid-19 spurred a technological advancement of unprecedented reach and changed how many people think of and interact with technology on a daily basis. Kissling (2014) wrote that "teachers' living experiences shape their teaching experiences" (p. 82) and asserts that teachers need to reflect on and "investigate the relationships between their lives and their work" (p. 90). I concur with Kissling that it is through these reflections, researchers may be able to gain insight to how teachers' perceptions and reasons shape their work as educators, and ultimately, the identities of the communities they build in school spaces.

This dissertation is the culmination of many years of study and many hours of hard work. Over several years, many sources guided and supported my decisions as I grew into the scholar I know I can be as I reach the final stages of my doctoral journey. I chose the scholarly works option, which entails writing a series of articles based around a retrospective document study already approved by USF IRB. In the following chapters, I will present the first three articles I wrote for this inquiry and review a timeline for completion on additional articles. I begin with my personal axiology and positionality, as I am the primary the instrument for analysis, hence transparency and reflection are of the utmost importance.

Researcher Axiology and Positionality

"Researchers have a personal history that situates them as inquirers"

(Creswell, 2013, p. 51).

My positionality in this inquiry is a complicated one. I am the primary researcher for the purposes of this dissertation, but also a guest in this inquiry as I joined in on this pursuit for understanding after being inspired by the research of two accomplished professors. I also needed to keep in mind that I was the Teaching Assistant (TA) for the Technology in Foreign Language Education course where I collected the data and held the role of fostering discussion, sharing multi-media resources (YouTube videos, websites, teacher materials, etc.), and helping to give positive constructive feedback to students as they posted their reflections, assignments, and projects. I am a doctoral student and the students in the class were masters' students and undergraduate students from the same college of education. I had to be very intentional about my interactions and the possible power differentials I could influence.

My positionality and my axiological stance were the foundation for my perspective in this inquiry. As Richards (2021) writes, "qualitative inquiries have minimal value unless researchers address and explain their axiological philosophies and choices that drive all dimensions of their research (Illingsworth, 2006; Baumberger et al., 2016)" (abstract, n.p.).

Throughout the process of this study, reflexivity and mindfulness through the creation of art were a continuous part of my practice as they have been for much of my doctoral experience. I come from an eclectic line of people who chose to live their lives draped in art and travel; singers, dancers, painters, performers, designers, mystics, entertainers- all adventurers from different parts of the world. My upbringing, while unconventional in many ways, exposed me to a vast array of visual expressions, literature, and theater from many various cultures. My culture is a mélange of old-world customs and Postmodernity, of artists and creative expressions, of counter culture and narratives outside the white picket fence of the American Dream.

For as long as I can remember, I drew, painted, and engaged in mixed media art collages. My mother would often have to deal with school administrators and teachers attempts to subdue me from what they referred to as my 'creative indiscretions,' like turning all my number 8s into snowmen during the winter, drawing snakes all over my worksheets, or starting up a small business selling homemade bath salts to the other school kids in pretty decorated jars I fished out of the recycling bin and dried rose petals I collected off the ground in the church cemetery… I am still remembered in my hometown as an "odd one." During my undergraduate years, I developed a serious obsession with Salvador Dalí and wrote my undergraduate thesis on the infamous eyeball-slicing scene in *Un Chien Andalou*, a surrealist film by Luis Buñuel, Dalí's close friend and

frequent collaborator. After college I spent years traveling, making art, teaching English, and advancing my teaching craft. As I look back on my life, I concur with Rohleder and Lyons (2015) that qualitative researchers "assumptions, values, [methodologies], and methods are inextricably intertwined" (p. 9). Long before graduate school, I knew the Jean Francois Leotard (1979) definition for Postmodernism; 'incredulity towards metanarratives.' While my education as a language teacher was Structuralist and Constructivist in nature, my personal culture and upbringing fostered Postmodern tendencies.

During my second year as a doctoral student, I had the opportunity to explore and write about my axiological stance with Dr. Janet C. Richards in her chapter on incorporating the arts to evoke qualitative students' axiological values. That exploration illuminated an axiological journey I engaged in for two years already. While writing the piece, I realized it began when I enrolled in a class on interview theory and how to become a reflexive researcher. Part of the course requirement was keeping a dialogic researcher journal where I reflected my thoughts on different types of interviews and on the interview process in general. The professor suggested to the class that if we desired to incorporate art into our journals, to follow our thoughts and see where it took us. I discovered that in the process creating art, I was freed to exist in a way where I was no longer is constrained by my personal and professional identities; a space where the parts of myself innately came together in liberated collaboration.

I would come to know this process as transmediation, the process of transferring a text in one sign system into another sign system. This could be from written word into visual art, lyrics and music, a letter to someone, poetry, dance, theater, or other semiotic system. For me, transmediation was

not only transforming concepts, but shining a light on my own axiological positionality. My enthusiasm for all things Qualitative Research led me to take classes in Poststructuralism and Arts-Based Research where a breakthrough occurred, and I began embracing my artistic past alongside of my academic present through transmediation on regular basis for an array of different purposes. It was not until I constructed a bridge between my personal and professional identities that I could understand how my axiological roots influenced my values, assumptions, conceptions of what phenomena are vital to explore, data collection and analysis methods, and the conclusions I drew from my findings.

I cannot deny my past, who I am personally, or that I am a Postmodern artist *and* a social Constructivist educator, so I did not try to in this inquiry. I engaged in this research as a reflexive researcher who uses all the tools at their disposal, including art, to be the instrument through which rigorous qualitative research can occur. During this process, I created in a series of films containing digital art that helped me create that space of axiological transparency that unites all parts of me in reflexive practice. The creation of visual expressions offered a continuous mirror for me to reflect on how I viewed and valued the data, myself, and the inquiry. I believe it was through my continuous artistic and reflective practice that I was able to make the human connections that led to the committee of people that supported me in this endeavor and the creation of the a priori questions that drove this study. In the following section, I will begin to share the background on virtual worlds needed to appreciate this inquiry.

Virtual Worlds: Background to Foreground

Since its emergence in the 1960s, computer technology's inclusion in education increased with time (Gaukrodger & Atkins, 2013). It made notable and invaluable contributions to foreign and

second language teaching and learning in the past two decades as the internet has permeated educational contexts. Videogaming, is now a worldwide phenomenon that enthrals millions around the globe and shines a spotlight on gamification and its potential in all sectors of life (Curry, 2022).

Educational videogames range from simplistic, like *Kahoot!*, to more advanced, such as the virtual worlds (VWs), online multiplayer video games, and augmented reality activities. Online games, and VWs, took the advancements in gaming technology to a new level allowing for situated learner interactions and computer-mediated communication (CMC) through voice and chat amongst learners in customized environments designed to support the learning objectives. Researchers observed that games not designed for educational purposes are even utilized (Connolly et al., 2012; Ritzhaupt et al., 2010). Many scholars use commercial off-the-shelf (COTS) games in educational research, such as *Civilization* (Squire, 2004; Squire et al., 2008; Lee & Probert, 2010) and *Making History* (Watson et al., 2011). Massively Multiplayer Online-Role-Playing Games such as *World of Warcraft* or *EVE Online* (Clark et al., 2009; Rausch et al., 2012; Reeves et al., 2008, Margitay-Brecht, 2016; Snelson et al., 2017), simulation-based video games like *SimCity 2000* (Tanes & Cemalcilar, 2010; Arnold et al., 2019), and narrative-focused adventures like *The Walking Dead* (Staaby, 2014, Toh & Kirschner, 2020) also found their way into the hands of educators and researchers. Thus, research supports the statement that educational videogames are not limited to games designed with the intention of education, rather they can be ones initially designed for entertainment.

One of the videogames initially meant for entertainment that made the cross over into education is *Minecraft*. From its inception, *Minecraft* had a significant impact on the videogame industry,

education, and research. To date, it sold over 600 million copies, has over a 130 million monthly players and the Chinese edition, which is free, and seen downloads skyrocket over 400 million (Curry, 2022). *Minecraft* received worldwide attention when its developer, *Mojang*, became a part of *Microsoft* in a $2.5 billion take-over in 2014 (Owen, 2014) and then again in 2016 with the release of *Minecraft Education Edition*, an educational version of the now popular game. But what is *Minecraft*?

The Story of Minecraft

The story of *Minecraft* begins in 2009 with Zachary Barth, an independent developer. Barth created *Infiniminer* as a personal side project. The artistic representation of the game was a unique but simple environment made up of block-like entities within a procedurally generated world. Players engaged in the mining and placing of blocks to build structures and create their imagination's designs. It was this simplistic world building method that inspired Markus "Notch" Persson to develop his own Java-based game that would go on to become *Minecraft*. *Minecraft* is a multiplayer sandbox building game (Ekaputra et al., 2013). With its unusual success story of a small indie game going viral (Persson, 2011), *Minecraft* has earned its creators international accolades, such as the Independent Game Festival's *Seumas McNally Grand Prize* award in 2011, along with millions of dollars in revenue (Lynley, 2011). With each release significant changes made to the game quite different, yet it would appear to have longevity as it continues to strike a chord for millions of players with each new version (Curry, 2022).

Minecraft, first developed in Java, is compatible with both Mac and Windows systems, and is available for Android and iOS devices. Multiple unique versions are now available, many with

several play dynamics, such as one-player mode and multi-player mode or creation mode and survival mode, that allow for more choice and customizability for the context of use.

For a one-player or multi-player game to begin, the player(s) must first create a world where they can exist. This is the procedurally generated three-dimensional world that the *Minecraft* game creates before the players engage in gameplay for the first time. Once generated, the player enters into the game space at a spawn point. With the addition of *Minecraft Education Edition*, the teacher can adjust the spawn point and decide where in the biomes of the *Minecraft* world they want students to emerge, hence they able to begin the lesson in a specific location.

In the classic version, the world of *Minecraft* is, as previously mentioned, block-like and crude. Players spawn amongst trees and hills made of blocks, rivers and clouds made of blocks, even pigs and farm crops made of blocks. This digital world presents them with an open environment of virtual blocks and virtually zero instructions on what to do next. There are several classic gaming interface elements at the bottom of the gameplay screen. These include hearts, symbolizing health in most first-person and third-person shooter games, and a row of empty boxes. These boxes or slots are staples in the gaming world and indicate a location where one would pick and choose between various tools, weapons, or possessions their avatar can utilize. As one looks out into the *Minecraft* world, only their block-like right arm is visible and shows the implement their avatar is currently wielding.

Once a player spawns in a *Minecraft* world, the possibilities are extensive and driven by their own imagination and creativity. The game's uniformity of meter-square elements in a visual allusion

to LEGOS recreates the scenario of an individual at play with the classic blocks. However, this play leaves the physical world and presents itself in a virtual world where the player is not limited by the provided toy blocks. *Minecraft* allows the player to choose any element from the ground they stand on to the water in the ocean to be broken apart and reformed into whatever they please. Players can use text and verbal communication to chat, collaborate, and engage in the game together, as well as use codes, easily found online through Minecraft's website or the extensive YouTube collection of tutorials, to teleport around, find points of interest, and complete task-based adventures. By smashing trees and hills for stockpiles of basic components like lumber, stone and coal, then hunting and gathering materials from different biomes, players have the ability to recombine basic elements into a *Minecraft* workbench using the game's crafting interface. This allows the player an even larger crafting interface to fashion more complex items out of basic components.

Minecraft in Education

Minecraft Education Edition, the "educational version" of the popular game, caters to the world of education and includes settings that streamline the creation process for teachers to allow them to easily create lessons and experiences within the game. *Mojang* and *Microsoft* are not the first ones to take videogame development into the educational sector. It is of note though because *Minecraft's* enormous success fueled it to become an educational tool for various subjects around the globe (Short, 2012). In only the last ten years, educators and researchers used *Minecraft* to teach spatial geometry (Förster, 2012), sustainable planning (West & Bleiberg, 2013), language and literacy (Bebbington, 2014; Garcia Martinez, 2014; Hanghøj et al., 2014), digital storytelling (Garcia Martinez, 2014), social skills (Petrov, 2014), informatics (Wagner, 2014), computer art application (Garcia Martinez, 2014), project management (Saito et al., 2014), and chemistry

(Hancl, 2013). Scholars also identified the potential for future research in the areas of ecology, geology (Ekaputra et al., 2013), biology, physics, geography (Short, 2012), the arts, history, and media (Brand & Kinash, 2013). *Mojang* came together with Finnish developer *TeacherGaming LLC* to upgrade *Minecraft* to include easier, more efficient, creation tools for virtual assessment, more user-friendly server management, and tools for teacher-player management (e.g., muting players, teleporting players, disabling inputs etc.) making *Minecraft Education Edition* the next step in Game-Based Learning (GBL) (Nebel et al., 2016).

Acknowledging teachers' lived experiences, reflections, and perceptions is vital to understanding how teachers adopt new technology and why they decide to incorporate it into their coursework. Kissling (2014) wrote that "teachers' living experiences shape their teaching experiences" (p. 82) and asserts that teachers need to reflect on and "investigate the relationships between their lives and their work" (p. 90). Through these reflections, researchers may be able to gain perspective on how teachers' personal and professional experiences contribute to their perceptions and shape their work as educators, and ultimately, the identities of the communities they build in school spaces.

Statement of the Problem

Over the past two decades, the widespread increase in access to advanced technology, like virtual worlds, creates the need for immediate research. Cope and Kalantzis (2013) envisioned the future of today's virtual worlds when they called for a "transformation of the teaching profession" where teachers are "designers of learning environments for engaged students" (p. 11).

The interactions possible in virtual worlds can be interpreted as expressions of the concept of students as designers, active agents in learning, citizens building digital diplomacy, innovators co-

constructing new conceptions, and learners acquiring new ways of thinking- all enabled by technology. Virtual worlds are opportunities for teachers to employ pedagogy in a technology-forward way that meets the needs of diverse students in the 21st century by redefining the context for learning, community, and the implementation of literacy and language practices. However, this can only be achieved if research provides increased insight into the practices and beliefs of teachers today.

Filseck and Bundgens-Kosten's 2012 sentiment is quoted again in 2019 by deHann; "what [instruction] should look like… is still unclear and will require a great deal more research and practice" (p. 64). The teacher's role in teaching language has for many, Constructivists included, been student-centered, and future research could benefit from exploration into the teacher's role in game-based educational contexts (Molin, 2017). Also, few studies that explore pedagogy or virtual worlds take into account teachers' *lifeworlds* (NLG, 1996; Kalantzis & Cope, 2012), or *funds of knowledge* (Moll, Amanti, Neff, & Gonzalez, 1992). These aspects compose an individual's personal and community knowledge, lived experiences, expertise, and education, which all shape their axiology and outlook on literacy, language, and technology. Research that considers these aspects when working investigating teachers' reasons for technology acceptance and use could bring insight into teachers' agency in implementing pedagogy and new emerging technologies in the classroom, as well as bring insight into how teachers perceive their role in VWs. As the existence of Covid-19 persists and many students around the world continue to opt for online learning models, there is a lack of research as to why some teachers accept and integrate new emerging technologies like virtual worlds. Case studies that share teachers' journeys, voice

their perceptions and intentions, and illuminate the factors that impact their acceptance and use of technology are crucial.

Significance of the Articles

Virtual worlds are now included in the spaces where millions of people interact for an array of purposes and to engage in activities that are not possible in the real world, from looking inside volcanos to co-constructing situated language learning with a group trip to the bottom of the ocean. Face-to-face education will resume as options for in-person learning become increasingly safe, however, the technology that emerged during the pandemic is not going to disappear. Taking a sociocultural approach to viewing virtual worlds reveals that these these emerging technologies are already shaping humanity as they permeate the lives of millions of people by creating environments in which they have social interactions with other individuals.

A review of the literature on language teachers and virtual worlds, exploration into teachers' perceptions of why they accept and integrate *Minecraft* in their practice, and analysis of the artifacts they produce are not only significant, but essential to answer the pedagogical imperative set into motion by the acceleration of technology by the emergence of the Covid-19 pandemic. Even pre-pandemic, multiple scholars noted (Squire, 2006) that many young people today spend more time engaging in digital world activities than in printed texts, TV, or films. Since 2009, Linden Lab's VP of technology development, Joe Miller, has argued that language learning is the most common educational activity in the virtual world of *Second Life* (Lorenzo et al., 2013; Borona et al., 2018). However, utilizing virtual worlds for education or to conduct research were, until recently, costly (Sadler and Dooly 2013). Although, with the recent release of *Minecraft Education Edition* and the world's current demand for digital options during and post pandemic, it is now

possible to effectively employ *Minecraft* in many educational settings, which opens up new possibilities for virtual world technology.

Kucer (2014) built upon the work of the New London Group (1996) (also known as the NGL) to argue that literacy requires learning in linguistic, cognitive, sociocultural, and developmental dimensions and at its core is the cognitive dimension, positioning the individual as a meaning maker. This puts the focus not on one specific system but on multiple sign systems through which meanings are conveyed. It also extends literacy to involve communities beyond the individual, the social identities, and how different people and cultures utilize literacy to interact and communicate among each other and with the world (Kucer, 2014). Literacy is an important part of language learning and findings from research on teachers' acceptance and use of virtual worlds in language learning contexts could help illustrate how teachers' experiences contribute to their choices in literacy practices, how they create communities, engage in various pedagogies, and integrate new emerging technologies into their teaching practices, which could lead to improvements in digital teaching practices and teacher education methods.

There is also significant body of evidence to support that teacher beliefs are a critical factor in understanding teacher behavior (refer to Calderhead, 1996; Clark & Peterson, 1986; Kane, Sandretto, & Heath, 2002; Pajares, 1992). Researchers, like Kagan (1992), cited significant evidence supporting the relationship between teachers' beliefs and their classroom practices. However, some researchers are less convinced and describe inconsistencies between teachers' beliefs and practices (Calderhead, 1996; Ertmer, Gopalakrishnan, & Ross, 2011; Fang, 1996; Kane et al., 2002). Fang (1996) and Ertmer et al. (2001) argue contextual factors interfere with teachers'

ability to consistently align their practice with their own beliefs citing factors like curricular requirements and social pressures from parents, peers, and administrators. This underscores the need for new research of varying methodologies to illuminate teachers within virtual world research.

Chapter Abstracts

Article 1 Abstract - Systematic Literature Review

Due to rapid technological advancement and widespread implementation over the past decade, there is now a gap in the literature regarding new emerging technologies like virtual worlds. This inquiry uses a systematic approach to review virtual world research and present trends in language instruction pedagogy, the role of language teachers, and the hurdles that exist for teachers and researchers when looking towards the literature. Discoveries include trends of progressive and multi-approach pedagogy, undefined teacher roles/identities, and the characterization of teachers as innovators.

Keywords: Virtual Worlds, Digital Games, Pedagogy, Teacher Roles, Language Teachers, Systematic Review

Article 1 - *A Priori* Questions

This systematic literature review aims to answer three critical questions that seek to identify trends in the associated pedagogies, the characterizations of language teachers' roles in relation to Virtual World (VW) language teaching and learning, and the barriers that exist to conducting a literature review in this area of research. This inquiry is structured around the guiding questions:

1. What hurdles exist to exploring language teachers' roles, and the use of pedagogy related to virtual worlds through a literature review?

2. How are the roles of the teacher characterized in virtual world language teaching and learning research?

3. What pedagogical models are associated with virtual world language teaching and learning?

Article 1 - Current Status

I submitted this piece to *The Journal of Educational Technology and Society* where it is currently under review.

Article 2 Abstract - Thematic Literature Analysis

Due to the rapid technological needs faced during Covid-19, the world experienced rapid technological advancement and widespread implementation over the past few years, widening the already existing gap in the literature base regarding the current perspectives of teachers towards new emerging technologies like virtual worlds. By analyzing the literature of the past decade through thematic analysis, we can begin to inform and direct recovery and rebuilding. This inquiry uses Reflexive Thematic Analysis of virtual world research to generate trends in teachers' perspectives and begin to understand how they view their roles in virtual world instruction. Discoveries include trends showing access is a priority, emotional undercurrents in teachers' perspectives, an emerging rift between how teachers view themselves and how they are characterized in the literature, and a two-sided effect of experience.

Keywords: Virtual Worlds, Digital Games, Teacher Perceptions, Language Teachers

Article 2 - *A Priori* Questions

This thematic literature analysis aims to answer a critical question that seeks to identify trends in the perceptions of language teachers in relation to Virtual World (VW) language teaching and learning. It is focuses on the guiding question:

1. What themes exist in teachers' perceptions of virtual world language teaching and learning?

Article 2 - Current Status

I submitted this piece to *The Qualitative Report* where it is currently under review.

Article 3 Abstract- Artifact Analysis

Over the past decade new emerging technologies evolved as they were adapted, adopted, and appropriated to meet the demands of a technologically advancing world. The development of *Minecraft Education Edition* questions the social arrangements of the education setting and begs for research into the acceptance and usage of new Virtual Worlds as it creates a platform with resources that take an already popular mode of social entertainment and make it conducive to Social-Constructivism theory. The purpose of this study is to explore how language teachers who choose to incorporate *Minecraft Education Edition* integrate it into foreign language teaching and learning designs.

We explored two pre-service teachers' lesson plans and customized *Minecraft* worlds, which they submitted to a course on technology in foreign language education. These two teachers extended the role of the teacher to that of designer and made *Minecraft Education Edition* their tool. This

allowed us to qualitatively analyze the artifacts they created to identify how they integrated the digital game into their language teaching and learning practice.

We discovered pre-service teachers even in a supportive higher ed environment do not integrate technology to a degree past basic adoption and maintain consistent levels of entry level usage with virtual worlds. Reflexive Thematic Analysis and the Technology Integration Matrix (TIM), which functioned as a theoretical framework for this study, revealed three distinct trends including 1) The Missing Role of Teacher, 2) A Journey of Growth and Development, and 3) Minecraft Attempts Innovation (Even if Teachers Do Not).

Keywords: Virtual Worlds, Technology Acceptance, Technology Integration, Language Teachers, Digital Artifacts

Article 3 - *A Priori* Questions

Two *a priori* questions drove this inquiry:

1. In what ways do two pre-service teachers engaged in a technology in foreign language education course integrate *Minecraft Education Edition* in foreign language learning lessons?

2. What trends are evident in the *Minecraft Education Edition* artifacts of two pre-service teachers engaged in a technology in foreign language education course?

Article 3 - Current Status

I submitted this piece to CALICO where it is currently under review.

Article 4 Abstract – Reasons for Technology Acceptance

In this paper, I explored the reasons three pre-service teachers gave for why they accept and integrate *Minecraft Education Edition* into their growing practice. During a six-week online university course on technology in foreign language education, a group of twenty-one pre-service and in-service teachers created weekly Reflexive Digital Story (RDS) Journals to document their technology exploration along with lesson plans and projects that incorporated innovative technologies they wanted to integrate into their practice. Three of the pre-service teachers enrolled in this course became innovators and early adopters in comparison to their peers as they voluntarily integrated *Minecraft Education Edition* into their coursework. This allowed me to qualitatively analyze their coursework to identify the reasons they integrated the digital game into their developing practice. This work contributes to the field of digital game-based learning, technology acceptance and integration, and the study of teacher education by illuminating the factors that contribute to why pre-service teachers accept and use Virtual Worlds (VWs). I discovered the reasons these pre-service teachers gave for acceptance and use of VW technology embodied the recognition of a need for motivation and engagement in the classroom, beliefs about the social nature of culture and language, and perceptions of VWs as an opportunity to make the impossible possible.

Keywords: Virtual Worlds, Technology Acceptance, Language Teachers, Minecraft

Article 4 - *A Priori* Questions

Two *a priori* questions informed this inquiry:

1. In what ways do 3 pre-service teachers actively engaged with *Minecraft Education Edition* in a technology in foreign language education course perceive foreign language learning through virtual worlds?

Article 4 - Current Status

Submitted to the journal of *Teachers and Teaching* where it is currently under review.

Article 5 Abstract – Pre-Service Teachers' Perceptions of VWs

In today's technological era, understanding if and how teachers' acceptance and integration of technology evolves is critical to understanding their needs. Technology creates complicated demands on educators and there is ample research on the factors that may contribute to their limited success at integrating it (Bustos & Nussbaum, 2009). In this paper, I explored the perceptions three pre-service teachers had of language learning in Virtual Worlds (VWs). During a six-week online university course on technology in foreign language education, three pre-service teachers voluntarily integrated *Minecraft Education Edition* into their coursework. The format of the course allowed me to qualitatively analyze their reflections, lesson plans, projects, and other coursework to reveal their perceptions of language learning in VW contexts and contribute to the literature on pre-service teachers' acceptance and integration of new emerging technologies. This inquiry revealed how the unique journeys of the participants meant unique perceptions and how Covid-19 was a social influence for them. It also illuminated the need for additional research to better understand the different stages on the spectrum of development pre-service teachers experience, how their perceptions of technology are formed, influenced, and what type of education is necessary to support individuals on their journeys towards becoming in-service teachers who can utilize new emerging technology tools to teach 21st century skills, foreign languages, and more.

