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Teachers' and Students' Perspectives About Patterns of Interaction

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This is to certify that the doctoral dissertation by

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