Keywords: Virtual Worlds, Technology Acceptance, Language Teachers, Teacher Perceptions, Minecraft

Article 5 - *A Priori* Question

Two *a priori* questions informed this inquiry:

1. What reasons do 3 pre-service teachers actively engaged with *Minecraft Education Edition* in a technology in foreign language education course give for their acceptance and usage of virtual world technology?

Article 5 - Current Status

Accepted and published by the *Journal of Language Teaching* (JLT).

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Chapter Two: Language Teachers and Virtual World Research:

A Systematic Literature Review

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Introduction

Virtual Worlds (VWs) and language learning are receiving heightened attention given their ability to connect students and teachers from around the globe in an immersive environment designed for interactive learning experiences. Yet, most of this attention is on the students' or users' experiences versus teachers' perceptions. VWs are an opportunity to bridge the gap between learners and teachers through customizable digital environments designed to support learning objectives, but not unless teachers are ready and willing to implement them. The rationale for this review is to shine a light on the gaps in the current literature base and begin the search to reveal elements that might impact language teachers' acceptance and usage of VW technology, specifically teachers' perceptions, roles, and the pedagogy used with VW teaching and learning.

Background

Educational video games range from simplistic, like *Kahoot!,* to more advanced, such as Virtual Worlds (VWs) and online multiplayer games, which take the advancements in gaming technology to a new level. They enable situated learning interactions and computer-mediated communication (CMC) through voice and chat between learners in customized environments designed to support learning objectives. Many scholars use commercial off-the-shelf (COTS) games in educational

research, such as *Civilization* (Squire, 2004; Squire et al., 2008; Lee & Probert, 2010) and *Making History* (Watson et al., 2011). Massively Multiplayer Online-Role-Playing Games such as *World of Warcraft* or *EVE Online* (Clark et al., 2009; Rausch et al., 2012; Reeves et al., 2008, Margitay-Brecht, 2016; Snelson et al., 2017), simulation-based video games like SimCity 2000 (Tanes & Cemalcilar, 2010; Arnold et al., 2019), and narrative-focused adventures like The Walking Dead (Staaby, 2014, Toh & Kirschner, 2020) also find their way into the educational market.

The popularity of video games for pleasure applied in educational contexts leads to many scholars' interest in their application to Computer-Assisted Language Learning (CALL) (Hubbard, 2009). Researchers apply video games using theoretical frameworks such as the Interaction Hypothesis (Smith, 2003; Chapelle, 2005), Activity Theory (Blin, 2004), and Sociocultural Theory (Thorne, 2008). Digital Game-Based Language Learning (DGBLL), a vein developed from Digital Game-Based Learning (DGBL), is the newest development in CALL. Past research on DGBLL focused mainly on the characteristics and qualities of games most relevant to language learning (Gee, 2008; Sykes & Reinhardt, 2012) or the self-reported perceptions of language learners regarding the efficacy of gameplay for language learning (Peterson, 2012; Allen et al., 2014). DGBLL is a new field compared to others, with some of the earliest research conducted in the mid-1980s (refer to Morrison, 1984; Culley et al., 1986; and Jones, 1986). Since then, CALL experienced a significant diffusion effect (Levy, 1997; Reinders, 2012; Cornillie et al., 2012; Sykes & Reinhardt, 2013; Peterson, 2013). The 2000s fuelled this diffusion with the advent and large-scale accessibility of mobile technology and social networking (Scholz, 2016), which directly impacted digital game creation and accessibility (Sykes, Ozkoz, & Thorne, 2008).

The amount of terminology and acronyms found in the discussion of DGBLL is extensive and by no means rigid in definitions or categorizations. Many forms of VWs can be categorized under the broad technical term Multi-User Virtual Environments (MUVEs) (Sykes, 2011) and then into three general categories, Social Virtualities, Massively Multiplayer Online Games (MMOGs), or Synthetic Immersive Environments (SIEs). However, the terminology in this area of study is often interchangeable or outdated due to the swift evolution of technology. Since there is a little consensus on terminology among scholars and educators, we use Heim's (1998) definition, as it demonstrates a broad construct that is all-encompassing of emerging forms:

"A technology that convinces the participant that he or she is actually in another place by substituting the primary sensory input with data received and produced by a computer […]. The 'as-if' quality of virtuality becomes a pragmatic reality when the virtual world becomes a workspace, and the user identifies with the virtual body and feels a sense of belonging to a virtual community" (Heim, 1998, pp. 220-221).

Technologies that convince the participant that he or she is in another place require that the user assume an avatar to represent themself and act on or within the world for the purpose of work, play, or connection. While a *video game* limits the user to the objectives of gameplay, a *Virtual World* (VW) is open to the potential to support learning and language objectives. Within VWs, users are not just reading text, engaged in 3D graphics, or following a game plan but have the ability to interact with others, use the space to act upon an array of objectives, and can experience authentic scenarios in a pragmatic way.

Other Reviews

While there is growing interest in DGBLL, the past decade produced few literature reviews on digital games in language learning contexts. As shown in Table 2.1, there is one general literature review (Peterson, 2016), two meta-analyses (Chiu et al., 2012; Tsai & Tsai, 2018), three scoping reviews (Hung et al., 2018; Jabbari & Eslami, 2018, Xu et al., 2019) and five systematic reviews (Borona et al., 2018; Hung et al., 2016; Hwang & Wu, 2012; Klimova & Kacet, 2017; Poole & Clarke-Midura, 2020). After an analysis of these reviews, many questions remain, especially regarding the subset of Virtual Worlds (VWs).

Scope of This Review

This review has two important purposes. First, it aims to synthesize how the research surrounding VWs characterizes the roles assumed by the teacher and identify the pedagogy used within this literature. Second, it strives to illuminate the hurdles we encountered when exploring teacher-focused research related to VW language teaching and learning. This review will be different from previous reviews as it will focus specifically VW research that uses language teachers and adds to the literature with an analysis of the roles research characterizes them as taking on in VWs. While some may argue a review should cover at least twenty years, new emerging technologies are changing life every day as they redefine the limits of humanity's potential. Waiting twenty years is not appropriate in this situation. VWs are one of the newest digital advancements where the most relevant literature is recent and constantly developing as the popularity of different technologies changes.

Table 2.1

Past Reviews on Digital Game-Based Language Learning Related Research (Fung & Abuemira, pending)

Previous Review (Year)	Field of Study	Approach Type	Time Period	Review Focus	# of Studies	Results
Poole & Clarke-Midura (2020)	DGBLL	Systematic Review	2012-2017	To identify games used in Second/Foreign Language research	49	Found vocabulary gains, value realizing through verbal and physical communication, safe environments for communication, and opportunities to use L2 in diverse communicative and collaborative activities.
Xu et al. (2019)	DGBLL	Scoping Review	2000-2018	Trends in DGBLL features, methods, targeted skills, impactful elements, & pedagogical role		Found majority of game usage sought to enhance ELLs cognitive development in English.
Hung et al. (2018)	DGBLL	Scoping Review	2007-2016	Empirical evidence & Impacts of DGBLL	50	Found positive outcomes in students' learning, psychological states, and language acquisition; MMORPGs are the most common genre to enhance ELL; computers are the most common platforms.
Jabbari & Eslami (2018)	MMORPGs	Scoping Review	2006-2015	Effectiveness- second language learning context	31	Found most studies employ qualitative methods with MMORPGs; use interviews, observations, chat logs, and questionnaires for data collection; commercial games outperform free or researcher-designed games.
Tsai & Tsai (2018)	DGBLL	Meta-Analysis	2001-2017	Effectiveness- digital games for L2 vocabulary	26	Found digital games can motivate and enhance students' L2 vocabulary; best effect of L2 vocabulary game-based learning takes place when students with prior L2 learning experiences play task-based games; games with added features accelerate students' productive vocabulary.

Table 2.1 (Continued)

Klimova & Kacet (2017)	DGBLL	Systematic Literature Review	2010-2016	Efficacy of DGBLL	6	Found educational computer games are effective in vocabulary acquisition, exposure to target language, and engagement; high interactivity may hinder vocabulary acquisition; teachers' lack of knowledge about computer games hinders proper usage.
Hung et al. (2016)	DGBLL	Systematic Literature Review	2010-2014	Research Trends in DGBLL	589	Found DGBLL composes small number of studies; majority were MMORPGs used with higher ed students in English.
Peterson (2016)	MMORPGs	Literature Review	2006-2014	Cognitive and Sociocultural theories		Found MMORPGs facilitate growth in the Zone of Proximal Development and provide opportunities for target language interaction.
Hwang & Wu (2012)	DGBLL	Systematic Literature Review	2001-2010	Trends in game-based learning	59	Found vocabulary is the most practiced language skill; commercial games contain the most elements of a good game; use of good gaming elements are inconsistent among digital games.
Chiu et al. (2012)	DGBLL	Meta-analysis	2005-2010	Effectiveness- DGBLL & EFL Outcomes	14	Found published studies have large effect sizes vs. unpublished studies have small effect sizes; concluded medium effect size for use of DGBLL in EFL contexts and effect size is larger for engaging meaningful play versus drilling or practice.
Borona et al. (2018)	DGBLL	Systematic Literature Review	2005-2017	Benefits/challenges of language learning practices in VWs	32	Found progress in learning outcomes, communication skills, and motivation.

Research Questions

This inquiry employs three research questions:

(1) What hurdles exist to exploring language teachers' perceptions, roles, and the use of pedagogy related to virtual worlds through a literature review?

(2) How are the roles of the teacher characterized in virtual world language teaching and learning research?

(3) What pedagogical models are associated with virtual world language teaching and learning?

Study Search

The study search consisted of five databases with articles relevant to education, language, and technology. These databases were Education Resources Information Center (ERIC), Education Source (EBSCO), Scopus, JSTOR, and Google Scholar, Scopus, and Google Scholar provided more results EBSCO and JSTOR.

The first search was in Scopus and used the term "virtual worlds." It rendered minimal results relevant to our inquiry. A review of each abstract eliminated those that did not meet the eligibility criteria. Next, a list of keywords extracted from previous literature reviews combined into search strings expanded the search as we proceeded through all the databases. These terms included game, gamification, gamify, digital, online, virtual, language teachers, foreign language, second language, and L2. The Boolean operator OR expanded the search when used between variations in terminology. The Boolean operator AND combined terms and narrowed the search to studies that met the eligibility criteria. The search period was the last eleven years and rendered a total of

forty-two articles to be considered for acceptance. Thirty-two of them did not fully comply with the inclusion criteria leaving a total of ten articles to compose this corpus.

Eligibility Criteria

    Inclusion Criteria:

- Empirical Research on Virtual World language learning.

- Reports of pilot programs and prototype studies.

- Published between January 2010 and December 2021.

- Articles published in Peer-reviewed journals only.

- Studied virtual worlds, MUVES, or immersive digital environments such as Minecraft, Second Life, Metaverse, and other commercial and prototype models in the language learning context (Foreign Language, Second Language, English Language Education, Literacy Education contexts included).

- Included the perceptions of 'language teachers' in relation to virtual world language teaching. 'Language teachers' encompasses all teachers who teach language and/or literacy skills. This includes second and foreign language teachers, English Language Arts teachers, Literacy teachers, and Special Education teachers who teach language learners.

- Full text available in English.

Exclusion Criteria:

- Studies that used the term 'Virtual Worlds' but exclusively focused on Virtual Reality (VR) accessory technology, such as headsets and gloves for VR gameplay.

- Studies on Virtual Worlds from subject areas other than Language or Literacy Education.

- Theoretical papers and Conference Proceedings

- Did not report on the perspectives of teachers of language learners.

- Studies using samples that include language teachers mixed with teachers from other subject fields like science, math, and social studies.

Coding and Analysis

We employed Atlas.ti 22 for the coding and analysis phase. To develop the codebook, we used Atlas.ti 22 to code several sample articles, updating the codebook with each iteration. Coding began with two main preliminary codes focused on the two main guiding questions: 'Role of the Teacher' and 'Pedagogy.' The codes of 'Role of the Teacher' and 'Pedagogies' became code groups, each containing specific codes. The group "Teacher Roles" evolved to include the specific roles teachers the literature characterized teachers as assuming: *Censor*, *Collaborator*, *Designer*, *Evaluator*, *Facilitator*, *Innovator*, *Mentor*, *Tech Support*, *Qualified Teacher,* and an *Undefined Role*. These codes helped build a detailed picture of various role characterizations related to VWs. The code 'Pedagogy' became a group composed of eight different types of pedagogies, learning approaches, and educational theories including: *Collaborative, Communicative, Game-Based Learning, Multiliteracies, Progressive, Reflective Practice, Student-Cantered, Traditional Pedagogy, and Constructivism*. The code *Undefined Pedagogy* covered instances without specified pedagogy.

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Typically, researchers using Atlas.ti 22 would code on their own and then run the Inter-Coder Agreement (ICA) process. During this inquiry, we simultaneously engaged in the coding process, which allowed us to maintain 100% coder agreement. The memo option within Atlas.ti 22 provided an easy-to-access space to log observations, notes on codes, connections, or emerging trends. The software also enabled the creation of visualizations of the data, which combined with the customized spreadsheets Atlas.ti 22 generates fuelled a thorough analysis through the lens of the research questions. These strategies supported the observations of unique attributes and the synthesis of evidence across diverse studies.

Results

The first key features recorded were APA citation, country of origin, methodology, data sources, and teacher status. Noting these elements showed which journals contributed to the field of research on language teachers' perspectives related to Virtual Worlds (VWs) and how recently they published those works. This revealed two studies from 2010, one from 2011, three from 2013, three from 2014, one from 2015, and one from 2018. The inquiries came from ten different journals with researchers or participants representing seven different countries. All but one article (Oh & Nussli, 2014) was from a journal specifically related to technology in education. The United States made the largest contribution by taking part in six inquiries. The next largest contributions came from Taiwan with three inquiries and Turkey with two. China, Australia, Spain, and Japan participated in one study, respectively. Five out of ten studies involved participants, instructors, and/or researchers from two different countries. Six articles used in-service teachers, and four used pre-service teachers. All but two (eight) of the studies employed a qualitative research design, yet

only half of those specified a specific qualitative methodology. The other two studies employed mixed methods. The most common data sources were surveys and interviews, but journals, teacher reflection materials, and artifacts were also common (see Table 2.2).

What hurdles exist to exploring language teachers' perceptions, roles, and the use of pedagogy related to virtual worlds through a literature review?

Several hurdles exist when exploring Virtual World (VW) teaching and learning. The first is the search for articles. This is due to the large amount of terminology used with VW research. Terms are interchanged, some technology fits under multiple terms in multiple categories, and researchers, teachers, and the gaming industry do not always agree on definitions and categorizations. The rapid evolution of VW technology and researchers' and teachers' penchant for unconventional use of VWs caused any rigidity applied to search terms to be counterproductive.

This inquiry exposed the issue that Virtual World (VW) research does not have any standardization of terms. If a researcher wants to dive into VW teaching and learning, the search for appropriate articles is not easy or quick. This has major implications for researchers and teachers who want to explore VWs, as many do not have weeks to hunt for research relevant to their work. If this area of research is to match the pace of VW technology evolution, an organized resource hub for VW research will need to be created to give teachers and researchers a place to locate peer-reviewed, published research without the significant time investment.

Table 2.2

Accepted Articles with Key Features (Fung & Abuemira, pending)

Title (Year) Journal	Country	Methodology	Data Sources	Teacher Status
Silva et al. (2010) Journal of Computing in Teacher Education	United States	Qualitative Case Study	Mentor blogs, observation notes, chat logs, interviews	In-Service
Cheng et al. (2010) Journal of Technology and Chinese Language Teaching	Taiwan/ United States	Mixed Method	Two-Part Survey	Pre-Service
Wang et al. (2011) Journal of Educational Technology, Development and Exchange	United States/ China	Qualitative Case Study	Post-Study Survey, Focus group interview, teacher reflections	Pre-Service
Dooley & Sadler (2013) ReCALL	United States/ Spain	Qualitative Ethnography	Course documents, reflections, course artifacts	Pre-Service
Tseng et al. (2013) Australasian Journal of Educational Technology	Taiwan	Qualitative	Reflections, Interviews	Pre-Service
Gerber & Price (2013) Educational Media International	United States	Qualitative Case Study	Screen captures and journal entries	In-Service
Oh & Nussli (2014) International Journal on Advances in Life Sciences	United States	Mixed Method	6 different instruments- Surveys and reflections	In-Service
Lin et al. (2014) Procedia Technology	Australia/ Taiwan	Qualitative Exploratory	Teaching journals, observational data, artifacts	In-Service
Sarac, H. S. (2014) *Procedia-Social and Behavioural Sciences*	Turkey	Qualitative	Structured Interviews	In-Service
Sweir & Peterson (2018) The JALT CALL Journal	Japan	Quantitative	Survey	In-Service

This inquiry also revealed minimal research from the Covid-19 era. There is a need for discussion that is conscious of the world's developing new landscape of increased technological integration, as the perceptions of students and teachers may have changed during this time. Many educational contexts used online resources for well over a year which may have changed how students and teachers perceive different technologies. Future research into contemporary perceptions of teachers and students is needed.

Finally, there is a limited number of inquiries that focus on language teachers without skewing their sample by including teachers from other disciplines. Without more research that focuses solely on language teachers, it is challenging, if not impossible to grow the field of language teaching and learning in tech-driven environments. Many inquiries included language teachers but also included teachers from a variety of other disciples in the same sample. It is not appropriate to lump a science or math teacher and a language teacher into the same category. Their training is different, the pedagogy they use may be different, and their overall needs might be different.

If hurdles like these are not addressed, researchers and educators cannot expect the field of VW teaching and learning to grow or produce works that will fuel innovation. The implications of these issues are that without improvement, teachers will continue to be marginalized in research and innovative new technologies will not be integrated in ways conscious to the needs of teachers.

How are the roles of teachers characterized in virtual world language teaching and learning research?

In relation to VWs, research characterizes teachers as assuming a multitude of roles, including tech support, designer, facilitator, collaborator, evaluator, mentor, and digital gatekeeper. However, it

also characterizes them in more than just a role within the classroom, but who they should be in their professional identity, such as an innovator and a highly qualified educator. The literature on VWs characterizes teachers as needing to be a step above designer, in a position where they envision themselves as digital pioneers looking beyond the classroom to the possibilities technology might offer if the system they worked within was reimagined, redesigned, and taken in a more advanced technological direction. Roles like tech support and designer emerged to support a trend in the literature that characterizes language teachers using VWs in a position that requires a teacher that exceeds normal standards- a highly qualified teacher. Eighty percent of the corpus characterizes teachers as needing special advanced skills in the areas of technical support, classroom management, teaching knowledge, and design ability. This characterization depicts teachers as needing structured training or professional development and clearly defined pedagogical guidance to understand their roles in and out of VWs. The trend of language teachers not having clearly defined roles is consistent in fifty percent of the articles. Even when their roles are identifiable, the majority of the articles are unclear about how teachers should fulfil those roles. As seen in Table 2.3, language teachers are depicted as having multiple identities/roles in ninety percent of the articles.

Table 2.3

The Roles of Teachers and the Associated Pedagogies, Learning Approaches, and Learning Theory

Article	Roles	Pedagogies, Learning Approaches, & Educational Theories
Silva et al. (2010) Journal of Computing in Teacher Education	• Mentor • Highly Qualified Educator • Innovator • Tech Support • Collaborator	• Progressive • Collaborative • Student-Centered Practice • Reflective Practice
Cheng et al. (2010) Journal of Technology and Chinese Language Teaching	• Highly Qualified Educator • Innovator • Tech Support • Designer • Facilitator	• Progressive • Communicative • Collaborative • Student-Centered Practice • Reflective Practice • Constructivism
Wang et al. (2011) Journal of Educational Technology Development and Exchange	• Highly Qualified Educator • Tech Support • Designer	• Undefined Pedagogy
Dooley & Sadler (2013) ReCALL	• Highly Qualified Educator • Tech Support • Designer • Facilitator • Collaborator	• Progressive Pedagogy • Communicative Pedagogy • Collaborative Pedagogy • Student-Centered Practice • Reflective Practice • Constructivism
Tseng et al. (2013) Australasian Journal of Educational Technology	• Highly Qualified Educator • Tech Support • Mentor • Designer • Facilitator • Evaluator	• Progressive Pedagogy • Communicative Pedagogy • Collaborative Pedagogy
Gerber & Price (2013) Educational Media International	• Tech Support • Innovator • Highly Qualified Educator • Designer • Digital Gatekeeper	• Game-Based Learning Pedagogy
Oh & Nussli (2014) International Journal on Advances in Life Sciences	• Tech Support	• Progressive Pedagogy • Communicative Pedagogy • Collaborative Pedagogy
Lin et al. (2014) Procedia Technology	• Tech Support • Innovator • Highly Qualified Educator • Facilitator	• Communicative Pedagogy • Student-Centered Practice • Reflective Practice
Sarac, H. S. (2014) *Procedia-Social and Behavioral Sciences*	• Tech Support • Innovator • Designer	• Progressive Pedagogy • Student-Centered Practice • Constructivism
Sweir & Peterson (2018) The JALT CALL Journal	• Tech Support • Innovator • Highly Qualified Educator • Digital Gatekeeper	• Student-Centered Practice

What pedagogical models are associated with virtual world language teaching and learning?

The Atlas.ti 22 software provided an opportunity to create visualizations where documents were seen as icons, and dotted lines connected them to codes to indicate presence within the document (see Figure 2.1). Visualizations supported the analysis phase by illuminating that the inquiries in our corpus blur the lines between pedagogy and educational approaches, and even expand into educational theory with the inclusion of Constructivism as an influence on instruction. Seven specific models emerged: four recognized pedagogies, two educational approaches, and one educational theory. These included: Collaborative, Communicative, Game-Based Learning, Progressive, Reflective Practice, Student-Centered Practice, and Constructivism.

This inquiry revealed thirty percent of the articles used Constructivism as an overarching educational theory that guided their work (see Table 2.3) and seventy percent used multiple pedagogies and/or learning approaches (see Table 2.4). The most prevalent pedagogy was Progressive Pedagogy (60%), followed by Collaborative (50%) and Communicative (50%) (see Table 2.5). There was also an article (Wang et al., 2011) that completely omitted all discussion on this area.

Figure 2.1

Pedagogies, Learning Approaches, and Learning Theory in Atlas.ti 22
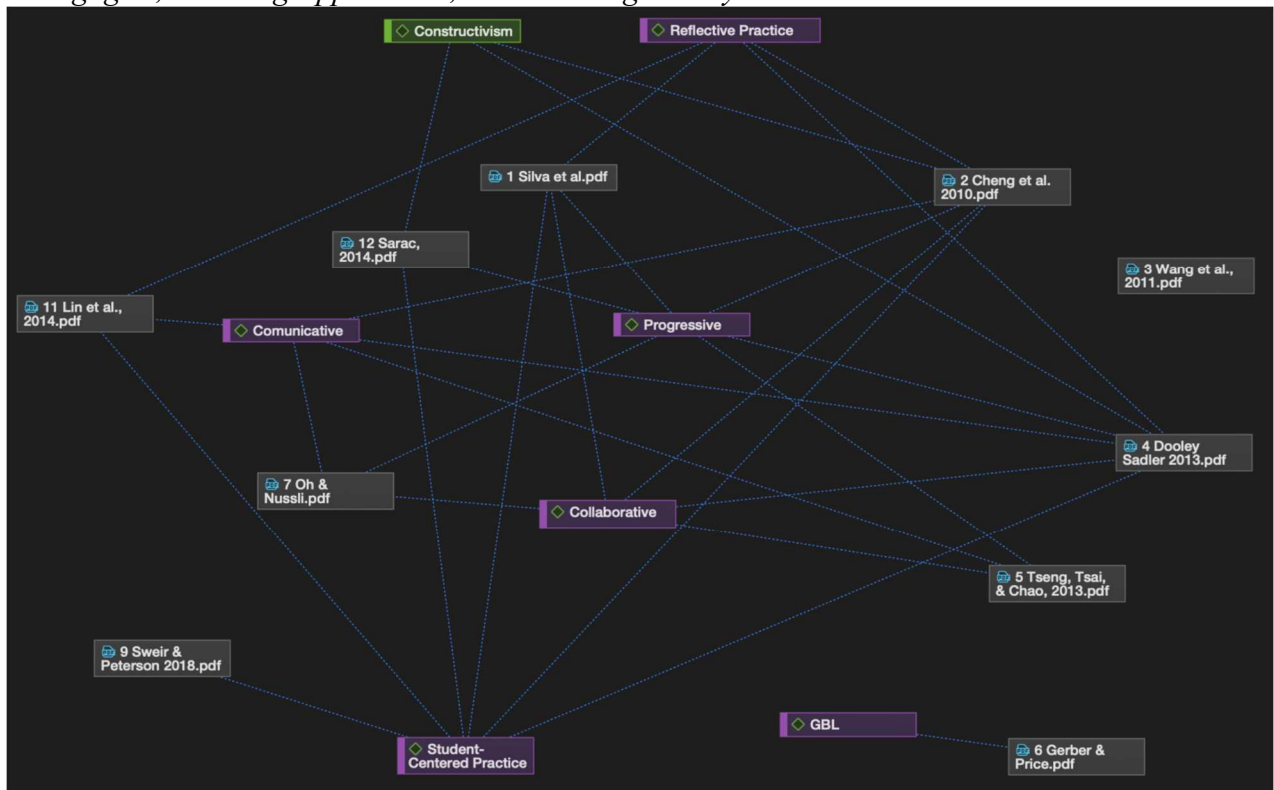
Table 2.4

Multiple Pedagogies and/or Learning Approaches

Number of Pedagogies and/or Learning Approaches	% of Inquiries
Multiple Pedagogies and/or Learning Approaches	70%
Single Pedagogies and/or Learning Approaches	20%
No Identifiable Pedagogies and/or Learning Approaches	10%

Table 2.5

Pedagogies

Pedagogy	% of Inquiries
Collaborative	50%
Communicative	50%
Game-Based Learning	10%
Progressive	60%

Many of the articles in the corpus used multiple pedagogies/approaches/educational theories, but none of the articles clearly documented how they were combined or how researchers instructed the language teachers participating to use them. Sixty percent of the articles employed a specific educational approach along with pedagogy (see Tables 2.5 & 2.6). Only two articles (Sweir & Peterson, 2018; Gerber & Price, 2013) expressed the use of an educational approach or pedagogy on its own (Student-Centered practice, Game-Based Learning.

Table 2.6

The Use of Education Approaches

Educational Approach	% of Inquiries
Student-Centered Practice	20%
Reflective Practice	0%
Student-Centerd Practice and Reflective Practice	40%
Neither	40%

Summary

These results show that Progressive pedagogy and educational approaches that employ Student-Centered and Reflective Practice (Collaborative and Communicative) are predominant in Virtual World (VW) research. Seventy percent of research employs multiple approaches and pedagogies to negotiate learning. While this diversity has its advantages with reaching different styles of learners in varying communities and cultures, it also contributes to the ambiguity in this genre. The roles and identities teachers must assume to be a part of VW teaching and learning are unclear. Teachers may opt for alternative routes where are more comfortable, have better access, or are more supported, instead of choosing new emerging technologies to accomplish their goals. There is a need for future research into not only the perceptions of teachers, but also their actual practice, as the question of how teachers use VWs still looms.

Implications

This literature review reveals important implications for academics and for classroom educators. The challenges that lie with extensive and ununified terminology prevent both demographics from accessing research that has the potential to inform continued study, innovation, and practice. A centralized and structured set of terms is needed to make new emerging research easier to locate and more consistent in meaning. This area of study is developing as fast as the technology it focuses on and Virtual Worlds (VWs) are a creative digital horizon that has the potential to expand the definitions of technology literacy, the roles and identities of the teacher, and spur discussion on teacher education.

Limitations

A limitation to this study is the challenge of terminology. The field of virtual world research includes a vast array of different terms that are constantly changing, evolving, and being used in different ways by different researchers. As mentioned in this inquiry, what one researcher defines as a virtual world, a video game, or a simulation can be different from another. A uniformed set of terminology is unfortunately not available at this time.

Conclusion

This inquiry explored a field of research that includes interchangeable terminology, rapidly changing technology, and a deficit in literature geared towards exploring specifically language teachers. It represents a deep dive into the digital waters of Virtual World (VW) research with *a priori* questions that guided it in a direction revealing pixelated lines between teacher roles, pedagogies, and technology. Unfortunately, the physical world and the potential virtual worlds of education cannot evolve without more research and an easier way access to i

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Chapter Three: Language Teachers & Virtual World Research:

A Thematic Analysis with Atlas.ti 22

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Introduction

Ito (2008) recalls that just 'a few decades ago, the idea of consumer software designed for children's education, entertainment, and empowerment was barely a glimmer in the eye of a few innovative educators and technologists' (p. 89). Nevertheless, not all games, digital or otherwise, are designed to support language learning. However, many that were not conceived with language learning in mind are adaptable to the central concepts of Digital Game-Based Language Learning (DGBLL). Games considered applicable to DGBLL that do not have these concepts built into their design, such as *Minecraft*, which does not require the user to interact with language to play, require well-designed language learning tasks for the gameplay experience to be beneficial for language learning (Kessler, 2013; Bikowski & Kuhn, 2014). Kuhn's (2014) session entitled 'The World is Not Enough' on *Minecraft* with constructivist writing tasks exemplifies how the game can be structured to support the language learning experience in ways it does not do on its own. Kuhn used Minecraft to leverage game pacing, space, and intentional design to create situated learning contexts conducive to teaching academic writing tenets to English language learners.

The research on Digital Game-Based Language Learning (DGBL) is grounded in the research of L2 learning. For example, Sykes and Reinhardt's (2013) fundamental DGBLL concept of feedback

is firmly established as a pillar in L2 learning (see Carroll, Swain, & Roberge, 1992; Hyland & Hyland, 2006). Holden and Sykes (2013) argue that 'innovative technologies, including digital gaming environments, offer a solution to many of the challenges of giving L2 pragmatic feedback by offering scaffolded, just-in-time, meaningful, and individualized feedback' (p. 156).

The analysis of game elements and characteristics in relation to their application in L2 teaching and learning divides into two categories: learner reflections and learner experience. The most prevalent category in DBGLL, learner reflections, relies on learner-reported data most often collected using questionnaires or interviews focused on the efficacy of the gameplay experience. The less common category of learner experience focuses on the learner/user experience and entails an analysis of how the gaming concepts described by Sykes and Reinhardt (2013) are addressed inside the game by the learner/user and what outcomes in language or skill development are observable. More research is needed from all perspectives (see Cornillie et al., 2012; Godwin-Jones, 2014; Reinhardt & Sykes, 2014), especially when the perspective is that of the teacher versus the student.

Given researchers, educators, and the gaming industry do not have an agreed-upon terminology, in this inquiry, we use Heim's (1998) broad definition to encompass all emerging forms of virtual worlds. Heim's (1998) definition describes:

> 'A technology that convinces the participant that he or she is actually in another
> place by substituting the primary sensory input with data received and produced
> by a computer […]. The 'as-if' quality of virtuality becomes a pragmatic reality

when the virtual world becomes a workspace, and the user identifies with the

virtual body and feels a sense of belonging to a virtual community' (pp. 220-221).

Virtual worlds are not just about reading texts and following game plans. They expand the experience to include the ability to interact with others, utilize digital space to act upon diverse objectives, and take part in authentic scenarios in a pragmatic way. Technologies that convince users they are in another place give them the opportunity to use an avatar to represent themself and give them the ability to act on or within the world for the purpose of work, play, or human connection. 'Video games' limit users to the objectives of gameplay. Virtual worlds expose users to new digital supports for learning or language objectives.

Other Reviews

While there is growing interest in Digital Game-Based Language Learning, there are minimal literature reviews on digital games in language learning contexts, and none of them employ a thematic analysis in their methodology. As shown in Table 3.1, there are only two meta-analyses (Chiu et al., 2012; Tsai & Tsai, 2018) and five systematic reviews (Borona et al., 2018, Hung et al., 2016; Hwang & Wu, 2012; Klimova & Kacet, 2017; Poole & Clarke-Midura, 2020), three scoping reviews (Hung et al., 2018; Jabbari & Eslami, 2018, Xu et al., 2019), and one general literature review (Peterson, 2016) from the past ten years.

After an analysis of these reviews, there are many questions remain, especially regarding the subset of virtual worlds (VWs) and how they are used in language teaching and learning contexts. Also, none of these reviews focused on teacher perceptions or explored teachers' actual usage of VWs in their practice.

Table 3.1

Past Reviews on Digital Game-Based Language Learning Related Research

Previous Review (Year)	Field of Study	Approach Type	Time Period	Review Focus	# of Studies	Results
Poole & Clarke-Midura (2020)	DGBLL	Systematic Review	2012-2017	To identify games used in Second/Foreign Language research	49	Found vocabulary gains, opportunities for value realizing through verbal and physical communication, safe environment for communicating in the L2, and opportunities to use L2 in diverse communicative and collaborative activities.
Xu et al. (2019)	DGBLL	Scoping Review	2000-2018	Trends in DGBLL features, methods, targeted skills, impactful elements, & pedagogical role		Found majority of game usage sought to enhance ELLs cognitive development in English.
Hung et al. (2018)	DGBLL	Scoping Review	2007-2016	Empirical evidence & Impacts of DGBLL	50	MMORPG is the most common genre to enhance ELL. Computers are the most common platforms for playing games for ELLs. Positive outcomes in students' learning, psychological states, and language acquisition.
Jabbari & Eslami (2018)	MMORPGs	Scoping Review	2006-2015	Effectiveness- second language learning context	31	Found most studies employ qualitative methods with MMORPGs and use interview, observations, chat logs, and questionnaires for data collection, and commercial games outperform free or researcher designed games.
Tsai & Tsai (2018)	DGBLL	Meta-Analysis	2001-2017	Effectiveness- digital games for L2 vocabulary	26	Found digital games can motivate and enhance students' L2 vocabulary learning. Best effect of L2 vocabulary game-based learning might take place when students with prior L2 learning experiences play task-based games.

Table 3.1 (Continued)

Klimova & Kacet (2017)	DGBLL	Systematic Literature Review	2010-2016	Efficacy of DGBLL	6	Found educational computer games are effective in vocabulary acquisition, exposure to target language, and engagement. High interactivity may hinder vocabulary acquisition. Teachers lack of knowledge about computer games hinders their proper use.
Hung et al. (2016)	DGBLL	Systematic Literature Review	2010-2014	Research Trends in DGBLL	589	Found DGBLL composed small number of studies. Majority were MMORPGs used with higher ed students in English.
Peterson (2016)	MMORPGs	Literature Review	2006-2014	Cognitive and Sociocultural theories		Found MMORPGs facilitate growth in the Zone of Proximal Development and provide opportunities for target language interaction.
Hwang & Wu (2012)	DGBLL	Systematic Literature Review	2001-2010	Trends in game-based learning	59	Found vocabulary is the most practiced language skill, commercial games contain the most elements of a good game and use of good gaming elements are inconsistent among digital games.
Chiu et al. (2012)	DGBLL	Meta-analysis	2005-2010	Effectiveness- DGBLL & EFL Outcomes	14	Found published studies have a large effect size, vs. unpublished studies have small effect size. Concluded medium effect size for use of DGBLL in EFL contexts, and effect size is larger for engaging meaningful play versus drilling or practice.
Borona et al. (2018)	DGBLL	Systematic Literature Review	2005-2017	Benefits/challenges of language learning practices in VWs	32	Found progress in learning outcomes, communication skills, and motivation.

Scope of This Inquiry

This inquiry explores language teachers' perceptions related to virtual world (VW) learning through a qualitative analysis of virtual world literature. It uses the techniques and strengths of systematic review to support a qualitative approach, which identifies discoveries through a technology-driven thematic analysis. This inquiry is different from previous reviews as it uses literature as data but engages in a thematic analysis versus a systematic synthesis. It specifically focuses on language teachers' perspectives and not the perspectives of teachers across multiple disciplines as it extracts vital information on teachers as users of games. It is also unique in that it focuses on only the past eleven years (2010-2021) and employs cutting-edge qualitative analysis technology, Atlas.ti 22, to identify trends.

Research Question

This inquiry aims to answer a critical question that seeks to identify trends in the perceptions of language teachers in relation to virtual world (VW) language teaching and learning. This inquiry is structured around the guiding question:

(1) What themes exist in teachers' perceptions of virtual world language teaching and learning?

Study Search

The study began with a systematic search, which consisted of searching five databases with full articles relevant to education, language, and technology subjects to cover all aspects of this topic. These databases were Education Resources Information Center (ERIC), Education Source (EBSCO), Scopus, JSTOR, and Google Scholar; Scopus and Google Scholar provided more results than EBSCO and JSTOR. We believed a search of several databases was necessary as some may not be comprehensive or contain articles that focused on our topic (Gough, Oliver, & Thomas, 2013; In'nami and Koizumi, 2010). According to Lipsey and Wilson (2001), a search of multiple sources is the most effective strategy to locate relevant and pertinent references for inquiries that rely on literature. Scholars attest that the selected databases are considered comprehensive and reliable sources (Asher et al., 2013; Harzing & Alakangas, 2016; In'nami & Koizumi, 2010; JSTOR, 2018).

The first search was in Scopus and used the two terms "virtual worlds" AND "teacher perspectives." This initial search only rendered ten results (see Figure 3.1). A review of each abstract eliminated all that did not meet the eligibility criteria and was not relevant to second or foreign language education, the perspectives of language teachers, and technology related to virtual worlds (VWs). Next, Boolean search terms expanded the search by creating longer search strings with the various terminology for VWs. The search strings included combinations like 'virtual world' OR 'MUVE' OR 'education games' OR 'video games' OR 'computer games' OR 'game-based' OR gamify OR gamification AND 'teacher perspectives.'

Figure 3.1

Original Scopus Search
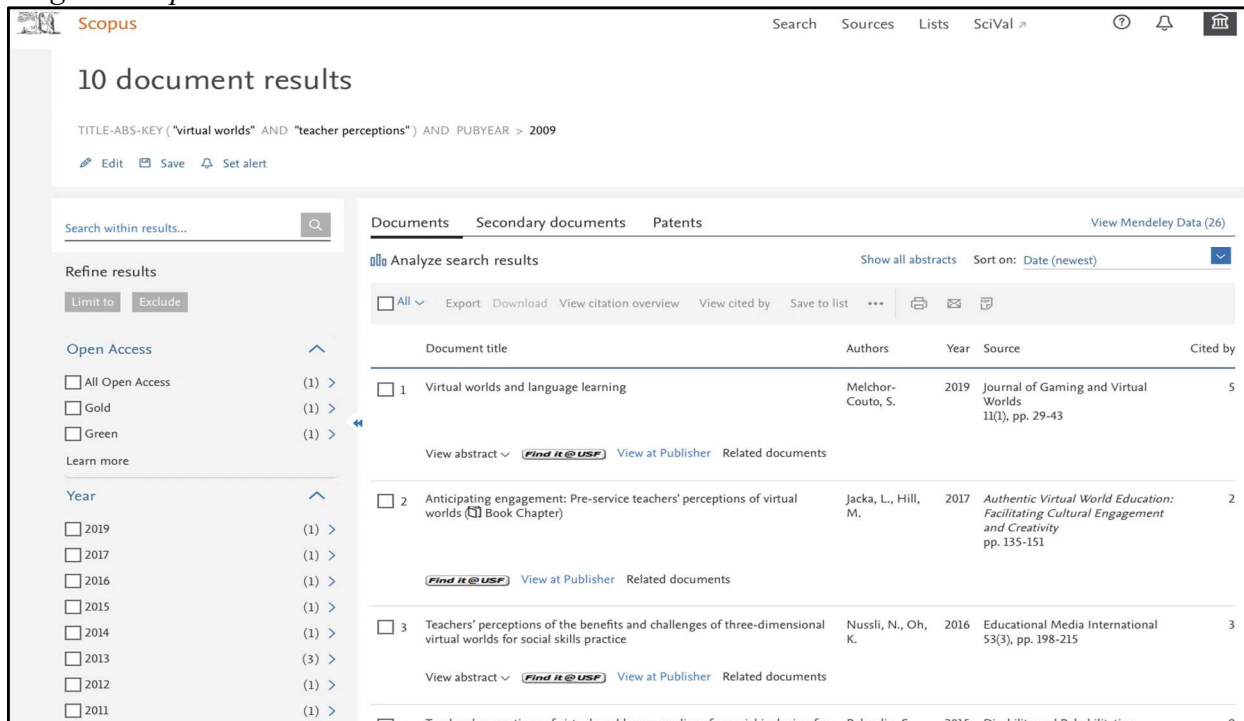
The search structure focused on two main points, Virtual Worlds (VWs) and language teacher perceptions. The search terms needed to be modified for each database to locate articles that existed at the intersection of these two points. We searched the last eleven years as we discovered that was when the development and release of several pivotal games made a notable impact on the gaming industry, research, and society. We considered a total of forty-two articles for acceptance but eliminated thirty-two of them for various reasons related to the elimination/inclusion criteria.

Eligibility Criteria

Ten articles compose this corpus as they adhere to the strict inclusion criteria. The inclusion and exclusion criteria determined acceptance. Methodology, the strength of literature base, and quality were not considered.

Inclusion Criteria:

- Empirical Research on Virtual World language learning.

- Reports of pilot programs and prototype studies.

- Published between January 2010 and December 2021.

- Articles published in peer-reviewed journals only.

- Studied virtual worlds, MUVES, or immersive digital environments such as Minecraft, Second Life, Metaverse, and other commercial and prototype models in the language learning context (Foreign Language, Second Language, English Language Education, Literacy Education contexts included).

- Included the perceptions of 'language teachers' in relation to virtual world language teaching. 'Language teachers' encompasses all teachers who teach language and/or literacy skills. This includes second and foreign language teachers, English Language Arts teachers, Literacy teachers, and Special Education teachers who teach language learners.

Exclusion Criteria:

- Studies that used the term 'Virtual Worlds' but were explicitly focused on Virtual Reality (VR) technology, such as headsets and gloves for VR gameplay.

- Studies on Virtual Worlds samples that include teachers from subject areas other than Language or Literacy Education.

- Theoretical papers and Conference Proceedings

- Did not report on the perspectives of teachers of language learners.

Coding and Analysis

We employed the qualitative coding software Atlas.ti 22 during the coding and analysis phase. This software allowed this inquiry to rise to a new level in its qualitative analysis through the creation of visuals and networks that advanced researcher observations and facilitated the identification of trends. Coding began with a main preliminary code of 'teacher perceptions,' which focused on answering the guiding question. To further develop the codebook and codebook definitions, we coded several sample articles, updating the coding materials with each one.

These initial rounds of coding revealed a growing trend of concern as to the support or judgment teachers might receive from their communities if they used virtual worlds (VWs) in their practice and a rift between how researchers saw the role of the teacher and how teachers perceived their roles.

Once we completed an acceptable codebook, we employed the qualitative coding software Atlas.ti 22. Several times per week, we met via MS TEAMS and screen-shared back and forth as we read through each article. After each paragraph or two, we stopped to pose questions like: What do you see? How could we code these perceptions? Does this meet the definition of a code we have? Do we need to add a new code?

As coding progressed, the codebook evolved to contain a clear code system for teachers' perceptions. The code of 'Teacher Perceptions' became a code group containing several specific codes such as Access, Community Influence, Positive Experience, Negative Experience, Identity, Representation, and Values. Each of these codes was defined by explicit criteria.

The code of Access represented teacher perceptions that were directly related to issues of access. This included all positive and negative issues relating to accessing native speakers, experiencing technical issues, device compatibility issues, hardware costs, internet connectivity requirements, and physical access to technology.

The Community Influences code applied to all teacher perceptions, positive and negative, related to pressures or influences from the community where they live or teach.

The Positive Experience code applied only to perceptions relating to how experience with technology impacted their perceptions in a positive way, versus the 'Negative Experience' code was exactly the opposite.

The Identity code pertained to perceptions related to the internal and external layers of an individual's identity, such as gender or socioeconomic status (Loden & Rosener, 1991).

The code of Representation related to the perceptions teachers have about how they, their students, or humans in general, are portrayed or represented inside and outside by Virtual World (VW) usage. The Values code pertains to an individual's underlying moral, philosophical, educational, or cultural values. Since all perceptions revolving around representation are not rooted in values, some are more directly related to community influences or experiences.

Included in the group of Teacher Perceptions was the code of Emotion. This code covered the emotional statements made by teachers, as 'I feel…' was often repeated along with positive and

negative adjectives describing emotions like fear, shame, distrust, disinterest, joy, comfortability, and excitement.

The code group of "Teacher Roles" also emerged, which included the specific roles teachers expressed they embody, including that of a Censor, Collaborator, Designer, Evaluator, Facilitator, Innovator, MKO (More Knowledgeable Other), Mentor, Tech Support, Qualified Teacher, and an Undefined Role. While VWs may be conducive to specific types of pedagogy that may influence the role of the teacher, how teachers and researchers perceive and employ the position may vary. These codes were straightforward in definition and helped further our ability to analyze what roles teachers believe they assume and how they may influence their perceptions.

Thomas, Harden, and Newman (2013) argue that conducting thematic analysis is the best method to create a connection between findings from many different types of research. We employed a thematic synthesis where the findings from one study were compared to the findings of another study to identify connections and create common themes across them. The steps of Reflective Thematic Analysis functioned as an overall guide during the exploration of relationships between codes, the formation of categories, and the solidification of themes in the data. The Atlas.ti 22 software enabled the creation of detailed visualizations showing networks of connections, which expanded our understanding of the data. The memo function in Atlas.ti 22 also facilitated the documentation of the various narratives that formed during the analysis phase and allowed the two members of the research team to easily note their observations, thoughts, and concerns in a unified manner. Given our data was a collection of research articles, the software became a tool for

recognizing connections between findings from diverse inquiries and generating meaningful results from their comparison.

The following sections present the findings of this analysis and the implications they have for educators and researchers today and tomorrow.

Results

As previously mentioned, the accepted studies were diverse. Six of the articles used in-service teachers, and four used pre-service teachers. Eight out of ten of the studies employed a qualitative research design, but only four specified a specific methodology, such as a case study or ethnographic design. The other two studies employed a mixed-methods approach. The most common data sources were surveys, interviews, journals, teacher reflection materials, and artifacts (see Table 3.2).

Table 3.2

Accepted Articles with Key Features

Title (Year) Journal	Country	Methodology	Data Sources	Teacher Status
Silva et al. (2010) Journal of Computing in Teacher Education	United States	Qualitative Case Study	Mentor blogs, observation notes, chat logs, interviews	In-Service
Cheng et al. (2010) Journal of Technology and Chinese Language Teaching	Taiwan/ United States	Mixed-Method	Two-Part Survey	Pre-Service
Wang et al. (2011) Journal of Educational Technology Development and Exchange	United States/ China	Qualitative Case Study	Post-Study Survey, Focus group interview, teacher reflections	Pre-Service
Dooley & Sadler (2013) ReCALL	United States/ Spain	Qualitative Ethnography	Course documents, reflections, course artifacts	Pre-Service

Table 3.2 Continued

Tseng et al. (2013) Australasian Journal of Educational Technology	Taiwan	Qualitative	Reflections, Interviews	Pre-Service
Gerber & Price (2013) Educational Media International	United States	Qualitative Case Study	Screen captures and journal entries	In-Service
Oh & Nussli (2014) International Journal on Advances in Life Sciences	United States	Mixed-Method	6 different instruments- Surveys and reflections	In-Service
Lin et al. (2014) Procedia Technology	Australia/ Taiwan	Qualitative Exploratory	Teaching journals, observational data, artifacts	In-Service
Sarac, H. S. (2014) *Procedia-Social and Behavioural* *Sciences*	Turkey	Qualitative	Structured Interviews	In-Service
Sweir & Peterson (2018) The JALT CALL Journal	Japan	Quantitative	Survey	In-Service

What themes exist in teachers' perceptions of virtual world language teaching and learning?

It was not far into the analysis phase of this inquiry that themes became apparent from the connections and relationships between codes. The analysis used five codes with strictly defined definitions and employed Atlas.ti 22 to form networks to better understand how they linked to documents and other codes. These Atlas.ti 22 network views scaffolded a continuous discussion focused on the questions: "What does this mean for humanity?" and "How do these codes reveal larger themes/trends?" It was this conversation that flourished into the following themes: 1) The Battle of Identities, 2) The Value of Access, 3) The Price of Experience, and 4) The Weight of Emotions.

Theme 1: The Battle of Identities

Identity is a topic of prominence in many places around the globe, and teachers' identities are no exception. This inquiry showed that within the literature on language teachers and Virtual Worlds (VWs), there is a straightforward question of how teachers negotiate their personal and professional identities, the factors that influence them, and what those differing parts mean for their practice. Ninety percent of the articles had the Values code, which represented elements within their perceptions directly connected to a value system. That value system could be personal values, cultural values, or even the values of a learning theory, like Constructivism, and was a prominent factor in their perceptions. Eighty percent of the articles had both the Values code and the Representation Code. The Representation code helped to identify instances where teachers were concerned with how students and teachers were represented inside and outside of VWs. Sixty percent of the articles in our corpus had the Values code, the Representation code, and the Identity code. A thorough review of the study memos and researcher journals revealed a connection between the teachers' influential values and how teachers' personal and professional identities factor into their practice. This corpus of articles illuminated teachers' concerns over what their community and their peers would think of them professionally if they used VW technology and their struggle to incorporate what they personally wanted into their professional life without risking retribution from those around them. If teachers' culture or community does not value video games, game-based learning, or technological innovations, they may not be receptive to them in a professional environment, even if they see their value in their personal lives.

The analysis phase also revealed teachers perceive the choice to use VWs as their own personal choice, not something they perceive as required by today's students or communities. Hence, if

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VWs are not openly endorsed, teachers may not use them, and even if they are, they may still choose not to integrate them into their practice. The perceptions examined did not reflect VWs as an innovation that has become widely accepted by educational communities or deemed valuable to future educational efforts. This corpus does not reflect teachers' envisioning themselves as innovators. Therefore, if teachers do not envision themselves in that role or in a position where they have the perceived qualifications or community support, they would opt for something they are more comfortable with personally (see Figure 3.2).

Figure 3.2

Perceptions and Documents in Atlas.ti 22
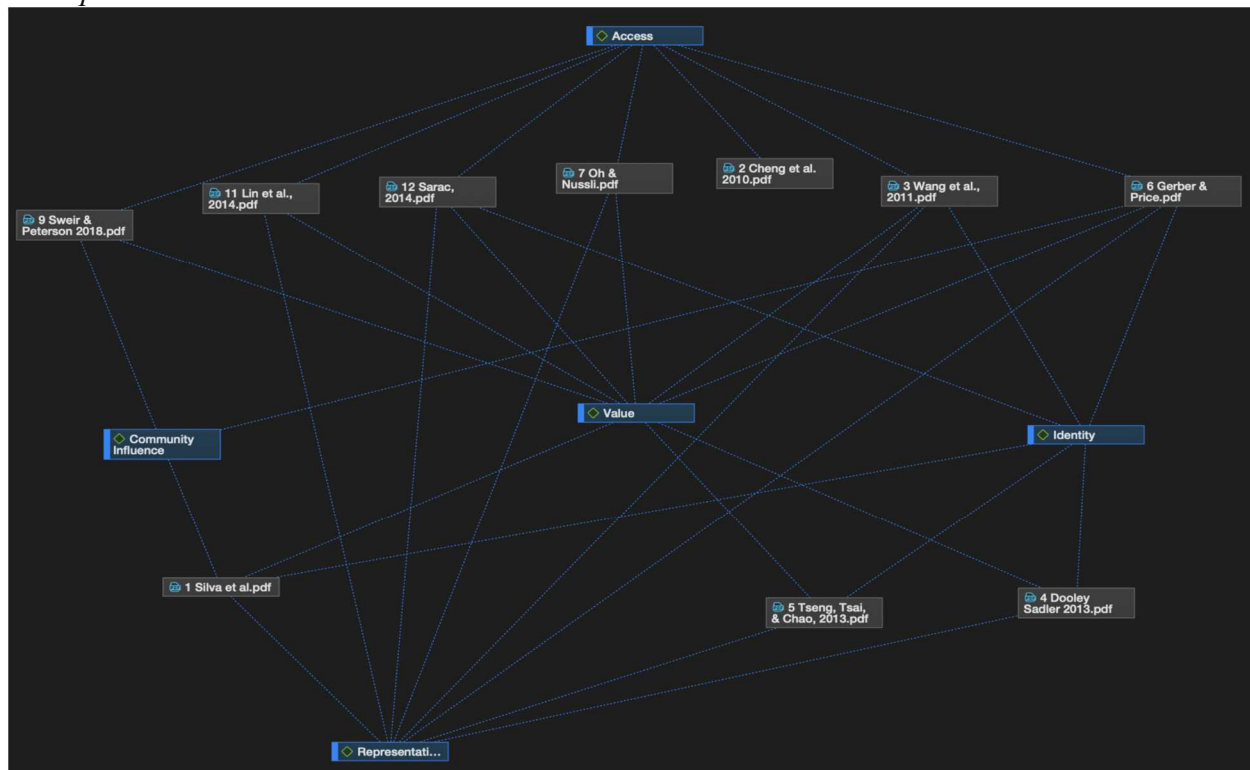
In one of the articles (Sweir & Peterson, 2018), a teacher responded to a survey saying, 'I do not have a lot of intrinsic desire to delve into virtual worlds. To be honest, I think that VR could be a

very powerful learning tool. That said, there are many paths toward student learning, and I am choosing one that is more familiar to me' (p. 223). While this statement is true in that there may be alternate paths to the same goal, it also highlights two questions: 1) If teachers do see new technological innovations like virtual worlds as powerful tools but want something more familiar to them, will innovation ever occur? 2) How do we help teachers see themselves as innovators and become willing to accept and integrate new, powerful opportunities?

In contrast to Sweir and Peterson, Gerber and Price (2012) found that the teachers in their study 'saw the value and the worth of gaming as a literacy experience when they were able to connect gaming paratexts to traditional literacy practices and brainstorm ways to incorporate them in their classroom instruction' (p. 58). Today's teachers are under a considerable amount of pressure, so it is understandable that they may opt for something more familiar if they are not comfortable using technology. Teachers' comfortability with technology is partially connected to the training they receive. More research is needed within teacher education and professional development programs to explore what technologies they are preparing teachers to use, why teachers accept or reject them, and how they integrate them into their practice.

Theme 2: The Value of Access

The *Values* code also led to the identification of a trend in teachers' concerns surrounding the value of access. The *Access* code was prominent in seventy percent of the articles in the corpus for a variety of identifiable reasons. Some teachers perceived the lack of facial cues within Virtual Worlds (VWs) as a barrier to students' ability to access valuable benefits of a language learning environment. Others perceived it necessary to have specialized teaching skills to manage students

in Virtual World (VW) scenarios, something that would require advanced training, improved tech support, and all-around community support in order to be realized. One of the biggest access issues highlighted in teachers' perceptions was physical access to the technology and infrastructures that would allow virtual worlds to be used in educational contexts. These access issues include funding, high-speed internet, appropriate locations within virtual worlds, curriculum, and compatible devices.

It is evident that teachers are aware of the socioeconomic inequities in schools of all levels and diverse contexts and are empathetic to them. Their perceptions show that they understand the complications that arise with this type of technology, and if they cannot easily navigate them, they need to choose other, more accessible routes to their end goal. This has implications for all technological advancements in education. If teachers do not believe that they have access to the necessary training and support and students do not have the physical or visual access to what is needed, they will not attempt to reconceptualize their methods for language teaching and learning.

Theme 3: The Price of Experience

This review revealed that experience can impact teachers' perspectives in both a positive and negative manner. Sixty percent of the articles in the corpus included teachers' perceptions after some type of experience with Virtual Worlds (VWs). This could have been a personal experience or a multistep inquiry procedure that included surveys or reflections in between rounds of working with VW technology. If teachers' experiences were unstructured or if they were ill-prepared or disinterested in the technology, the experience could impact their perceptions negatively.

When teachers are not provided with clear pedagogy, clear roles they need to fulfill, and training on how to employ classroom and technology management skills, their receptivity to technological innovations is reduced, and their perceptions do not reflect a willingness to accept or integrate them on their own. If teachers are prepared with clear expectations for their roles and teaching pedagogy, the impact on their perceptions has the potential to be more positive. However, this is not a clear divide. Our analysis showed that fifty percent of the studies that had experience as a contributing factor in teachers' perceptions of VWs were divided between positive and negative (see Figure 3.3).

Figure 3.3

Experience as Visualized in Atlas.ti 22
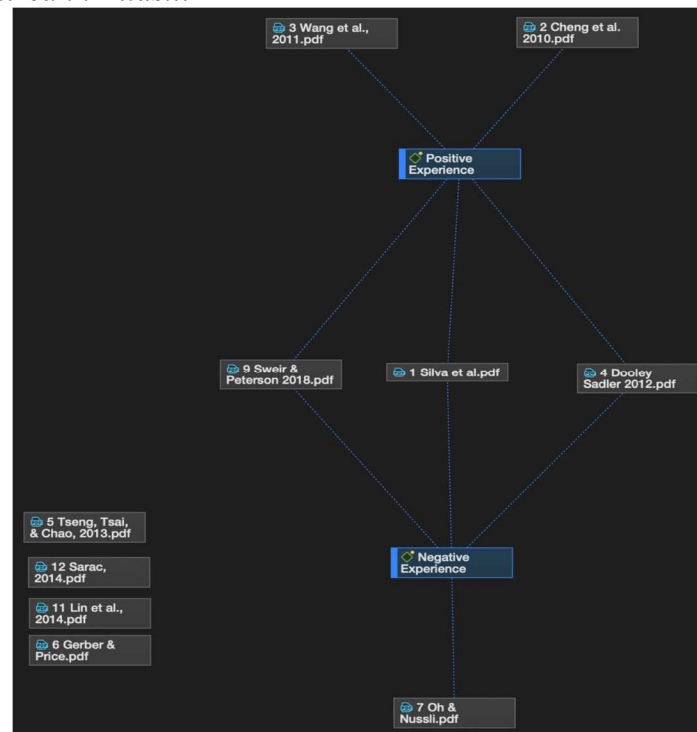
This highlights that all experiences are not created equal, and that community, cultural, and personal factors cannot be dismissed from the list of possible influential factors on teachers' behavior. Just because a teacher has an experience that impacts their perceptions positively, it can

also remind them of the negative aspects of technology integration as well. For example, tech issues were a recurring factor for almost all the inquiries included in the corpus. The responsibilities and demands put on teachers by schools as for curriculum requirements can be daunting. Even if VWs prove to be a powerful tool to achieve their goals, tech issues may underscore that teachers may not have the time to dedicate towards this type of innovation due to their already heavy load. Hence, experience essentially works as a double-edged sword. It illuminates the possibilities of virtual worlds and highlights the other contextual elements facing educators today that need to be addressed.

Theme 4: The Weight of Emotions

Language teachers often must take into consideration students' feelings and comfort levels, as learning a language involves communicating with other speakers and developing intercultural competence. Ten out of ten articles (100% of the corpus) employed the code of *Emotion*. Upon focused analysis, this inquiry showed that within each theme was an underlying current of emotions, positive and negative. Teachers often used the phrase 'I feel…' followed by an emotional term, such as one referencing fear, comfort, or joy. This emotional undercurrent was not just related to students' emotions but teachers' emotions and may indicate that emotional concerns are something that teachers take into consideration when they are weighing the positives and negatives of VW technology. If teachers fear burnout, lack of control, retribution from colleagues, administration, or their community, or other factors, it could impede their ability to do their job to the best of their abilities. It also poses a question about the weight they are giving to emotional concerns. Are teachers crafting their practice to reflect their emotional concerns or to

serve their students to the best of their abilities? The questions surrounding teachers' emotions in language teaching and learning are fertile ground for future research.

In regard to VW teaching and learning, the corpus described the role of the teacher as innovators. Yet, there was no evidence that teachers perceived themselves as the innovators of Virtual World (VW) technology who were ready to re-program the system and embark on new digital endeavors. Teachers must consider themselves as being more than mere designers or digital architects. They must be willing to look beyond the classroom to be innovators in the digital revolution in education if the systems they work within are to be redesigned and taken in a technology-driven direction. Many teachers consider this to be risky. They have enough risks on their plate and may be discouraged to take on additional risks. For instance, teaching culture and intercultural competence already involves risks for language teachers, as they need to ensure they never stereotype culture or present it in a manner that overly simplifies or confines culture to shallow representations of music, food, and dance.

One of the barriers to the implementation of digital game-based language learning in the classroom, evident in this corpus, is that teachers are afraid of being judged by their peers, administration, and community. Moreover, they perceive a stigma associated with what is termed as "digital games" in education; thus, teachers are unwilling or hesitant to embrace digital educational games in class even if research proves that games have a prominent place among mainstream learning technologies. This may indicate some disagreement between research and pedagogical practices. Consequently, further research is required to investigate teachers' perceptions related to employing game-based language learning to identify their viewpoints, how

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they support their pedagogical approaches with theory to promote learning, and what motivates them to evolve from instructor to designer to innovator.

A characterization that did align with language teachers' perspectives was that of a digital gatekeeper. While language teachers did not see themselves as innovators, a portion of them (20%) did see their professional identity as one that includes the role of a digital gatekeeper when it comes to students and technological advancements like Virtual Worlds (VWs). Some teachers were concerned with how avatars would represent their students. For example, if female students would be represented by thin, busty, scandalously clad avatars or if they would have realistic-looking avatars that did not stereotype genders or body types. Other teachers were concerned about the environment students would be exposed to, such as nude paintings in hotel lobbies or virtual bars serving alcohol. Teachers were even concerned about students' contact with other individuals who were not enrolled in their course. All of which are valid concerns when journeying into new digital territories. The role of the teacher is often characterized as one that is required to make sure students are safe and that they are upholding the values their educational community has put into place. Some teachers would be wary about embarking on the road to becoming an innovator with VW technology. If they decide to implement technology like VWs and a student or parent decides they do not approve of something encountered, it may cost the teacher their job, if not their career, depending on the community where they live and work.

Summary

As the current technological era advances, there is an urgent need for research into the perceptions of teachers and their practice in relation to educational technologies. There are gaps in

the literature as to teachers' perceptions and implementation of new virtual world and gaming technologies and in their roles within the classroom when new emerging technologies are in play. This inquiry shows that emotions create an undercurrent in teachers' decision-making processes, but future research is needed to determine the influence of those emotions. There is preliminary evidence of a deviation between how the researcher characterizes teachers' roles and the way teachers see themselves. This deviation creates a barrier to the evolution of teacher training, curriculum development, and the creation of environments conducive to the construction of students' literacies and 21st-century skills. Teachers perceive access and security as prominent parts of the implementation, and without clear support and direction as to their place in evolving educational systems, there will be a standing rift between innovation and reality.

Limitations

The limitations to this study include hermeneutic considerations as the researchers who conducted this inquiry may not see the same themes or trends as other researchers given their unique backgrounds, experiences, and axiological stances and may even see different elements if they returned to the data in the future as their experiences and stances may have evolved further.

A second anticipated limitation of this study is the small number of articles included in its corpus. It may have been more useful to employ more articles to obtain a more detailed picture and gain a better understanding of the research area under investigation. Additionally, there is no one fixed terminology in the field of virtual world research. Researchers use the terms differently, hence the lack of consistency in the used terminologies and the multiple terms that are open to various interpretations.

Conclusion

This inquiry explored a field of research that includes interchangeable terminology, rapidly changing technology, and a deficit in literature geared towards exploring teachers' perceptions rather than students' experiences. Its results demonstrate trends within language teachers' perceptions that pose questions about teachers' personal and professional identities, the influence of emotions and experience, and issues of access and stigma in relation to VW teaching and learning. Immersive virtual reality is a promising avenue for language learning. Through VWs, teachers and students have engaging opportunities to interact in dynamically customized or personalized believable virtual environments that can suit a lot of language learners' needs. However, how language teachers view themselves does not clearly align with the emerging characterizations of their roles in relation to virtual world technology. Extensive further research is needed to investigate the influence of virtual worlds on teachers' perceptions.

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Chapter Four: Mining Artifacts: Pre-Service Teachers' Usage

of Minecraft Education Edition

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Introduction

Every day new emerging technologies evolve as they are adapted, adopted, and appropriated in different environments to meet the demands of the world. Technology amplifies the importance of teacher education and professional development programs as they "sharpen [teachers'] knowledge, skills, attitudes, and self-efficacy for transformative practice" as "technology integration is an important skill that teachers need to acquire to deepen students' learning and support achievement of instructional objectives" (Aldosemani, 2019, p. 46). Koehler et al. (2014) pose an argument supporting the assertion that teachers must be knowledgeable about the interrelated domains of teaching, technology, and learning to support pedagogical outcomes. This is especially true in today's increasingly interconnected world of new digital options because "('new' and 'old') emerging technologies are evolving organisms that experience hype cycles, while at the same time being potentially disruptive, not yet fully understood, and not yet fully researched" (Veletsianos, 2010, p. 3).

With the rise of Constructivism theory, Gillespie et al. (2014) purported that the traditional question of what technologies do to people is reversed and is now a question of how do people

"appropriate, understand, make sense and continuously reconstruct them" (Gillespie et al., 2014, p. 22). The material affordances of communication technologies, as in the properties and features of objects and settings that "invite" users to employ them in specific ways (Hutchby, 2001), have inspired scholars like Lievrouw and Livingstone (2006) to redefine new technologies in a way that unites "artifacts, practices, and social arrangements and formations as inseparable and mutually determining" (Lievrouw, 2014, p. 23).

As a step towards filling the gap in the literature on teachers' acceptance and usage of VW technology, the purpose of this study is to explore how language teachers who choose to incorporate *Minecraft Education Edition* (MEE) integrate it into foreign language teaching and learning designs. In this paper, I explored two pre-service teachers' lesson plans and customized *Minecraft* worlds, which they submitted to a course on technology in foreign language education. These two teachers extended the role of the teacher to that of designer and made MEE their tool. This allowed me to qualitatively analyze their artifacts to identify how they integrated the digital game into their growing practice.

Literature Review

Digital Game-Based Learning

Over the past decade, researchers documented an increase in teachers' openness to and use of specifically digital games (Fishman et al., 2014; Millstone, 2012; Takeuchi & Vaala, 2014). Some, such as Herold (2015), asserted that although technological tools and applications were widely present in educational settings, there was evidence that suggested teachers had not yet transformed their practice to integrate them. New Digital Game-Based Learning (DGBL) studies with MEE

demonstrate the clear pedagogical potential to integrating technology into classroom practices and report broader benefits like increased student motivation, creativity, problem-solving skills, commitment, and opportunities for collaboration (Dikkers, 2015; Lorence, 2015; Callaghan, 2016). Jenson and Hanghøj (2019) assert that it even creates new dynamics of participation, shifting the classroom from teacher-centered to student-centered.

Learner-focused research has long overshadowed the teacher's critical role in the adoption and design of Digital Game-Based Learning (DGBL) activities (Egenfeldt-Nielsen, 2007; Hanghøj & Brund, 2010; Ketelhut & Schifter, 2011). Much of the literature on teachers' adoption of Game-Based Learning (GBL) focuses on teachers' attitudes, beliefs, and school context as it impacts their adoption and appropriation of games (Beavis et al., 2014; Bourgonjon et al., 2013). While research in this area is critical, it often disregards teachers' actual game usage (Bar-El & Ringland, 2021). The amount of research on teachers' attitudes and beliefs concerning Game-Based Learning (GBL) and the amount on teachers' actual usage of games is vastly disproportionate (Marklund & Taylor, 2016), especially when it comes to lesson designs that use commercial games (Van Eck, 2009). GBL and DGBL require a high degree of pedagogical structure to ensure students have opportunities to interact with subject-specific concepts to convert gameplay into learning outcomes (Kluge, 2016). Egenfeldt-Nielsen (2007) argue that the educational usage of games moves beyond the learner-game interaction and extends to teachers' new role as a user of games within their practice.

Minecraft in Education

The literature base shows a variety of subject areas use *Minecraft Education Edition* (MEE) in practice and research*,* such as spatial geometry (Förster, 2012), sustainable planning (West &

Bleiberg, 2013), language and literacy (Bebbington, 2014; Garcia Martinez, 2014; Hanghøj et al., 2014), digital storytelling (Garcia Martinez, 2014), social skills (Petrov, 2014), informatics (Wagner, 2014), computer art application (Garcia Martinez, 2014), project management (Saito et al., 2014), and chemistry (Hancl, 2013). Research also documents its potential for ecology, geology, biology, physics, geography, history, media, and the arts (Brand & Kinash, 2013; Ekaputra et al., 2013; Jenson & Hanghøj, 2019; Short, 2012).

In a step towards a better understanding of how teachers use game-based learning in their practice, Bar-El and Ringland (2020) explored what DGBL experiences teachers designed for their students with MEE. They examined 484 lesson plans generated by teachers for learning various subjects and developed teacher profiles to describe the types of teachers that used MEE in their practice.

Measuring Technology Integration

Whether or not teachers integrate technology is only the beginning of the integration equation, especially regarding Digital Game-Based Learning (DGBL) and Virtual Worlds (VWs). It is also necessary to explore and understand the degrees to which teachers integrate technology into their teaching practice through consideration of the level of technology integration required in relation to various aspects of the learning environment (Abbitt & Davis, 2021). The Technology Integration Matrix (TIM) is a rubric researchers and educators can use to capture the extent to which a particular technology is integrated into an instructional context (Allsopp et al., 2007; FCIT, 2019). It creates a descriptive tool to assess teachers' levels of technology integration that starts at entry-level and progresses through adoption, adaption, and infusion to an advanced level of transformative teaching (Aldosemani, 2019).

The TIM framework is also supported by Constructivism learning theory and provides a systematic method with standard language to evaluate technology integration (Welsh et al., 2011). It provides a framework for "describing and targeting the use of technology to enhance learning" by combining "five interdependent characteristics of meaningful learning environments: active, collaborative, constructive, authentic, and goal-directed" with "five levels of technology integration: entry, adoption, adaptation, infusion, and transformation" (FCIT, 2019) (see Figure 4.1).

This matrix can be used to better understand the degree of integration of technology in relation to characteristics of the learning environment and illuminate how integration impacts five different dynamics of the classroom experience. These include the dynamic between 1) instructional focus on tools and instructional focus on content, 2) teacher ownership of learning and student ownership of learning, 3) procedural understandings and conceptual understanding, 4) simple use of technology tool and complex use of technology tools, and 5) conventional use of technology tools and innovative use of technology tools (FCIT, 2019) (see Figures 4.2 through 4.6).

Figure 4.1

Technology Integration Matrix (TIM) (FCIT, 2019).

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

Figures 4.2-4.6

TIM Matrix Classroom Dynamics (FCIT, 2019)

Figure 4.2
Instructional Focus: Tools vs. Content

Entry	Adoption	Adaptation	Infusion	Transformation

Instructional Focus on Tools

Instructional Focus on Content
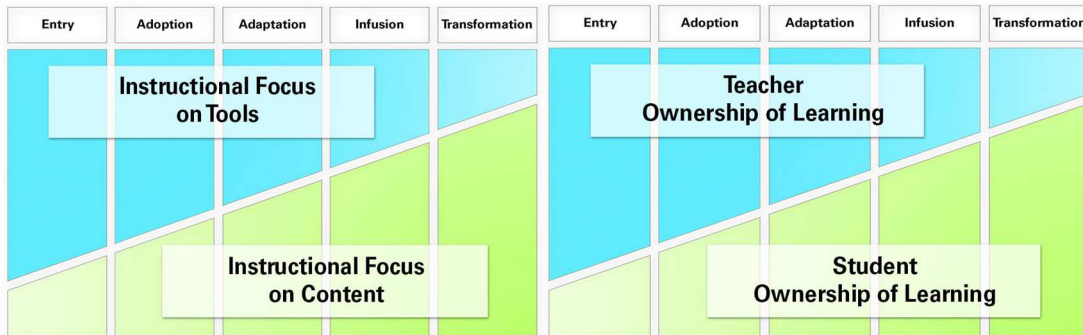
Figure 4.3
Ownership of Learning: Teacher vs. Student

Entry	Adoption	Adaptation	Infusion	Transformation

Teacher Ownership of Learning

Student Ownership of Learning
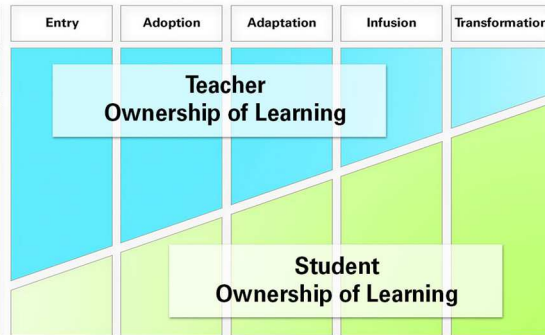
Figure 4.4
Understandings: Procedural vs. Conceptual

Entry	Adoption	Adaptation	Infusion	Transformation

Procedural Understandings

Conceptual Understandings

Figure 4.5
Use of Tech Tools: Simple vs. Complex

Entry	Adoption	Adaptation	Infusion	Transformation

Simple Use of Technology Tools

Complex Use of Technology Tools

Table 4.6
Use of Tech Tools: Conventional vs. Innovative

Entry	Adoption	Adaptation	Infusion	Transformation

Conventional Use of Technology Tools

Innovative Use of Technology Tools

Methodology

      Data Collection

I designed this inquiry to employ a multiple case-study approach (Krathwohl, 1998; McMillan &

Schumacher, 1997) with multiple cases from the same bounded context. The data I reviewed were

the *Minecraft Education Edition* (MEE) worlds and lesson plans created by pre-service foreign

language teachers enrolled in a technology in foreign language education course at a large

Research 1 university in the Southeastern United States during the summer of 2021. I served as

the teaching assistant for this course. The creation of these artifacts was not mandatory as students

received a choice as to what technologies they wanted to focus their assignments and projects

around. A total of twenty-one students enrolled in the course, but only ten students chose to

incorporate MEE into their work. Five of the ten students who decided to include MEE created a

lesson plan for foreign language instruction and a customized MEE world where it could be

implemented. Four were pre-service teachers, and one was an in-service teacher. I reduced the

sample down further according to which students consented to the examination of their

coursework, as the Family Educational Rights and Privacy Act (FERPA) protects the privacy of

students' educational documents (FLDOE, 2022). This resulted in a total of two female pre-service

teachers as participants for this artifact analysis.

      Participants

Both participants were also involved in a larger study I conducted for my dissertation, so I began

by referencing that data for their demographic information. Teacher One was a temporary French

instructor at the high school level who designed a MEE world for a grade seven, level one, French

as a foreign language class. At the time of data collection, she was a student in a master's program.

I categorized her as a pre-service teacher because during the course she never said she had a teaching license and revealed that she had little teaching experience, so was grateful to have the opportunity to be in her temporary teaching position. Teacher Two was a second-year undergraduate student and pre-service teacher studying Spanish who designed a MEE world for an English for Speakers of Other Languages (ESOL) context in grades eight through ten. During the course, she revealed this is her first education class and that she does not have any classroom teaching experience.

Research Questions

Two *a priori* questions guided this inquiry:

1. In what ways do two pre-service teachers engaged in a technology in foreign language education course integrate *Minecraft Education Edition* in foreign language learning lessons?

2. What trends are evident in the *Minecraft Education Edition* artifacts of two pre-service teachers engaged in a technology in foreign language education course?

Data Analysis

After I obtained IRB approval and went through the consent process to do this retrospective document analysis, then systematically analyzed the two participants' work using Reflexive Thematic Analysis (Braun & Clarke, 2006; Clarke & Braun, 2013), the Technology Integration Matrix (TIM), and the TIM's accompanying dynamics models (see Figure 2 through 6).

First, I used the TIM to identify the different ways each teacher integrated *Minecraft* into their work and evaluated the balance of dynamics it resulted in using the five TIM dynamics models.

Second, I built off the literature on analyzing Virtual World (VW) lessons and artifacts by using heuristics such as *"How does this teacher build worlds?" "What media options do they employ?"* and *"What does the teacher expect students to do in this lesson?"* to analyze each teachers' integration at a deeper level (Bar-El & Ringland, 2021)*."* As I reviewed the artifacts and my research notes, I began to note patterns in the data. This helped me to follow the steps of Reflective Thematic Analysis and develop a set of open codes I could use to code the data, my memos, and my reflections. Memo-ing became a crucial part of my process as it "promotes new discoveries, helps keep track of one's thought processes, aids in categorizing codes, and facilitates detailing an account of the coding process" (Andu, 2019, pp. 85-86). Once I condensed and categorized my codes, I was able to generate trends within the set of artifacts.

To further validate my work, one of my co-investigators explored the artifacts using the TIM matrix tools and reflexive thematic analysis noting her ratings and thematic findings. She was able to verify the integration ratings I determined and concurred with the themes I generated during this exploration.

Positionality and Axiological Stance

During the analysis process, kept in mind Briggs' (2019) statement that "the perspective or position of the researcher shapes all research." I was the teaching assistant for the course where these participants created their artifacts and a doctoral student in a technology in education and foreign language program. As Patton (2002) profoundly stated, "In qualitative inquiry, the researcher is the instrument" (p. 14). Hence, in this case, I am the instrument. I am an experienced foreign language teacher with a technology background and a side career as professional abstract painter.

My passion for art and technology was something I had to continuously be aware of as I engaged with the data.

Results

In what ways do two pre-service teachers engaged in a Technology in Foreign Language Education course integrate Minecraft Education Edition in foreign language learning lessons?

Teacher One's Artifacts

The objectives of Teacher One's *Minecraft* experience were to identify sports vocabulary and other activities that use the verb "jouer," learn to conjugate that verb, and then apply the conjugations within written sentences to compose a simple story about the activities their family members play. Teacher One built this MEE virtual world as an experiential space where students could act on the world (Hew & Cheung, 2010). Her lesson plan states the guiding idea is that students "acquire language throughout the lesson," build upon it, and apply it through "movement and engagement within the world." Students engaged in a scavenger hunt where they followed directions written in French on blackboards and in books they found throughout the world.

Teacher Two's Artifacts

The objectives of Teacher Two's MEE experience included filling in missing words from six simple sentences on a worksheet as they rowed a boat down a digital river. This River Boat World included signs with questions written on them in front of a visual element, such as a plant or a mountain that would assist the student in figuring out the correct missing word from the sentence.

The worksheet also had the six target vocabulary words in a word bank. This MEE world can be described as a "simulation of space" (Hew & Cheung, 2010, p. 36). It uses MEE to create a boat ride scenario that would not otherwise be possible for students in a contained classroom.

Table 4.1

Teacher One and Teacher Two's Lesson Objectives

Lesson Objectives

Teacher One	Teacher Two
To identify sports vocabulary and other activities using the verb "jouer"	Use basic adjectives, nouns, and verbs in a sentence
To learn the conjugation of the verb "jouer" (to play)	Understand basic sentences
To apply language and grammar knowledge into written sentences	Connect visual aids to words
To execute a final story using the verb conjugation and vocabulary learned in the lesson	

Teacher One, Teacher Two, and TIM

Active Learning

The Technology Integration Matrix (TIM) revealed for when it came to the dimension active learning, Teacher One's degree of integration rose above entry-level to the level of active adoption as they had students actively using technology as a tool rather than as a vehicle to receive information passively. However, the teacher still controls the type and use of technology and strongly regulates students' activities. Teacher Two's lesson plan places thems in the role of lecturer and tech support, giving directions and going through the definitions of the target

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vocabulary before students engage the technology, then answering students' questions if necessary. Active student work it limited by the lesson design, but is also remains at the adoption level, as the River Boat World concept is not a delivery system for information yet does encourage students to stay in the rowboat instead of interacting with the elements of the MEE world.

Collaborative Learning

In the dimension of collaborative learning, "students use technology tools to collaborate with others rather than working individually at all times" (FCIT, 2019, n.p.). Teacher Two's design again limits students' opportunities to work with their peers beyond asking each other for help outside of the game. The River Boat World is built for students to use individually and while the concept of a boat ride is unique and allows students to do something they could not do inside the classroom, it ultimately isolates them from not only their peers, but the interactive elements that exist within the game itself. Teacher One's artifacts also drop to entry-level integration in the collaborative learning dimension as their design do not promote collaboration.

Constructive Learning

Teacher One's integration increases to the level of adoption for the dimension of constructive learning, while Teacher Two's integration remains at entry-level. Constructive learning means that "students use technology to connect new information to their prior knowledge rather than to passively receive information" (FCIT, 2019, n.p.) The TIM indicates that the adoption level of constructive learning is where students begin to use technology to build on their prior knowledge and construct meaning. When technology is integrated at this degree, it means the teacher provides students with opportunities to "construct meaning about the relationships between prior knowledge

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and new learning, but the teacher makes the choices regarding technology use" (FCIT, 2019, n.p.). Teacher One's MEE lesson plan states that *"students will need to have previous knowledge of French to be able to understand the content on signs, in the books, and in other texts found around the world."* It also details that the world will *"test students' abilities to interpret language and perceive information to successfully complete each task."*

Teacher Two's artifacts demonstrate entry-level integration. The sentences on the worksheet are simple, such as *"There are _____ (noun) in the water."* While these could be seen as relating to a science or nature-related lesson, there is not enough evidence in these artifacts (such as world customization around a theme) to constitute an integration rating higher than entry-level in the category of constructive learning.

Authentic Learning

The TIM authentic learning dimension refers to when "students use technology tools to link learning activities to the world beyond the instructional setting rather than working on decontextualized assignments" (FCIT, 2019, n.p.). Teacher One's lesson asks students to write a story in the target language about the sports/activities their family members play, which does relate to the world outside the instructional setting, but it is barely the minimal requirement for authentic learning past entry-level in the manner it is executed. The TIM adoption level descriptors indicate that integration to this degree means "students have opportunities to apply technology tools to some content-specific activities that are related to the students or issues beyond the instructional setting" (FCIT, 2019, n.p.). The model for the story students must write shows single sentences written in the target language, which are equivalent to "My mom plays soccer." With only eight

sports/activities reviewed in the lesson, and the course level as French 1, I interpret it as just a drill or sentence practice.

Teacher Two also missed opportunities for deeper integration of technology in the dimension of authentic learning. I rated their artifacts at entry-level as Teacher Two assigned work "based on a predetermined curriculum unrelated to the students or issues beyond the instructional setting" (FCIT, 2019, n.p.). In the River Boat World, students see the questions from their worksheet on signs within the world but do not have any added opportunities to engage in higher-order learning or relate the content or the technology to their life outside of the instructional context in any meaningful way.

Goal-Orientated Learning

The final dimension of the TIM is goal-orientated learning which measures the degree to which "students use technology tools to set goals, plan activities, monitor progress, and evaluate results rather than simply completing assignments without reflection" (FCIT, 2019, n.p.). While the built-in inventory feature might assist students in monitoring their progress, evaluating their work, and reflecting on activities, the artifacts created by Teacher One indicate that it is the teacher directing students in the conventional usage of these functions, setting the goals for students at each step, and using the features to monitor their progress. For goal-directed learning, this is entry-level integration, borderline adoption level. For integration to rate at a higher level, such as the adaption level, students would need to "independently use technology to set goals, plan, monitor, evaluate, and reflect upon specific activities" and "explore the use of the technology tools for these purposes" (FCIT, 2019, n.p.).

Teacher Two's lesson was rated at entry level integration as the technology was not incorporated in any ways related to goal-direction. The built-in inventory feature was not used as students' avatars were sequestered within a rowboat and opportunities to acquire items or use tools were not accessible to them from that location.

TIM Classroom Dynamics

Finally, I looked beyond the different levels of integration to how the degree of integration impacts different dynamics of the classroom including 1) instructional focus on tools and instructional focus on content, 2) teacher ownership of learning and student ownership of learning, 3) procedural understandings and conceptual understanding, 4) simple use of technology tool and complex use of technology tools, and 5) conventional use of technology tools and innovative use of technology tools (FCIT, 2019). I created adapted TIM models of the five dynamics to demonstrate how both teachers' integration levels affected their classroom dynamics based on the TIM Matrix dynamics (see figures 4.7 through 4.16).

Figures 4.7-4.12

The Classroom Dynamics of Teacher One and Two Based on the TIM Matrix Dynamics

Figure 4.7
Teacher One
Instructional Focus: Tools vs. Content
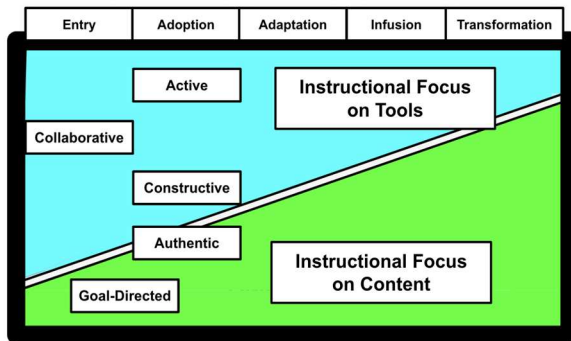
Figure 4.8
Teacher Two
Instructional Focus: Tools vs. Content
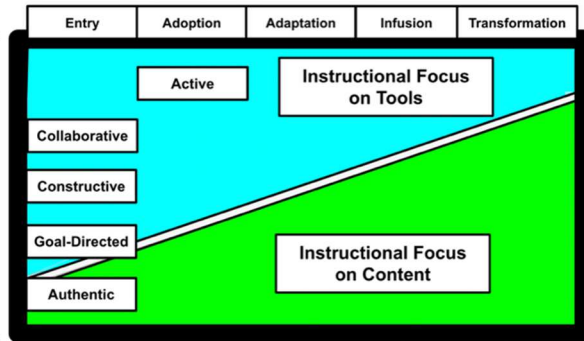
Figure 4.9
Teacher One
Ownership of Learning: Teacher vs. Student
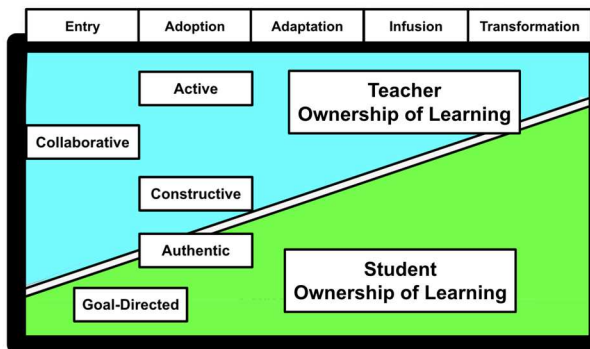
Figure 4.10
Teacher Two
Ownership of Learning: Teacher vs. Student
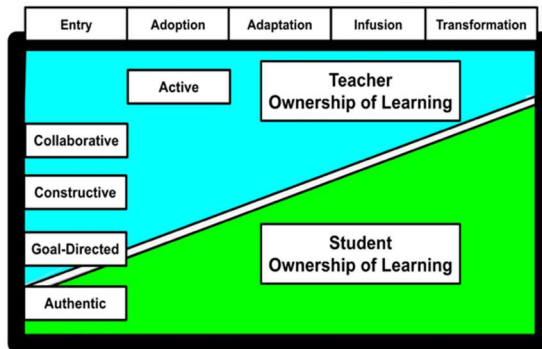
Figure 4.11
Teacher One
Understandings: Procedural vs. Conceptual
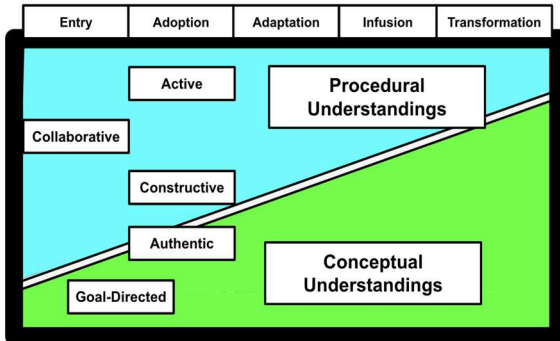
Figure 4.12
Teacher Two
Understandings: Procedural vs. Conceptual
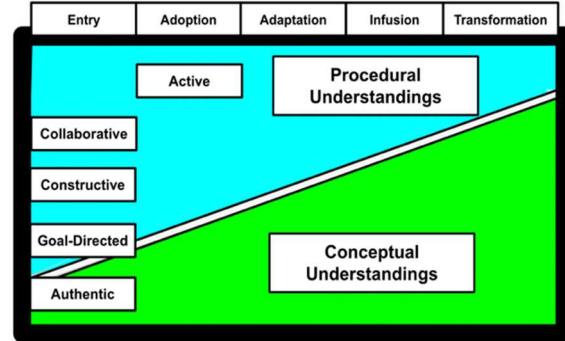
Figures 4.13-4.16

The Classroom Dynamics of Teacher One and Two Based on the TIM Matrix Dynamics

Figure 4.13
Teacher One
Use of Tech Tools: Simple vs. Complex
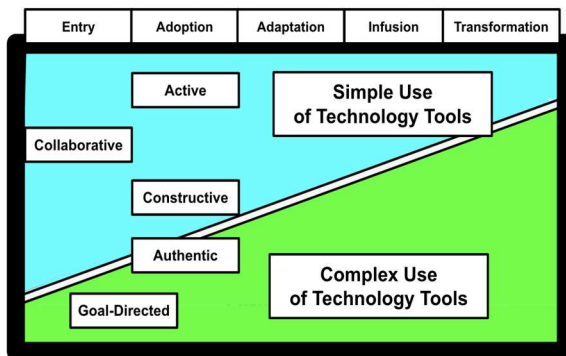
Figure 4.14
Teacher Two
Use of Tech Tools: Simple vs. Complex
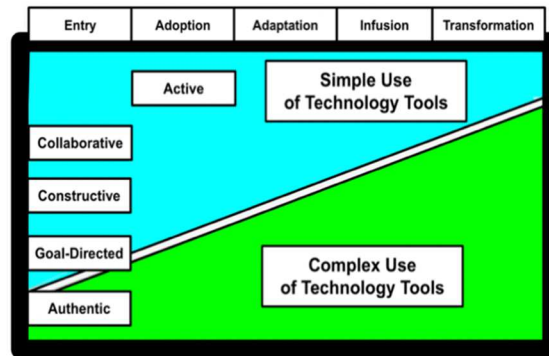
Figure 4.15
Teacher One
Use of Tech Tools: Conventional vs. Innovative
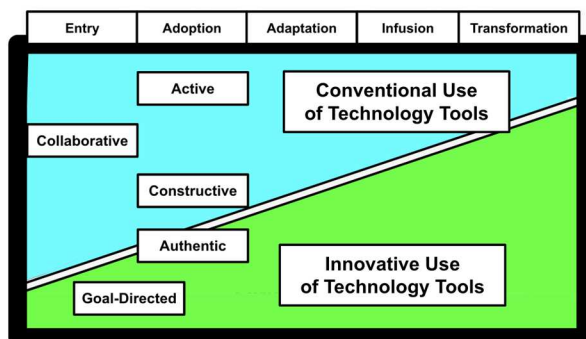
Figure 4.16
Teacher Two
Use of Tech Tools: Conventional vs. Innovative
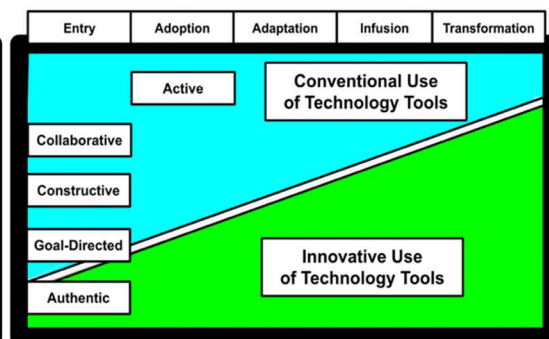
What trends are evident in the Minecraft Education Edition artifacts of two pre-service teachers engaged in a technology in foreign language education course?

To answer this *a priori* question, I used Reflexive Thematic Analysis, literature-informed heuristics, the Technology Integration Matrix (TIM), and TIM's accompanying dynamics models.

This revealed three distinct trends including 1) The Missing Role of Teacher, 2) A Journey of Growth and Development, and 3) Minecraft Attempts Innovation (Even if Teachers Do Not).

Trend 1: The Missing Role of Teacher

The position of the teacher can entail many different obligations and requirements, especially as new emerging technologies take education in new and innovative directions. Looking across the materials of Teacher One and Teacher Two, I noted a distinct trend in the data: the role of the teacher was absent from the majority, if not all, of the materials. Neither Teacher One nor Two clearly specified the extent of their roles during gameplay. My analysis of their artifacts revealed opportunities for teachers assuming the role of lecturer, designer, tech support, evaluator, and even facilitator. However, the only roles explicitly stated, were that of evaluator, tech support, and lecturer. This provokes the questions of: Why are teachers not clear about their roles? Where do teachers see themselves within their practice in relation to virtual world usage?

The roles these teachers take on when employing *Minecraft Education Edition* (MEE) in their practice may be vague due to the technology supporting flexibility over determined roles. It could also be because Teachers One and Two were pre-service teachers enrolled in a course on technology in foreign language education and had not established their professional identities or fully developed their practice in the context of a real classroom. Without experience and established professional practices, these pre-service teachers may not have been able to step into the professional identity of an active teacher, let alone a designer or innovator. It is also possible that roles beyond lecturer or tech support are not ones they see themselves in on a regular basis

and the introduction of innovative technology forces them to focus their efforts in new ways beyond what they are learning in their current coursework.

Trend 2: A Journey of Growth and Development

Teacher One and Teacher Two are from a generation of students some researchers consider digital natives as they were raised in decades where technology's infusion into society was already at significant levels in comparison to previous generations (Prensky, 2009). However, these two participants demonstrate that growing up during a time of significant technology presence and using technology as a student does not prepare an individual to assume the role of instructor, designer, or innovator of new emerging technologies. Rather, their work is evidence that becoming an educator is a journey of growth and development with incremental steps along the way. Even though these individuals were enrolled in a semester-long university course on technology in foreign language education when they created these artifacts, both teachers were at the beginning stages of their journey. They demonstrate a basic understanding of how MEE worlds can be customized but do not yet grasp the more advanced opportunities available to them as teachers to support language objectives through customizable environments where language can be embedded into activities through situated learning pedagogy.

Trend 3: Minecraft Attempts Innovation (Even When Teachers Do Not)

The final trend I noted was that when neither teacher encouraged their students to use the full capacity of tools or to explore unconventional or innovative uses of technology, the MEE technology attempted to do so. Studies within the last ten years show K–12 teachers predominantly utilize games for drill and practice activities (Takeuchi & Vaala, 2014; Wang & Tahir, 2020) and

this was again seen in this inquiry. Yet, when teachers do not intentionally provide opportunities, sometimes innovative technologies like MEE do it for them.

Christiansen (2014) argued that *Minecraft* supports a 'modding culture' (a culture of modifications) through crafting and building options, and Bar-El and Ringland (2021) found the flexibility of *Minecraft* also supports the important role teachers have in shaping tools, like games, to serve their practice. In this inquiry, the artifacts back up this research from the perspective of student and teacher, encouraging both sides to go beyond the basic to craft their own paths. The lesson plans these two teachers created only considered interaction with outside media as physical items (worksheets, paper/writing utensils, and notebooks). However, their MEE worlds created opportunities for their students to search out other technologies physical and digital. This was sometimes through the customizations of the teacher, and at other times by the way *Minecraft* worlds automatically generate opportunities for students. When elements are located around a world and students are given time to explore and discover, MEE invites the student to engage with it, find new game capabilities, analyze their options, and take their experiences to new levels. If teachers do not see themselves or their students in the roles of designers, builders, and agents of innovation, *Minecraft Education Edition* may be the opportunity they need to be invited into those positions.

Limitations

The first clear limitation of this study is hermeneutic considerations. What I report in my analysis today may be different from what I would report if I conducted this study ten years from now. It may also be different from what another researcher sees at any point for our experiences,

axiological stance, and positionality would be different. There are also general complications with analyzing artifacts. Artifacts are snapshots into a teachers' practice and sometimes may not be representative of their practice as a whole. Finally, as a teacher who specializes in technology in language acquisition and is a proponent of virtual worlds, bias is a limitation that needs to be recognized. While I took intentional steps to counter it, such as memo-ing and journaling to stay reflexive, other researchers may see my enthusiasm for MEE as a clear bias to my research.

Implications

This inquiry is a snapshot into the development process of two in-service teachers who attempted to build their knowledge of technology in foreign language education through university coursework. Their artifacts offer insight into how teachers use MEE as a teaching medium. These artifacts are evidence of teachers' need for clarity in their roles and tools for developing connections between technical knowledge, pedagogical knowledge, and content knowledge as they progress on the journey of growth and development as teachers. Recent studies show that teachers' implementation of Game-Based curricula impacts student learning outcomes (Wilson et al., 2018). Virtual worlds (VWs) might be a step towards technology integration that requires more in-depth training, as they add layers of complications and required knowledge to implement. The incorporation of a Framework like TPACK (Technology, Pedagogy, and Content Knowledge Framework) or tools like the Technology Integration Matrix Observation Tool, Lesson Plan Review Tool, and Reflection Tool that assist teachers in evaluating their use of technology might prove pivotal to teacher education programs if they aim to build pre-service teachers' understanding of how the elements of technology, pedagogy, and content knowledge combine in meaningful tech-infused language learning designs. In the role of designer, the work these teachers

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did was at the entry level. This backs up the trend that even though they were enrolled in a course dedicated to technology in foreign language education, it was just a preliminary step on the path to recognition, acceptance, and integration of the possibilities an innovation like MEE offers to teachers and students. The field of Digital Game-Based Learning (DGBL) would benefit from more research into technology-driven lesson plan design processes, the socio-technical arrangements that result from teacher education experiences, the growth trajectory of pre-service teachers, how teachers determine the roles they assume, and how their educational experiences build into acceptance and integration of new technologies. (Bar-El & Ringland, 2021; Berg Marklund, 2014; Egenfeldt-Nielsen, 2004; Hangjøj & Brund, 2010).

Conclusion

Many researchers, such as Aldunate and Nussbaum (2012), believe the "adoption of technology by teachers in order to facilitate and support the teaching–learning process in the classroom is expected to have a great impact on the quality of the teaching experience" (p. 5.19). However, there is clear documentation to show teachers did not effectively use information technology in their teaching during the past two decades (Hixon & Buckemeyer, 2009; Levin & Wadmany, 2008). My inquiry into pre-service teachers' MEE artifacts highlights the importance of new research into teacher education, the recognition of the journey they go through as they learn to integrate technology, and the development of teachers' professional identities as they learn to incorporate new emerging technologies that were not accessible until recently.

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Chapter Five: Minecraft Education Edition in Foreign Language Education:

Pre-service Teachers' Reasons for Acceptance and Integration

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Introduction

Research shows plentiful evidence of the educational benefits of technology integration (Balanskat et al., 2006; Harrison et al., 2002). Keengwe, Kidd, and Kyei-Blankson (2009) assert that teachers need to familiarize, utilize, and integrate technology, as well as reconfigure their desired learning outcomes and classroom practices to align with the culture of technological usage.

In this paper, I explored the reasons three pre-service teachers gave for why they accept and integrate *Minecraft Education Edition* into their growing practice. During a six-week online university course on technology in foreign language education, a group of twenty-one pre-service and in-service teachers created weekly Reflexive Digital Story (RDS) Journals to document their technology exploration along with lesson plans and projects that incorporated innovative technologies they wanted to integrate into their practice. Three of the pre-service teachers enrolled in this course became innovators and early adopters in comparison to their peers as they voluntarily integrated *Minecraft Education Edition* into their coursework. This allowed me to qualitatively analyze their reflections, lesson plans, projects, and other coursework to identify the reasons they integrated the digital game into their developing practice. This work contributes to the field of

digital game-based learning, technology acceptance and integration, and the study of teacher education by illuminating the factors that contribute to why pre-service teachers accept and use Virtual Worlds (VWs).

Literature Review

Teachers' Acceptance and Usage of Technology

Research on technology adoption in teachers categorizes external (first-order) and internal (second-order) factors that impact integration (Snoeyink & Ertmer, 2001; Wachira & Keengwe, 2011). Typical external factors include time available for planning lessons and learning technology, and access to computers, the internet, software, and tech support. Internal factors include school-level factors such as their institution's organizational culture and factors like teacher's beliefs, attitudes, readiness, and openness to change (Wachira & Keengwe, 2011). Inan and Lowther (2010) posit that teacher demographics (age, years of experience, etc.) may have an impact on teachers' computer proficiency, but that some internal factors like teachers' beliefs and readiness may also be influenced by external factors like the availability of computers, tech support, and community support, which can positively or negatively influence their technology integration. As Veletsianos' (2016) states, there is a "negotiated relationship between the maturation of a technology/practice and the environment that surrounds it" (p. 9). Beavis et al. (2014) purport that the appropriation and adoption of digital games in educational contexts are often determined by factors like teachers' training, skills, resources, and the regulations of the educational system where they work. Egbert and Borysenko (2019) contended that few studies explore the use of *Minecraft Education Edition* in teacher education, which echoes Gabriel's (2016) statements on how teacher education programs need to include digital game-based learning

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in order to produce teachers that are competent at integrating digital games into their practice. This is also in line with the argument that the effort expended during the initial phases of acquiring a new behavior, such as using new technology, plays a crucial role in the process of acceptance (Al-Qeisi 2009; Venkatesh et al. 2003).

Marangunić and Granić's (2015) literature review on technology acceptance models described how researchers, Venkatesh and Davis (1996, 2000), expanded Davis' (1989) Technology Acceptance Model (TAM) with the introduction of the Technology Acceptance Model 2 (TAM2), which connects the constructs of *perceived usefulness* and *behavioral intention to use* with theoretical constructs of *social influence* (subjective norm, voluntariness, and image) and *cognitive instrumentals* (job relevance, output quality, result demonstrability, and perceived ease of use) (Venkatesh & Davis, 2000; Sullivan, 2012) (see Figure 5.1).

Figure 5.1

Technology Acceptance Model 2 (TAM2) by Venkatesh & Davis, 2000
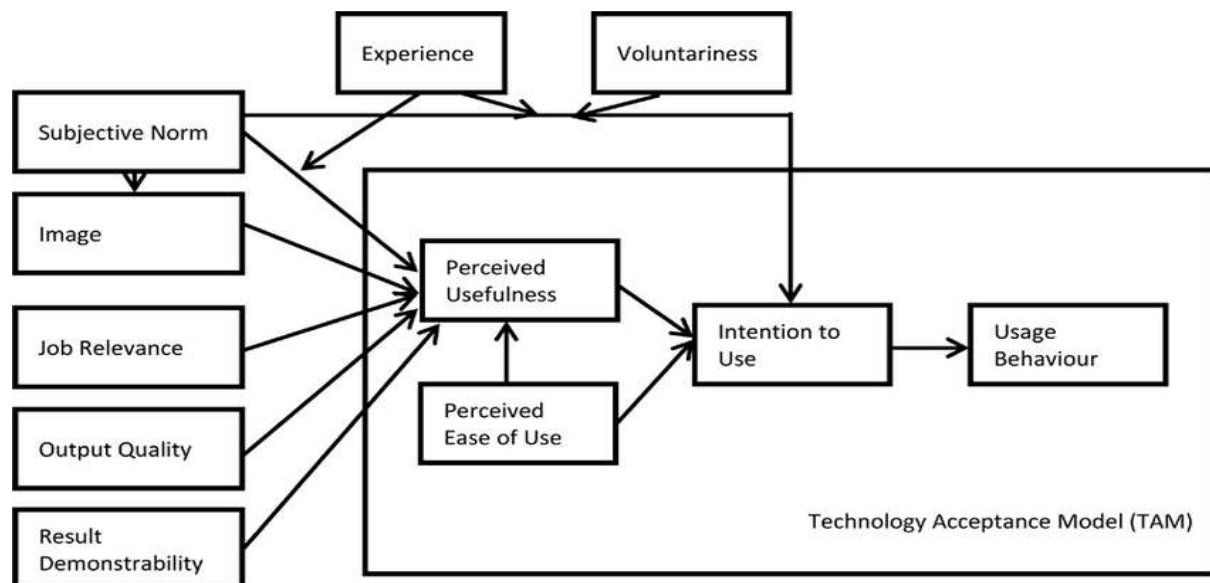
Students in today's educational system are currently being prepared for a life that requires digital literacy and 21st-century learning skills (Newbill & Baum, 2013). Hence, researchers developed many different theories and models that can be used to explore individuals' acceptance and use of new technology (Yurdakul-Kabakçı et al., 2014). Venkatesh and Davis' (2000) TAM2 served as a predecessor and steppingstone for Venkatesh, Morris, Davis, and Davis' (2003) model, the Unified Theory of Acceptance and Use of Technology (UTAUT) (see Figure 5.2). The UTAUT model specifically integrates eight dominant theories and models, including the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), the Motivational Model (Deci, 1971; Vallerand, 1997), the Technology Acceptance Model (TAM) (Davis, 1989), the Theory of Planned Behaviour (TPB) (Ajzen, 1991), the Innovation Diffusion Theory (IDT) (Tornatzky & Klein, 1982), the Social Cognitive Theory (Bandura, 1986), the Model of PC Utilization (Thompson et al., 1991), and the combined C-TAM-TPB model (Taylor & Todd, 1995).

Figure 5.2

The Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al., 2003
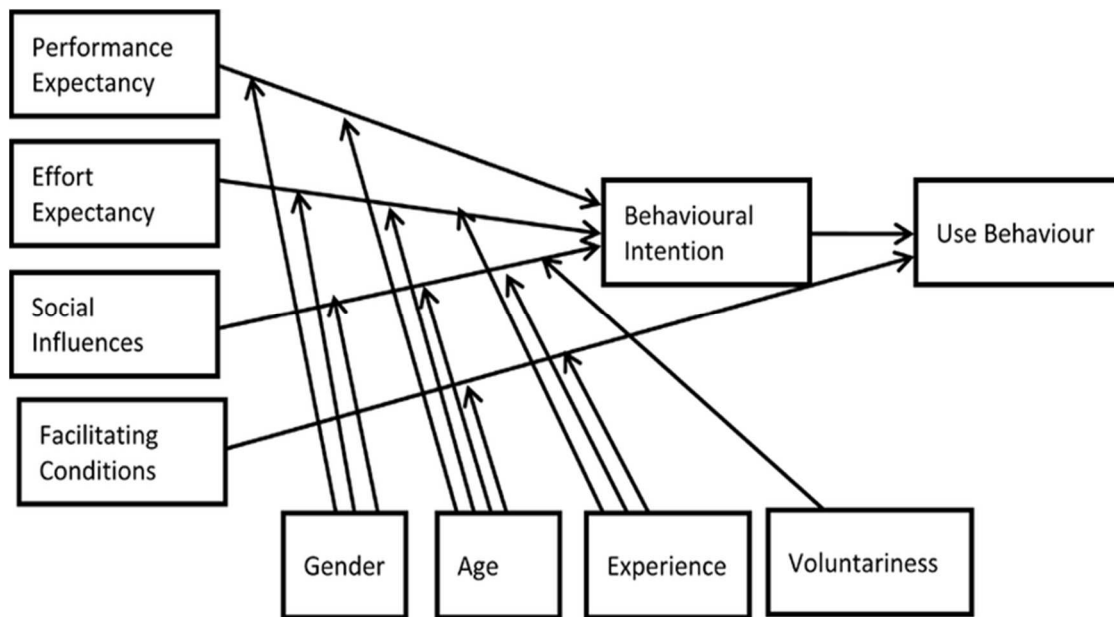
The UTAUT model diverges from the TAM models as it contents that the construct of *social norms* directly influences an individual's *behavioral intention to use* and creates a *facilitating conditions* construct that directly influences actual use. In the education sector, researchers used UTAUT to study students' mobile learning (Bharati & Srikanth, 2018; Chao, 2019; Moorthy et al., 2019; Sung et al., 2015), learning management system use (Ain et al., 2015; Fang et al., 2019) e-learning systems (Samsudeen & Mohamed, 2019) augmented reality (Guest et al., 2018, Nizar et al., 2019).

Digital Game-Based Language Learning

The literature on Digital Game-Based Learning (DGBL) shows that its implementation increases students' self-efficacy, academic performance, and motivation to learn (Hung et al., 2014). It also shows that specifically Digital Game-Based Language Learning has a positive impact on students and offers instructional advantages to teachers in relation to improvements in students' writing skills (Neville et al., 2009), listening skills (Bernert-Rehaber & Schlemminger, 2013; Roy &

Schleminger, 2014), reading skills, and speaking skills in the target language (Levy & O'Brien, 2006).

When it comes to types of games, the literature on DGBLL consists mostly of inquiries using commercial off-the-shelf (COTS) adventure games and massively multiplayer online role-playing games (Hung et al., 2018; The majority of these inquiries focus on the effects of in-game variables (i.e. game narrative structure, interaction, multimedia, etc.) non-game variables (i.e. autonomy, motivation, immersion, social interaction etc.), and player attributes (i.e. age, gender, game literacy, attitudes, etc.), and report positive results (Cornille et al., 2012; Peterson, 2012; Turgut & İrgin, 2010).

There are also many DGBLL inquiries that explore serious games (games where the primary purpose is one other than entertainment) (Doe, 2014; Jantke & Hume, 2015; Howland et al. 2013; Romero & Barma, 2015). Serious games are comparable to computer assisted language learning software (CALL) in that they improve students' vocabulary knowledge (Muller, 2012; Peirce & Vade, 2010), yet render more positive attitudes and motivation (Kocaman & Kizilkaya-Cumaoglu, 2014).

Acceptance and Usage of *Minecraft Education Edition*

The use of games in education is not a new idea. However, the acceptance and usage of Virtual Worlds (VWs) for Digital Game-Based Learning (DGBL) is only in its infancy. One notable institution already using *Minecraft* is Clemson University in South Carolina, USA. Clemson is a Research I university with a college of education that is "a transformative leader in improving

education from birth through adulthood" with award winning programs that "train teachers, school counselors, and school leaders," and uses *Minecraft Education Edition* as a classroom tool to build literacy and "learn about collaboration, communication, and critical thinking" (Minecraft a, 2022, n.p.,b; Clemson University, 2022). While the diffusion of VWs may not be rapid, the landscape of educational usage could soon change as billion-dollar video game franchises like *Minecraft* continue to invest in features geared to facilitate educational use (Egbert & Borysenko, 2018; Lincenberg & Eynon, 2021; Porter et al., 2018). Lincenberg and Eynon (2021) assert that numerous factors contribute to the rise of COTS games in education, such as increased cultural acceptance of digital games as an art form (Tavinor, 2011), the accumulation of research demonstrating the benefits of DGBL (Coleman & Money, 2020), and game developers desire to capitalize on the educational market (Jowitt, 2016).

Unfortunately, assuming the factors responsible for the rise of games in education are the same reasons teachers accept and integrate technology into their practice is not acceptable. Future research is needed to clearly identify the reasons pre-service and in-service teachers have for their acceptance and integration of VW technology like *Minecraft Education Edition*.

Methodology

    Study Design

Pre-service teachers are still students of educational practices who need guidance and training. Anderson and Maninger (2007) argue that the purpose of integrating new emerging technologies into teacher education programs is to create receptiveness and ability to use communication and information technologies in students' future practices. I concur with Nelson et al. (2009) and Yildiz

Durak (2019) that students should be provided with opportunities to build skills and knowledge through higher education in order to empower them to use technology in the classroom. In this inquiry, I employed a multiple case study with a sample of cases from a bounded context (Krathwohl, 1998; McMillan & Schumacher, 1997). The data for this study were documents and multimedia pieces, such as videos, podcasts, PowerPoint presentations, and written papers, submitted as coursework to a university-level course on technology in foreign language education for pre-service and in-service teachers.

Two experienced professors developed the course context of this inquiry in order to observe pre-service and in-service teachers learning about technology in an asynchronous, student-centered, online environment rooted in choice and social interaction with peers where the professor acted as a facilitator. They based the design on Social-Constructivism theory (Vygotsky, 1962) and the educational literature that promotes self-directed learning, where individuals can choose the methods and strategies appropriate for achieving their goals (Fisher et al., 2001). This design gave students choice in each of each of their assignments and projects so they could focus their academic efforts on the technologies and activities most applicable and beneficial to their specific educational context and growing language teaching practice. It also provided the opportunity to explore several different *a priori* questions (such as the one driving this inquiry) in an authentic, natural environment through retrospective document studies. While a more common qualitative research approach would have been to conduct interviews, this design created a scenario where teachers could voluntarily accept or reject Virtual World technology without pressure or influence from professors or researchers, yet rich data could still be collected on their technology acceptance and integration.

Participants

For this inquiry, it was important that only pre-service language teachers were eligible as it is "important to differentiate pre-service teachers' beliefs and competencies with regard to the acceptance and use of technology depending upon the subject taught" (Yildiz Durak, 2019, p.177). By only focusing on pre-service teachers in one subject, this research contributes to literature that could help inform instructional technology programs based on subject matter as it provides case studies for designers to reference in order to better understand the reasons various pre-service language teachers have for incorporating *Minecraft* in a context of Social Constructivism and self-directed learning (Baydas and Goktas, 2016). During the summer of 2021, twenty-one students from the college of education enrolled in a technology in foreign language education course at a Research I university in the Southeastern United States. All the students were either pre-service or in-service language teachers. Only ten students chose to integrate *Minecraft Education Edition* into their work: four in-service teachers and six pre-service teachers. I created this sample of three pre-service teachers after receiving institutional review board approval and reaching out to the eligible students. I could only include the pre-service teachers who would consent to examination of their coursework because the Family Educational Rights and Privacy Act protects the privacy of students' educational documents (FLDOE, 2022). Participant One was a female, first year undergraduate student, at the beginning of her journey to become a teacher. This course was not only her first technology course, but also her first education course. Teacher Two was a male undergraduate student less than a year away from graduation with aspirations on teaching abroad. Neither of these participants had classroom teaching experience. However, Teacher Three was a female undergraduate student nearing her second year who was at the time teaching in a secondary classroom setting and had multiple years volunteering in primary and secondary classrooms.

Data Collection

For six weeks (the duration of the summer semester) the course context required students to post a Reflexive Digital Story (RDS) Journal that documented their ideas, reflections, perceptions, and attitudes relevant to the technology they focused on that week. Students posted these journals after they completed the assigned readings and coursework for that week. The course syllabus directed students to "connect course content, teaching philosophy/pedagogy reflections, and individual experiences" and use the RDS journal as an opportunity to "create a multimodal autoethnographic digital story that demonstrates student reflexive practices and development." It also stated that the creation of an RDS includes "multiple drafts that take peer (and instructor) feedback into consideration and combines audio, visuals, and word-based text into a cohesive, expressive, 5-minute minimum sharable… video, animation, "podcast" style audio, etc. to share with your classmates reflecting on the topics of the week and directly addressing implications for your teaching." Each week students completed these journals along with a lesson plan assignment or project that related to the specific technologies they chose to integrate that week. The also course required students to actively review their peers' posts and comment on a minimum of two other students' work. As the primary investigator, I downloaded their multimedia RDS journals, written submissions, and discussion comments, anonymized them by assigning the participants pseudonyms, and saved them to encrypted files on a password-protected external hard drive. I then used Otter.ai to create transcripts of the video and audio data and uploaded everything to Atlas.ti 22 for analysis.

Research Questions

I used a single *a priori* question to guide this inquiry:

1. What reasons do 3 pre-service teachers actively engaged with *Minecraft Education Edition* in a technology in foreign language education course give for their acceptance and usage of virtual world technology?

Data Analysis

Theoretical Framework and Coding Process

Just as the researcher cannot be eliminated from the research, Anfara and Mertz (2015) contend that "theory plays a key role in framing and conducting almost every aspect of the study" (p. 11). I employed the Unified Theory of Acceptance and Use of Technology (UTAUT) as a lens to explore the reasons spoken and unspoken that potentially impact pre-service teachers' acceptance and use of *Minecraft Education Edition* (Venkatesh et al., 2003). To do so, I read over a sample of data from each of the participants and used it to inform the creation of a preliminary codebook (Codebook #1). This preliminary codebook composed of codes for the major UTAUT constructs, structural codes for the research questions, and codes to identify negative and positive perceptions, along with their definitions. I then went back through the data sample and tested this first codebook iteration. This deeper analysis helped me to revise my codebook into a second more detailed iteration (Codebook #2) that included codes for change, technology, design factors, and identity facets. I used this iteration to code all of the data from the three participants, adding additional codes during this open coding process. Exceptional coding of the data was a priority as I concur with Richards (2021) and Miles, Huberman, and Saldaña (2020) that coding is not a preliminary

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process that prepares data for analysis. Rather, "coding is the heart of data analysis" (Richards, 2021, p. 156). Without a meaningful coding practice, the quality of the research suffers as "the excellence of the research rests in a large part on the excellence of the coding" (Strauss, 1987, p. 27).

For the final analysis phase of this inquiry, I followed the literature on Reflexive Thematic Analysis (Braun & Clarke, 2006; Clark & Braun, 2013; Richards, 2021; Richards & Bebeau, 2021). As themes do not spontaneously emerge but are actively generated by the researcher through constant engagement with the data and active decision-making (Braun & Clarke, 2006; Clarke & Braun, 2013), this phase of the inquiry was an extensive, intentional, and highly personal process. As Briggs (2019) states, "none of us are detached, objective observers" and "the perspective or position of the researcher shapes all research" (p.1).

Axiological Stance, Positionality, and Verisimilitude

As Noble and Smith (2015) discuss, quantitative researchers frequently criticize qualitative research as "lacking scientific rigor with poor justification of methods adopted, lack of transparency in analytical procedures and the findings being merely a collection of personal opinions subject to researcher bias" (p. 1). Quantitative research uses tests and measures to establish validity and reliability, which cannot be applied to qualitative research, creating debate over whether terms like validity, reliability, and generalizability are applicable or appropriate for the evaluation of qualitative research (Long & Johnson, 2000; Noble & Smith, 2015; Rolfe, 2006; Sandelowski, 1993). Qualitative research employs methods that are inherently different in terms of philosophical position and purpose deeming an alternative framework for evaluation necessary

(Sandelowski, 1993). Lincoln and Guba (1985) established the criteria of verisimilitude, consistency and neutrality, and applicability.   In order to achieve these, the research must acknowledge "the complexity of prolonged engagement with participants and that the methods undertaken and findings are intrinsically linked to the researchers philosophical position, experiences, and perspectives" (Noble & Smith, 2015, p. 2). "Researchers have a personal history that situates them as inquirers" (Creswell, 2013, p. 51). "In qualitative inquiry, the researcher is the instrument" (Patton, 2002, p.14). I concur with these researchers, which is why I am transparent on my axiological stance, positionality, and the experiences that make me a unique instrument or lens to view the data.

My axiological stance is created by my background as a professional artist and dedicated activist who was raised by an extended family of eccentrics and performers who encouraged me to experience the world through artistic expressions. It is also crafted by my experiences traveling the world as an English language teacher, living amongst cultures different than my own, and opening myself to their traditions, values, and views of the world. I am a Social Constructivist teacher in the classroom, and a Post-Structuralist espousing incredulity towards metanarratives in my life as an artist.

My positionality at the time included my positioning as a doctoral student serving as a teaching assistant in the inquiry context. I am also a strong proponent of virtual worlds and online teaching, which required me to be conscious of my bias, understand that students may not want to share their truths with me if they disagreed, and take steps to ensure counter these limitations.

I do not try to eliminate myself from my work or pretend that it is not subjective. Rather, I accept it and view it with open eyes in recognition that multiple realities exist, and outlining my personal experiences and viewpoints that may have resulted in methodological bias, leaving a 'decision-trail' that makes my decisions clear and transparent (Lincoln & Guba, 1987). Primeau (2003) puts forth that as a researcher immerses themselves in data, reflexivity facilitates a deeper understanding of the impact their subjectivities have on their interpretation of that data. In order to achieve this reflexivity and follow the steps that Lincoln and Gupta put forth, reflection and memo-ing were a large part of my analysis process. While memo-ing is often associated with Grounded Theory, "all qualitative approaches can be enhanced by the use of memos" (Birks et al., 2008, p. 69).

Results

What reasons do 3 pre-service teachers actively engaged with Minecraft Education Edition in a technology in foreign language education course give for their acceptance and usage of virtual world technology?

The three participants gave a collection of reasons for their acceptance and usage of virtual world technology that formed three distinct trends of 1) A Need for Motivation and Engagement, 2) The Social Nature of Culture and Language, and 3) An Opportunity to Make the Impossible Possible.

Trend 1: A Need for Motivation and Engagement

The trend of "A Need for Motivation and Engagement" was the first trend I discovered within the participants' reasons. It is about how these unique individuals all believed today's students, K-12 and beyond, lack motivation and engagement and that can be improved with the effective

integration of technology like Virtual Worlds (VWs) because they are prevalent in many students' lives outside of school and backed by DGBLL pedagogy and its motivational benefits. This line of reasoning is rooted in the participants' reflections on their personal experiences and their status as current students.

Participant One discussed how *Minecraft Education Edition* is "a much more interactive and fun assignment while still teaching you so much more and giving you an opportunity to really show how things are while connecting certain words and ideas to how the images and environments are." She thought *Minecraft* would be an especially great way to teach younger generations because her experiences in academia showed her students are already immersed in technology. Her observations led her to believe books and paper/pencil activities might not be as effective and could possibly demotivate and disengage students. Participant One even extends the engagement aspect of *Minecraft* to the position of teacher, relating how she believes lesson designing and teaching are more engaging for teachers when using *Minecraft*.

One of the reasons Participant Two chose to implement *Minecraft Education Edition* was his belief that fun is a critical factor and his perception that VWs and VR (Virtual Reality) accessories are fun, engaging, and a source of motivation. Participant Two admitted that before the course started, he was worried that maybe he was in the wrong field, but that the course reminded him how much fun it is to create lesson plans with cutting-edge technology and to teach with them, which reaffirmed that he is on the right career path. The experience even motivated him to go out and get his first professional teaching job as a substitute teacher, which aligns with what Participant One

said about how working with technology does not only engage the student, but it engages the teacher.

Participant Three decided to explore and implement *Minecraft Education Edition* after she experienced the ineffectiveness of apps like *Duolingo* and wanted a more effective tech option for language learning. She quoted Chappelle and Sauro (2017) who state that applications like *Duolingo* "reflect a range of sometimes questionable L2 pedagogical approaches, including grammar-translation and memorization drills, and may not necessarily leverage principles of game-based learning beyond the motivational capabilities of gamified feedback and assessment" (p.205)." She recognized how pedagogy could be better applied to motivate and engage through the flexibility of *Minecraft Education Edition*, which offers opportunities for building, communicating, and designing experiences. Participant Three used research to back up her experience-based reasoning and stated that motivation is important because as Alsolami and Saaty assert "motivation directly influences L2 learning strategies, the amount of input which learners receive, and overall achievement and proficiency" (p.718).

Trend 2: The Social Nature of Culture and Language

This trend embodies the reasons the pre-service teachers gave related to culture, language learning, and the social nature of human beings as they live, learn, and communicate. For example, Participant One is highly interested in VWs and VR (Virtual Reality) accessories because she values immersive experiences and recognizes how *Minecraft* and other VWs can engage and motivate people by taking them to places that surround them in language, diverse cultural experiences, and opportunities to connect with other people through custom made worlds;

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elements she believes are valuable. Participant One's RDS journal entries and essay assignments reveal she values *Minecraft's* authenticity, social culture, and connection to the real world which she believes is missing in her own education. Her reflections show she embraces the collaborative culture and interaction encouraged by *Minecraft*, and wished she used it in her classes during Covid-19 when most of her professors took the route of *"here's the textbook, here's an assignment, teach yourself."* In Participant One's words, she now believes that *"if we used something more like Minecraft education, even for like my Spanish classes that I've taken, it would be much easier to learn the language… and it would be much better connecting the language and the words to the culture and to the environment than just reading through a textbook because reading through a textbook genuinely doesn't really show you as much as doing an online simulation can."* Her reflections convey that she thinks VWs are a powerful resource for social education opportunities and for evolving teaching practices to new social levels that were not often experienced in academia during the past two decades.

Participant Two and Three expressed similar sentiments as Participant One in their RDS journals and their interactions with their peers on the course discussion boards. Throughout her work in the course, Participant Three reiterated the importance of cultural context and authenticity in language learning. She believes students need social interaction in order to *"care about their education"* and to feel motivated enough to engage in the material. Participant Three stated, *"The basis of my opinion is that humans are social creatures… we naturally learn a language, our native language, because we are forced to engage with it to meet our communicative needs, and our communicative needs are like interacting with others expressing our likes and dislikes…"* As this statement demonstrates, the situated learning opportunities VWs present build on these participants' value

of culture and social interaction to illuminate positive reasons for acceptance that motivate them to integrate VWs into their growing practices.

Trend 3: An Opportunity to Make the Impossible Possible

The trend "An Opportunity to Make the Impossible Possible" became prevalent later in the participants' coursework as all three expressed in their RDS journals as having revelations about what it meant to live in today's era, the needs of students, and the affordances Virtual Worlds (VWs) offer in and out of the classroom. All the participants believed the world changed since the emergence of Covid-19 and that new emerging technologies, like VWs, offered options that were no longer possible (such as field trips to crowded indoor spaces like museums, lectures, and theaters) alongside opportunities that may never have been an option (trips to other countries or even to parts of their own town deemed too dangerous, expensive, or time consuming), which gave them a reason to pursue VWs.

A major reason for Participant Two's integration of VWs and their accessories into their practice was they are ways of connecting students, teachers, and technology within a virtual space where resources come together so that *"essentially, you can do anything."* He rooted his reasoning in the realization that *Minecraft* for educational purposes is *"a brilliant idea and everything because, you know, kids, they absolutely love Minecraft. And if you can utilize, you know, this technology to… help them learn and everything, then… I feel like that's amazing, especially after… Covid…"* He believes that *Minecraft Education Edition* might help students regain the mindset to learn by bringing a popular out-of-school literacy into the classroom, something that he perceived as not possible pre-Covid.

In her RDS journal, Participant Three expressed that she had experiences where the education system has been *"unfair"* to her and based her reasons for integration in a desire to develop equitable practices that would work towards changing how students experience learning. As a social justice-oriented person, she saw the potential for connecting with students from around the world and giving them engaging experiences. She also recognized the connection between *Minecraft* and VR technologies and their common benefits of taking students out of the physical reality into a digital reality where they can do more than they can in real-life.

Immersion and visiting places that are impossible in real life also impacted Participant One's reasons for integration. As someone who has an interest in Marine Biology, she was amazed at how *Minecraft Education Edition* included an underwater world that created opportunities to explore different marine life through a Virtual World (VW). The participants recognized how VWs create the opportunity for activities like field trips and museum tours, as well as ones that were always out of reach due to logistics, funding, and/or safety issues, such as visiting a volcano, traveling to the bottom of the ocean, or representing ones' self as avatar that expresses inner identity.

Limitations

The first limitation of this inquiry is hermeneutic considerations. I may see something different in this data should I look back on it ten years from now, and another researcher may see something different today or in the future as our interpretations are based on our unique positionalities and axiological stances. Second, researcher bias must be considered. I am a proponent of Virtual

Worlds and my own affinity for them may have clouded my judgement even though I took conscious steps to counter any bias. Third, the participants and the whole population of the course may not have wanted to share their truths in their RDS journals due to pressure from peers, professors, or the larger community. The university where I conducted this research valued innovation and creative technology usage. The professor and teaching assistant (me) of the course valued social learning and collaboration. If the students in the course (participants included) did not share these values, they may have been reluctant to disclose their true views. This could have also been a factor in why only three students out of the ten that incorporated *Minecraft* into their coursework consented to participating in this research. Fourth, those who did participate may not have been able to remember their reasons and perceptions accurately depending on when they completed the coursework and when they created their journal. There was also little direction given as to how to complete their journals and so students may not have reflected as deeply on their reasons as they would have with more guidance. Finally, quantitative researchers may see the small sample size and the lack of generalizability to be limitations. However, I disagree, as "the goal of most qualitative studies is not to generalize but rather to provide a rich, contextualized understanding of some aspect of human experience through the intensive study of particular cases" (Polit & Beck, 2010, p. 1451). The small sample size facilitated my "close association with the respondents, and enhance[d] the validity of fine-grained, in-depth inquiry," something that would not have been possible with a large sample size (Crouch & McKenzie, 2006, p. 483).

Implications

Based on the findings of this inquiry, advancements in theory may continue. The Unified Theory of Acceptance and Use of Technology is not the end all model for technology acceptance, but a

steppingstone that can be improved upon as more is learned about the evolving needs and preferences of people and societies. Inquiries such as this one provide cases in bounded contexts that give researchers and educators insight into how the lived experiences, goals, and era identities of individuals, as well as other factors, impact their acceptance and use of technology, and create references for the improvement or further validation of theoretical models.

The findings of this exploration also demonstrate that it would be advisable for universities to consider integrating this gaming platform in professional development programs as effective use of this software in the foreign language classroom may increase teacher motivation as well as learners' motivation to learn the target language. Virtual Worlds can connect students and teachers from around the world and offer them access to situated learning opportunities and authentic learning experiences thus creating a fun and motivating space for digital learning.

Future Research

According to the literature review of Smith, Kahlke, and Judd (2020), the assumptions built by Prensky (2009) and other futurists that younger generations are 'digital natives' remains influential in academia today, even though many educational technology researchers have argued for a move past those assumptions. More research is needed to better understand how pre-service teachers' age, training, and learning experiences with technology contribute to their acceptance and use of technology. To better understand the underlying reasons for teachers' current educational practices, how their educational contexts influence their work, and how technology effects their motivation to pursue teaching careers, research will need to explore more case studies where pre-

service teachers of different ages, cultures, and backgrounds are given the choice and opportunity to pursue new emerging technologies like VWs.

Conclusions

The reasons these pre-service teachers gave for acceptance and use of VW technology embodied the recognition of a need for motivation and engagement in the classroom, beliefs about the social nature of culture and language, and perceptions of VWs as an opportunity to make the impossible possible. I conclude that more research on the different educational contexts is needed to illuminate the various journeys, mindsets, and values that produce various reasons for the acceptance and use of VW technology. A better understanding of the reasons pre-service teachers provide for acceptance and integration, and the underlying factors that root their reasoning, might support future teacher educators to better understand their students and in turn create teachers that can better serve their students. Without knowing the different values, influences, and reasons behind pre-service teachers' choices, it is not possible to effectively train, educate, or support them as they face the ever-evolving landscape of education.

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Chapter Six: Pre-Service Teachers' Perceptions

of Foreign Language Learning in Virtual Worlds

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Introduction

Past research showed teachers integrated technology into their practice to a limited degree as recently as the early 2000s (Angeli, 2003). In today's technological era, understanding if and how teachers' acceptance and integration of technology evolves is critical to understanding their needs. Technology creates complicated demands on educators and there is ample research on the factors that may contribute to their limited success at integrating it (Bustos & Nussbaum, 2009). Many researchers have posited why teachers limit technology integration, or even avoid it completely (Budin, 1999; Guzman & Nussbaum, 2009; Mumtaz, 2000; Redman & Kotrlik, 2009; Vannatta & Fordham, 2004). In this paper, I explored the perceptions three pre-service teachers had of language learning in Virtual Worlds (VWs). During a six-week online university course on technology in foreign language education, three pre-service teachers voluntarily integrated *Minecraft Education Edition* into their coursework. The format of the course allowed me to qualitatively analyze their reflections, lesson plans, projects, and other coursework to reveal their perceptions of language learning in VW contexts and contribute to the literature on pre-service teachers' acceptance and integration of new emerging technologies.

Literature Review

Teachers' Perceptions of Technology Integration

The process of technology integration in educational settings is complex and open to constant improvement as people, educational policies, and the world changes and develops. Therefore, it is crucial to renew, revise, and be open to different variables in an exploration of teachers' acceptance and use of video games, Virtual Worlds (VWs), and Digital Game-Based Language Learning (DGBLL). However, research shows that teachers' perceptions and attitudes towards pedagogical innovations and information and communication technologies are prominent factors that impact adoption and integration (Tejedor & Muñoz-Repiso, 2006). The perceptions teachers develop as pre-service teachers influence their classroom performance as in-service teachers (Moon et al., 2016), and their experiences with technology impact their intention to use it in their future practice (Venkatesh et al., 2003; Zhou et al., 2016).

Theories and Models of Technology Acceptance

Davis, Bagozzi, and Warshaw (1989) define technology acceptance models as "an explanation of the determinants of computer acceptance that is general, capable of user behavior across a broad range of end-user computing technologies and user populations" (p. 985). Davis (1986, 1989) introduced the original Technology Acceptance Model (TAM), which stemmed from a combination of previous models and theories and put forth that an individual's attitude towards a particular technology comes from their perception of the technology's usefulness and ease of use. He also argued that their usage of a particular technology for a specific purpose, can be explored

through the study of how external variables connect to these constructs as they contribute to the individual's attitude towards usage and their behavioral intention to use (see Figure 6.1).

Figure 6.1

Technology Acceptance Model (TAM) by Davis, 1989
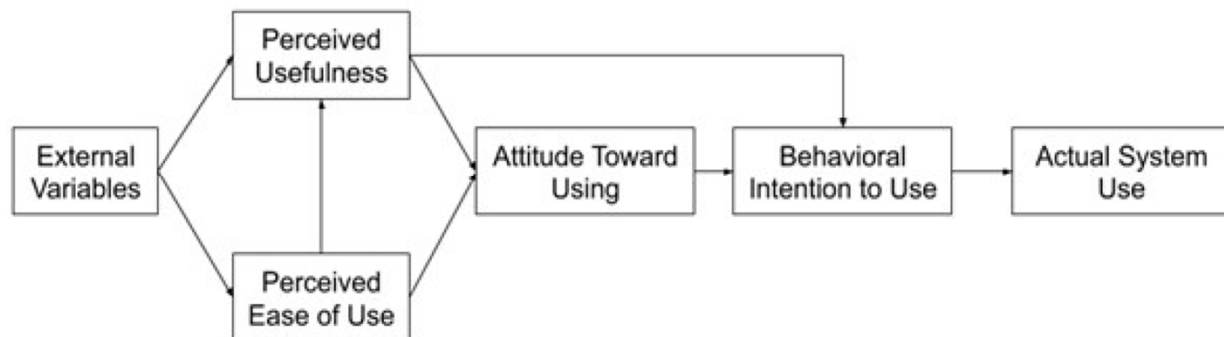
Davis' original Technology Acceptance Model (TAM) (1989) and Venkatesh and Davis' (2000) TAM2 served as part of the inspiration for Venkatesh, Morris, Davis, and Davis' (2003) model, the Universal Theory of Acceptance and Use of Technology (UTAUT) (see Figure 6.2). The UTAUT model combines eight dominant theories and models: 1) the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), 2) the Motivational Model (Deci, 1971; Vallerand, 1997), 3) the Technology Acceptance Model (TAM) (Davis, 1989), 4) the Theory of Planned Behaviour (TPB) (Ajzen, 1991), 5) the Innovation Diffusion Theory (IDT) (Tornatzky & Klein, 1982), 6) the Social Cognitive Theory (Bandura, 1986), 7) the Model of PC Utilization (Thompson et al., 1991), and 8) the combined C-TAM-TPB model (Taylor & Todd, 1995).

Figure 6.2

The United Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al., 2003
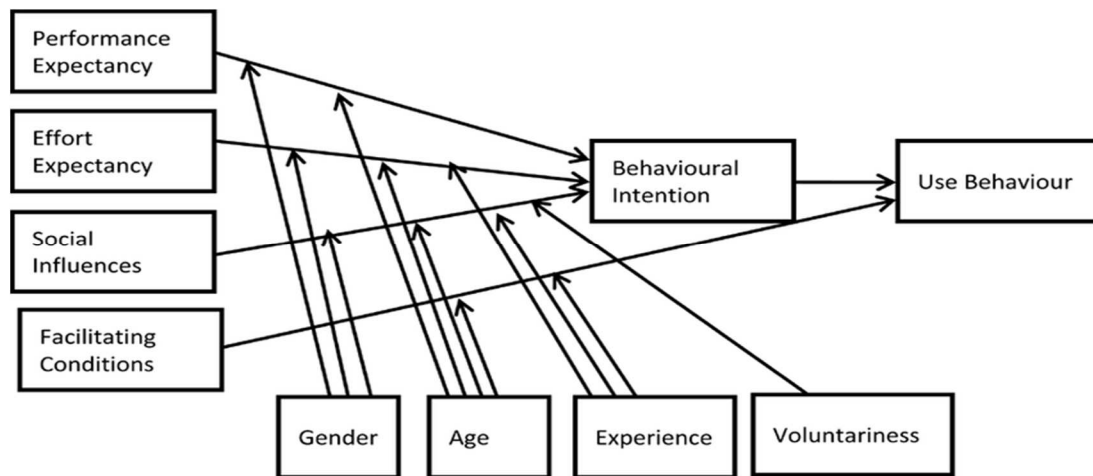
Acceptance and Usage of *Minecraft Education Edition*

While there is an array of studies from the past two decades on pre-service teachers' acceptance and usage of more traditional types of technology, including traditional video games, there is minimal research specifically relating to the acceptance and usage of *Minecraft*, and even less on *Minecraft Education Edition*, as it is barely 6 years old. Martín del Pozo et al. (2017) were one of the first research teams to publish findings using *Minecraft Education Edition*. They implemented an intervention for second-year graduate students pursuing master's degrees in primary education at the University of Castilla-La Mancha in Spain. The researchers aspired for this intervention to educate pre-service teachers on the pedagogical integration of digital game-based learning (DGBL). Their pre- and post-surveys indicated that over 95% of students had positive perceptions of using DGBL via *Minecraft Education Edition* for teacher education. Unfortunately, their

findings did not indicate whether or not the pre-service teachers had a behavioral intention to use *Minecraft Education Edition* in their future practice. However, their participants' responses to an open-ended question on the weaknesses of using gamification in the classroom highlighted a need for "teaching training in design, implementation, and development of these practices in their teaching profession" (Martín del Pozo et al., 2017, p. 8).

Gabriel et al. (2019) investigated pre-service teachers' perceptions of using *Minecraft* in general for teaching craft, design, and technology at the primary level. They discovered two groups of pre-service teachers: those who would like to use *Minecraft* in their practice and those who were against using it. Their findings reflected that both groups recognized the advantages for pupils such as spatial thinking and orientation, planning skills, increased motivation, social skills, and digital literacy. The researchers stated that when "Comparing the two groups in these two categories (basic attitudes towards digital games and *Minecraft*) it is striking that responses are nearly identical in many aspects, although the students voice their clear opinion for or against *Minecraft*" and the authors "can only guess which reasons are responsible for this phenomenon" (Gabriel et al., 2019, p. 257). They did identify that "the group who does not want to use *Minecraft* focuses more on the potential problems (missing equipment, own insecurity) than the other group" (Gabriel et al., 2019, p. 257).

Methodology

    Study Design

For this inquiry, I used a multiple case study approach with a sample of cases from a bounded context, specifically a university course for pre-service and in-service teachers on technology in

foreign language education (Krathwohl, 1998; McMillan & Schumacher, 1997). Two professors designed this course based on Social-Constructivism theory and the educational literature that promotes self-directed learning, where individuals choose the appropriate methods and strategies to achieve their goals (Fisher et al., 2001). The design allowed students freedom of choice in their assignments and projects so they could focus on technologies applicable to their specific educational context and growing language teaching practice. The data for this study were written documents and multimedia projects, such as videos, podcasts, and PowerPoint presentations submitted as coursework.

Participants

During the summer of 2021, twenty-one students from a college of education, all categorized as pre-service or in-service language teachers, enrolled in a six-week technology in foreign language education course at a Research I university in the Southeastern United States. Of those twenty-one students, ten chose to integrate *Minecraft Education Edition* into their coursework: four in-service teachers and six pre-service teachers. I determined the final sample of three pre-service teachers after I received IRB approval and reached out to the eligible students.

The three participants in this inquiry were all pre-service teachers, undergraduate students from the same college of education, and enrolled in the same bounded context, a technology in foreign language education course.

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Data Collection

The data for this inquiry were Reflexive Digital Story (RDS) Journals, which documented students' ideas, reflections, perceptions, and attitudes related to the technology they chose to focus on that week, lesson plan assignments, course projects, and discussion board comments. Each week, students posted their work to a Canvas discussion board and commented on each other's work to create a learning environment rooted in Social Constructivism. I downloaded their comments and their work, anonymized them and saved them to encrypted files on a password-protected external hard drive. I then used Otter.ai to create transcripts of the video and audio submissions before I uploaded everything to Atlas.ti 22 for the analysis stage.

Research Questions

I used one *a priori* question to guide this inquiry:

1. In what ways do 3 pre-service teachers actively engaged with *Minecraft Education Edition* in a technology in foreign language education course perceive foreign language learning through virtual worlds?

Data Analysis

For the analysis stage, I followed the literature on Reflexive Thematic Analysis (Braun & Clarke, 2006; Clark & Braun, 2013; Richards, 2021; Richards & Bebeau, 2021). This stage of the inquiry was an iterative, intentional, and personal process where I came to know the data, used theory to guide me. Reflexive Thematic Analysis served as a guide for analysis directing me to condense

multimedia data, categorize it, and gain a manageable view of its main points and reoccurring meanings (Caulfield, 2019).

Theoretical Framework and Coding Process

Literature shows researchers effectively studied many general and educational technologies with the United Theory of Acceptance and Use of Technology (UTAUT) model (Oye et al., 2014; Sumak et al., 2010, Williams et al., 2015). I used UTAUT as a framework to explore the perceptions of pre-service teachers related to virtual worlds. For coding, I employed the qualitative coding software Atlas.ti 22. It allowed me to upload a codebook composed of codes for the major UTAUT constructs, structural codes for the research questions, codes to identify negative and positive perceptions, and codes for change, technology, design factors, and identity facets. The software then enabled me to code my multimedia data and create memos and networks to help with my analysis.

After I progressed through the process of open coding and axial coding, I moved to categorization, where I chunked together groups of coded data, combined common codes, and labeled them into larger categories (Chenail, 2008; Richards, 2021). Finally, I generated themes and trends that encompassed the discoveries brought to the surface by my coding process, some produced inductively from the raw data, and others illuminated deductively from the theory and prior research that undergird the inquiry (Nowell et al., 2017).

My Axiological Stance

As Briggs (2019) states, "none of us are detached, objective observers" and "the perspective or position of the researcher shapes all research" (p.1). My axiological stance is composed by my background as a professional artist and teacher of English language development and English language arts in the American educational system. In the classroom, I follow Social Constructivism theory. However, outside of the classroom, I am a Post-Structuralist promoting incredulity towards metanarratives through my art. "Researchers have a personal history that situates them as inquirers," hence, I do not try to eliminate myself from my work, but remain conscious of my possible biases by maintaining a reflexive view of myself, my axiology, and my positionality (Creswell, 2013, p. 51).

Results

In what ways do 3 pre-service teachers actively engaged with Minecraft Education Edition in a technology in foreign language education course perceive foreign language learning through virtual worlds?

I generated two distinct themes that identified what the data was about, what it meant, and embodied the perceptions of the three pre-service teachers (Saldaña, 2016). These themes are: 1) Unique Journeys Mean Unique Perceptions and 2) Covid-19 is a Social Influence.

Theme 1: Unique Journeys Mean Unique Perceptions

The United Theory of Acceptance and Use of Technology (UTAUT) created a lens for me to analyze these students' journeys and helped to reveal that these three participants create a diverse cross-section of the different journeys and of a spectrum of development experienced by education students labeled as pre-service teachers. Their shared goal of becoming teachers was the same, but their individual journeys, their stage of development as teachers, and their end goals for their career were unique and influential.

With UTAUT as a lens, I noted specific findings related to each of its constructs. The construct of *Performance Expectations* is argued to be the most influential construct in the model (Agarwal & Prasad, 1997; Compeau & Higgins, 1995; Taylor & Todd, 1995; Venkatesh et al., 2003), and the strongest predictor of behavioral intention (Venkatesh et al., 2003). Venkatesh et al. (2003) defines this construct as the degree to which a user believes that using a particular technology will help him attain gains in performance and is directly influenced by the moderators of gender and age. This inquiry included one male participant and two female participants who were all relatively the same age (early twenties). Participant Two, a male participant, was technology orientated, and already using Virtual Worlds (VWs) and the technologies often associated with them (Oculus VR headset) for recreational purposes. Even though he expressed he did not know an educational version of *Minecraft* existed before the course, he believed that VWs were already a beneficial resource and incorporated multiple types into his course lesson plans. Exposure to *Minecraft Education Edition* amplified his already established perception VWs' potential for performance objectives and enforced his perspective with educational theory, an experience he described as *"eye-opening."* Participant Two's career goals were not geared towards teaching in the American

educational system, but to teaching English in another country where technology is highly embraced. This led him to design lessons that looked towards his future and aligned with this other country's educational initiatives. His status as a third-year education student reinforced his belief that VW integration would be appropriate for the community, learning standards, and performance expectations of his future country of residence, as this stage of development as a teacher already taught him the importance of technologies that aligned with these elements.

In contrast, apprehension related to the performance expectations of VWs was more prevalent for the two female pre-service teachers, Participant One and Participant Three. They were in different stages of their journey towards teaching careers, yet their end goals were similar- to have careers in the American educational system. Their lesson plans and designs aligned with American educational standards and sentiments, and both heavily drew upon their past experiences within that system to guide their perceptions. Participant One lacked experience with technology in education even though she was generally familiar with it outside of school. Her apprehension came from her lack of classroom experience, yet she could clearly see its benefits for cultural immersion, access, collaboration, and language acquisition when guided by a structured higher education course. Participant Three's apprehension came from extensive yet ineffective exposure to educational technology in education over the course of her entire academic experience.

While all three participants were of similar age and level in education, the era during which they grew up facilitated diverse experiences with technology integration in and out of school, which gave them each a unique perspective on technology acceptance that related directly to their past and future. This suggests that pre-service teachers' acceptance and integration of technology can

be influenced by their career goals and their perceptions of the cultural environments of their past and future no matter their age.

The independent construct of Effort Expectancy, which refers to the degree of ease in using a particular technology, is vital because during the early stages of use, new users can feel that there are barriers or obstacles to using the new technology (Davis, Bagozzi, & Warshaw, 1989; Thompson et al., 1991; Venkatesh et al., 2003). The research of Teo, Fan, and Du (2015) on gender and technology acceptance among pre-service teachers suggests that male and female pre-service teachers have "comparable perceptions about the usefulness of technology in education, hold similar attitudes about technology use, and have similar intentions of using technology in education" (p. 245). My discoveries do align with their findings on the gender moderator, but they can be more adequately attributed to the Experience moderator that is also connected to *Effort Expectancy* on the UTAUT model. Participant Two used PC games and video games in his personal life, and while he found the course information on integrating them into educational activities *"eye-opening,"* his reflections continuously expressed his unwavering perception that Virtual Worlds (VWs), like *Minecraft* and *VR Chat*, are *"very easy to implement,"* and never expressed any doubt in his ability to manage VWs in a classroom setting.

In contrast, Participant One and Three, who did not have the experience using VWs to the same degree, were more reserved in their judgments on ease of use, and transparent about their frustration at not knowing how to operate *Minecraft* and perceiving themselves as not talented with it. They were also much more analytical and in-depth about their assessments of the technology. Participant Three played *Minecraft* before enrolling in the course yet still went through

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multiple iterations of a *Minecraft* lesson she designed after deciding that she had not used the technology in the best way possible. Participant One, a brand new user of VWs, expressed the most excitement over *Minecraft*, yet her perspective was still apprehensive and realistic. She recognized that she would need to start with beginning tutorials on how to use VWs and spend more extensive time focusing on how to use the technology to the best of its potential, two sentiments Participant Three also expressed. Could this situation be an indication of differences in the way American society integrates technology into the lives of children of different genders? More research is needed to better understand how the moderator of gender affects technology integration and how it may be a factor for pre-service teachers.

The final UTAUT construct relevant to this theme is Facilitating Conditions, which is the degree to which a user believes that the necessary organizational and technical structures exist to support the use of a particular technology (Venkatesh et al., 2003). Research backs up the assertion that when users feel well-supported, they are more inclined to use a technology (Abu-Shanab et al., 2010; Eckhardt et al., 2009; San Martin & Herrero, 2012). The participants in this inquiry were all well-supported within an educational context and encouraged them to make choices based on their teaching context (current or future). While the educational context created supportive facilitating conditions and a high level of voluntariness of use (a UTAUT moderator) through extensive student choice in technology, the unique journeys of each participant created unique perceptions and illuminated their different stages of development as teachers. Their varying knowledge of the educational system, teaching and learning theory, and differing confidence levels in their abilities became evident and connected to how they accepted and integrated VWs.

Participant One was clear with her intention to use virtual worlds in her future practice, which is the first of two UTAUT dependent Constructs (*Behavioral Intention* and *Behavioral Use*). However, she also admitted that she did not know what that integration would look like as she is at the beginning of her journey and does not know her future teaching context. Participant Two did not discuss any issues with the organizational or technical structures necessary for him to implement Virtual Worlds (VWs) other than the current high prices for VR headsets should a teacher in any public education system want to use that accessory. Finally, Participant Three expressed concrete thoughts on the facilitating conditions of implementation based on the context of American public schooling. She displayed a consciousness of social justice issues, the differing needs of various contexts, and the complicated current landscape of education during the era post-emergence of Covid-19. Even though she was a year behind Participant Two, she had the most practical experience. Minecraft was possible to implement in the ESOL context she was working in during the course and incorporated it into her teaching multiple times. By the end of the course, she not only expressed clear behavioral intention but had already taken the next step and put it into her current practice, making it to the second UTAUT dependent construct of *Behavioral Use.*

More research is needed on the various journeys to teaching as a career and the different stages in teachers' educational development to fully understand how technology acceptance and usage form within their practice.

Theme 2: Covid-19 is a Social Influence

This theme relates to the UTAUT construct of *Social Influence,* which describes the degree to which an individual believes that important people in their community and/or society believe

he/she should use a particular technology (Venkatesh et al. 2003). Important people could refer to family members, friends, colleagues, influencers, icons, or other figures. Just like the construct of *Performance Expectation*, *Social Influence* is considered to have a positive relationship with the behavioral intention to use a technology (Abu-Shanab et al., 2010; Eckhardt et al., 2009; San Martín & Herrero, 2012; Venkatesh et al. 2003).

The participants' reflections did not indicate any specific sources of social influence within their specific population (i.e., peer, professor, or university pressure, etc.). Rather, all three participants recognized the influence of Covid-19 on the acceptance and integration of technology into students' lives and how VWs had the potential to combat issues of disconnection, social isolation, and lack of safe opportunities for experiences beyond the classroom. While the era of Covid-19 does not fit traditionally into the *Social Influence* construct as it is not an important person who believes individuals should use technology, it is an overarching era identity (Loden & Rosener, 1991) that worked as an influencer worldwide to promote the acceptance and use of technology in almost every aspect of life, including education. The context of this inquiry was an asynchronous online course on technology in foreign language education during the summer of 2021 when the university these students attended was still functioning strictly online due to health and safety mandates. These circumstances took away some of students' level of choice in their education and the uncertainty of future health and safety concerns may have acted as a moderator replacing voluntariness of use with a determining factor- online life due to mitigating circumstances. The data support the observation that these pre-service teachers were all conscious of Covid-19 and its impact on education and may have decided they needed to consider more innovative educational technologies, like VWs, to be sufficiently prepared for their future careers. More research is

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necessary to determine the impact Covid-19 had on the mindsets and practices of pre-service teachers if technology acceptance and use is to be better understood.

Limitations

The main limitation of this inquiry is hermeneutic considerations, as I may see something different in this data should I reexamine it in the future, and another researcher may see something different today or at any other time as my interpretation is rooted in my unique experiences, axiology, and positionality. A second limitation could be that of researcher bias. I am a proponent of virtual worlds and could be influenced by my own endorsement to see something that may or not be there or could be interpretated differently if I was not a believer in this new emerging technology.

Implications and Future Research

The cases included in this inquiry bring up important perspectives that contribute to the acceptance and use of Virtual World (VW) technology by pre-service teachers. New technologies add countless new layers of complexities to the already elaborate entanglement of factors that weigh on educators. While some researchers may term this generation as 'digital natives' (Prensky, 2009), individuals growing up during this time could have been highly immersed, somewhat immersed, or not immersed at all, with varying levels of each scenario in and out of school, depending on their location, socioeconomic status, culture, and the beliefs of their parents' and/or grandparents' generation who did not grow up with the same technological immersion now possible. The variation between pre-service teachers' experiences with technology, even though they were generally the same age, suggests that the discussion around technology integration in America is more complex than digital immigrant vs. digital native. Pre-service teacher education

needs to be viewed with a critical lens. My discoveries indicate the needs of pre-service teachers entering programs today may potentially be more varied than what is currently being acknowledged by educators, researchers, or curriculum designers. Additional research is needed to better understand the different stages on the spectrum of development pre-service teachers experience and how their unique journeys impact their perceptions, which in turn influence their acceptance and integration of new emerging technologies.

Conclusions

This inquiry revealed how the unique journeys of the participants meant unique perceptions and how Covid-19 was a social influence for them. While only time will tell if Virtual Worlds become a long-term fixture or the next outdated trend. The landscape of education will continue to change and evolve as the needs of students, teachers, and society do the same. No matter the outcome for VWs, more research is needed to better reveal how pre-service teachers' perceptions of technology are formed, how they may be influenced, and what type of education is necessary to support them on their journeys towards becoming in-service teachers who can utilize new emerging technology tools to teach 21st century skills, foreign languages, and more.

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Chapter Seven: Implications, Future Research, and Conclusions

This chapter reviews the five manuscripts' discoveries and creates connections between them. These manuscripts represent a collaboration between myself and the other authors in an effort I led to explore the implications of this dissertation's content and expand the field of research on virtual worlds in foreign language education. In this chapter I discuss these implications to the field and make recommendations for future research directions.

Overview of Studies

In this dissertation, "Minecraft in Language Teacher Education: Acceptance and Integration in Practice," I approached the study of language teachers' technology acceptance and integration through two entry points: 1) Literature Reviews and 2) Practice, specifically the exploration of pre-service teachers' practice in an educational environment. The five manuscripts' areas, process, and major discoveries are reviewed in Table 7.1.

Table 7.1

Overview of Manuscripts in the Dissertation

Entry Point	Manuscript	Title	Publication	Status	Discoveries
Literature Review	Chapter 2: Systematic Literature Review	Language Teachers and Virtual World Research: A Systematic Literature Review	*Australasian Journal of Educational Technology*	Under Review	• Progressive pedagogy is the most prevalent approach • Virtual Worlds are often employed with student-centered and reflective practice • 70% of the research reviewed used multiple approaches and pedagogies to negotiate learning • The roles teacher should assume in virtual world instruction are unclear • Teachers choose options where they are comfortable, have reliable access, and are well supported over new emerging technologies that make them innovators and designers
Literature Review	Thematic Literature Review	Language Teachers & Virtual World Research: A Thematic Analysis with Atlas.ti 22	*The Qualitative Report*	Under Review	• How language teachers negotiate their personal and professional identities and the factors that influence them are in question when it comes to virtual world instruction • Teachers personal and professional values impact their acceptance and integration • Teachers believe technology usage is their own personal choice • Teachers do not envision themselves as innovators and designers of technologically advanced curriculum • Teachers perceive access as critical, including students accessing the curriculum and their peers' physical cues, and their own ability to access physical, monetary, and community support • Experience can impact teachers' perspectives in positive and negative ways • Experiences without clear pedagogy, roles, and training, teacher reduce receptivity • Community, cultural, and personal factors impact teachers' acceptance even when they have positive experiences with technology • Teachers' emotions play a part in their acceptance of technology

Table 7.1 (Continued)

Practice	Artifact Analysis	Mining Artifacts: Pre-Service Teachers' Usage of Minecraft Education Edition	*CALICO*	Under Review	• Pre-Service teachers integrate technology at an entry-level or adoption-level • The role of the teacher in Minecraft is not clear and pre-service teachers could benefit from guidance as to their place in their technology practice • Pre-Service teachers may benefit from tools like the Technology Integration Matrix when learning how to integrate technology • Teachers' acceptance and integration of technology develops on a spectrum of growth towards a trajectory based on their personal journey • Minecraft offers students opportunities for innovation even when teachers do not
Practice	Thematic Analysis	Pre-Service Teachers' Perceptions of Foreign Language Learning in Virtual Worlds	*Teachers & Teaching*	Under Review	• Even when the goal of becoming a teacher is the same, the end career goals for teachers influences their perceptions • Teachers' past experiences and future aspirations impact their perceptions of technology • Covid-19 impacted teachers as if it was a social influencer changing their views on technology and its place in society and teaching • Future research is needed to determine the lasting effects of Covid-19 on teachers' perceptions
Practice	Thematic Analysis	Minecraft Education Edition in Foreign Language Education: Pre-service Teachers' Reasons for Acceptance and Integration	*The Journal of Language Teaching (JLT)*	Revisions Requested and Under Review	• Pre-service teachers perceive the current educational landscape as needing to motivate and engage students in new ways • There is recognition of humans as social creatures who develop language through interaction and virtual worlds having the potential to offer that in times of isolation like Covid-19 • Virtual Worlds can be perceived as offering pre-service teachers an opportunity to make the impossible possible for students even without considering the limitations of the post-pandemic world

The literature reviews create a background for the new studies of practice and clarify the context for the area of study, its gaps, and areas of potential (Chapter 1 and 2). Through this review of relevant literature on the current state of research it was possible to gain an understanding of the major points of interest in the field and where expansion and exploration were possible. I

discovered that much of the research on virtual worlds and instruction is interdisciplinary and combines teachers from multiple subject areas or places them in the role of student versus instructor for research inquiries. The literature base is composed of diverse works, yet it is this variety that also creates ambiguity in this genre. The roles, pedagogies, and identities teachers' must be willing to assume are not clear or consistent. It is concerning that there is not more dedicated research on language teachers and virtual worlds, the roles they assume during instruction, and their perceptions of and reasons for acceptance and integration. These two literature reviews discovered that there may be a rift between the way researchers view the roles and identities of teachers and the way they perceive themselves when it comes to Virtual World technology. While there is no indication that language teachers see themselves as innovators and designers who incorporate new emerging technologies, researchers do place them in that role. Moreover, the research on virtual worlds is highly inaccessible due to the wide variance in terminology used to define it.

The three studies concerned with pre-service teachers' practice, utilized the multimedia artifacts produced in an online teacher-education context during year two of Covid-19. Chapter 4 is an artifact analysis of two pre-service teachers *Minecraft Education Edition* lesson plans and custom-build worlds for foreign language instruction. It combines the Technology Integration Matrix with a qualitative analysis to generate themes. Chapter 5 and 6 are thematic analyses of three pre-service teachers' perceptions of Virtual Worlds and their given reasons for integrating *Minecraft Education Edition* into their practice. In these two inquiries I employed Venkatesh et al.'s (2003) United Theory of Acceptance and Usage of Technology. In each of these studies, I determined the forms of analysis to align with the theoretical perspectives and data types I chose for each

(Creswell, 2014). The three manuscripts reported empirical research on pre-service teachers'
acceptance and integration of Virtual Worlds. All three studies supported my conclusion that pre-
service teachers have a high demand for support and guidance on the integration of new emerging
technologies, like Virtual Worlds, into their growing teaching practices and that new research is
required to produce tools to guide the development of their professional identities, their ability to
navigate pedagogical logistics, and meet the demands of a technologically advanced world.

Implications and Future Research

This section of this dissertation has two parts: 1) Implications, and 2) Future Research. The
first section discusses the implications to teacher education, while the second section addresses
recommendations for future research efforts.

Implications for Pre-Service Teacher Education

This dissertation revealed there are opportunities to improve the design of the teacher
education course context in order to foster creative thinking that could result in a deeper integration
and possibly a more wide-spread acceptance of Virtual Worlds (VWs) in foreign language
educators. I found the Technology Integration Matrix (TIM) and its related tools to be a valuable
tool for evaluating pre-service teachers' technology integration and believe this set of resources
could be powerful if utilized by education students as they learn about new emerging technologies.
The TIM has the potential to be a guide for pre-service teachers as they explore technology options,
weigh pros and cons of acceptance, and plan usage within their growing practice. My discoveries
implicate that pre-service teachers' need clarity in their roles and tools for developing connections
between technical knowledge, pedagogical knowledge, and content knowledge as they develop

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their professional identities and grow their practices. If VW technology is to be integrated into the educational landscape, teacher educators must recognize that VW instruction requires specialized knowledge for implementation and asks teachers to step into the roles of designer and innovator, changing their positionality in relation to their profession, their colleagues, and their community. Foulger et al. (2017) argued the challenges teacher education programs have in developing authentic technology experiences for pre-service teachers, expressing that "teacher educators must establish new roles for themselves and be held accountable for providing all teacher candidates with equitable, high-quality technology experiences in the courses they teach" (p. 417). The three inquiries into pre-service teachers' practice included in this dissertation demonstrate how access, community and training support, and freedom of choice do not mitigate the need for reflection and examination of the roles teachers take on if more than lower levels of integration by a small group of early adopters is desired.

Future Research Recommendations

This research endeavor inspired me to develop several recommendations for further research. These recommendations can be categorized into three different areas: 1) Research on Pre-Service Teacher Education Program Contextual Designs, 2) Research on Teacher Roles, and 3) Research on Teachers' Technology Usage Trajectory. Each of these areas holds promise for research that could contribute to a better understanding of the acceptance and integration of virtual worlds, *Minecraft,* and new emerging technologies in education.

Research on Pre-Service Teacher Education Program Contextual Designs

The inquiries that compose this dissertation inspire me to put forth that future studies would benefit from a more robust exploration of the contextual factors that influence technology integration. For

example, my artifact analysis and two thematic analyses showed that the context of the participants' professional identities and personal journeys are major factors that influence pre-service teachers' technology integration. Each of the participants was at a different stage in development and had different objectives and perceptions of their trajectory to become a teacher. This is partially due to the overall population of the course where I conducted the inquiries being comprised of students who were pre-service teachers, in-service teachers, and regular students from the college of education at levels ranging from undergraduate (freshman to seniors) to masters (first and second year) levels. If the population of the course came from a more homogenous population, such as a second-year cohort from a master's in teaching (M.A.T.) program, perhaps the pre-service teachers in the sample would then envision learning at more in depth levels of technology integration.

Another contextual consideration could be that while the course in this inquiry was focused specifically on technology in the content area of foreign language education, it was merely an introduction course that provided an intro via a variety of readings and set of overview videos on technology's potential. The course did not have any prerequisites and did not offer any scaffolding for students to take a deeper dive into any single technology, even though the course did provide opportunities for students to explore *Minecraft Education Edition*. The professors who designed the course based it in Social Constructivism theory and student choice, hence the scaffolding came from interaction between students, students and teaching assistants (TAs), and students and the professor. If students were not interested or did not happen to interact with a peer that was exploring a specific technology, like virtual worlds and *Minecraft*, there was always an option for them to opt for other technology topics or keep their exploration of all technologies shallow. If the

course required students to engage in technology at a deeper level and provided scaffolding such as education materials, simulations, or mentoring opportunities, their integration depth may be different.

Research on Teacher Education Materials

Inspired by the contextual factors of course design and the implications for teacher education, I recommend future researchers explore the impact the incorporation of educational materials such as the Technology Integration Matrix (TIM) (FCIT, 2019) evaluation tools or the TPACK (Technological, Pedagogical, and Content Knowledge) Model (Mishra & Koehler, 2006) into pre-service teacher educational programs. The incorporation of tools such as these throughout the semester may change the way pre-service teachers envision technology integration as they might serve as a guide and a reference as they grow their knowledge on technology and teaching practices, which ultimately could impact their view on technology's place in teaching and learning, and how it can be incorporated in order to bolster 21st century skills, student autonomy and agency, and a student-centered classroom dynamic.

Research on Teachers' Roles

Many researchers have proposed different purposes for educational research and the roles teachers and researchers play in such explorations. López-Alvarado (2017) put forth that its purpose is:

> "Improving educational practice by analyzing the world of Education to understand it and make it better. It should be a critical, reflective, and professionally oriented activity. Educational research should have three objectives: to explore issues and find answers to questions (for academics), to share policy (e.g., relationships between

education/work/training, for policy makers) and to improve practice (for practitioners). Historically the role of the educational researcher has moved from academic theorist, through expert consultant, to reflective practitioner." (Abstract).

The systematic and thematic reviews I completed for this dissertation showed that there is a rift between the way researchers view the role of a teacher and the way teachers perceive the roles they take on when it comes to virtual world technology in teaching and learning. I concur with López-Alvarado and contend that the purpose of educational research is to inform and evolve best practices, explore the unknown, and serve as a venue for innovation. The role of the teacher being a crucial position of power through implementation. When it comes to new emerging technologies, if researchers believe that teachers are designers, innovators, policy makers, and reflective practitioners, yet teachers believe they are tech support, lecturers, and censors who are not walking the path of innovation, then the purpose of the research is stunted no matter the definition. Researchers should consider more in-depth qualitative inquiries on this rift that explore the reasons why teachers view their roles in specific ways and illuminate why they are not on the same page as researchers when it comes to the roles they assume in virtual world teaching and learning.

Research on Teachers' Technology Usage Trajectory

The development of a comprehensive understanding of how to use technology in education and its impact on students does not blossom overnight, rather it is developed over time as an individual has authentic experiences that connect pedagogy, technology, and content knowledge while building value. The discoveries of the three new qualitative analyses included in this dissertation motivate me to recommend future research trajectory of growth for pre-service teachers' technology understanding and proficiency. With a more comprehensive understanding

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of how pre-service teachers develop technological knowledge and skill relating to integration, teacher education programs can be designed to better prepare them for their futures as educators in a technologically advancing world. It would also offer insight into how to support pre-service teachers with diverse backgrounds and experiences with and without technology so they can effectively function in different educational contexts.

Conclusion Thoughts

I joined the effort to explore Virtual Worlds (VWs) in pre-service teacher education after I served as a Teaching Assistant (TA) for a professor exploring this area of study. Her course kindled a passion inside of me that eventually gave way to the work in this dissertation. The diversity of methods and perspectives is due to the personal axiology and positionality I brought to this exploration. My multiple roles and eclectic cultural background contributed to this work in many ways. I am a 38-year-old woman who just gave birth to my first child but has worked with children and adults as an English Language Arts and English Language Development teacher for almost a decade. I am also the managing editor of a peer reviewed academic journal on literacy and a well published visual artist. Virtual Worlds combined my love for technology and language with my artistic background. One of my committee members inspired me to pursue the literature reviews (Chapter 2 and 3) as he taught me their value through a course I took with him where I learned how they can lay the foundation for new research. It was during the deep dive into the literature that I discovered my theoretical frameworks, found gaps in the current research base, and developed my trajectory to expand the field. Throughout the dissertation process, I strived to stay true to who I was yet explore new possibilities in myself through collaborations with my co-authors. Their positionalities and backgrounds helped me discover more about myself as a lens for

research and become reflexive about who I am and who I can be. Continuous collaboration and mutual inspiration fostered the strength to produce the five manuscripts in this dissertation and planted the seeds for additional works to come. In the end, collaboration and self-reflection proved fruitful and I produced a series of scholarly works that are all under review at academic journals and will expand the research area of technology in education and second language acquisition. However, this is not the end, as this experience created fertile soil for new research and cultivated my inspiration to continue to conduct research on Virtual Worlds, language instruction, and teacher education, as it is an area of study that is bound to blossom in the current technological age.

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Appendix 1: IRB Letter of Approval

UNIVERSITY of SOUTH FLORIDA

APPROVAL

February 28, 2022

Kristen Fung

Dear Kristen Fung:

On 2/27/2022, the IRB reviewed and approved the following protocol:

Application Type:	Initial Study
IRB ID:	STUDY003925
Review Type:	Expedited 5
Title:	Minecraft Education Edition Integration in Foreign Language Education Teachers' Practice
Funding:	None
IND, IDE, or HDE:	None
Approved Protocol and Consent(s)/Assent(s):	• Updated Protocol CLEAN 02 24 • Consent Form CLEAN Approved study documents can be found under the 'Documents' tab in the main study workspace. Use the stamped consent found under the 'Last Finalized' column under the 'Documents' tab.

Within 30 days of the anniversary date of study approval, confirm your research is ongoing by clicking Confirm Ongoing Research in BullsIRB, or if your research is complete, submit a study closure request in BullsIRB by clicking Create Modification/CR.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

Katrina Johnson
IRB Research Compliance Administrator

Appendix 2: TIM Matrix Materials Image Permission

From: James Welsh <jlwelsh@usf.edu>
Date: Monday, May 9, 2022 at 12:20 PM
To: Kristen Fung <kristenfung@usf.edu>
Cc: Nathaniel Hogan <hogan1@usf.edu>
Subject: Re: Licensing the TIM Tools for Research

To whom it may concern,
The Florida Center for Instructional Technology (FCIT) at the University of South Florida is pleased to grant Kristin Fung non-exclusive permission to reproduce the Technology Integration Matrix, text and images, as they appear on our web site (fcit.usf.edu/matrix/) for the purposes described in the permission-request email (copied below). By accepting this permission, you agree to include the credit "The Florida Center for Instructional Technology, fcit.usf.edu" in all forms of publication.
We are impressed with your project and wish you luck in your studies!

James L. Welsh, Ph.D.
jlwelsh@usf.edu
Director, FCIT
University of South Florida, College of Education
http://fcit.usf.edu/

From: Kristen Fung <kristenfung@usf.edu>
Date: Monday, May 2, 2022 at 11:02 AM
To: Nathaniel Hogan <hogan1@usf.edu>
Subject: Re: Licensing the TIM Tools for Research

Hello Nate!

Yes! Please! I'd really appreciate it if you could put a quote together for me. I'd like to use the TIM matrix in one of my dissertation articles. Also, do you by any chance know if USF sponsors doctoral students to help them obtain licenses like the one I'll need on the TIM Matrix? I thought it might be worth asking since they have aid for students doing conferences, licensing technology tools, and other professional activities. Maybe they do funding for frameworks? Any info you could give me would be greatly appreciated.

To give you some background info, I would be the only person actually using the matrix and my study is a retrospective document study. My dissertation is composed of 5 articles that I will submit to peer reviewed journal. I'd like to use the matrix to analyze Minecraft artifacts in one of my articles. These Minecraft artifacts are customized Minecraft worlds preservice teachers (students at USF) made as class projects during Covid-19 online learning during the summer of 2021.

Do you recommend I do a consultation? I am pretty flexible over the next two weeks and could probably cater to your schedule. I'm definitely going to need a license, that's for sure, but I do have some questions on how to properly cite the TIM materials. I have the correct full APA references from the website but I want to make sure I know exactly how y'all would like in-text citations for quotes and figures to look like. Y'all created a fantastic matrix and I want to be prepared to credit y'all properly as I move forward.

I look forward to hearing back from you!   With cheer, Kristen Fung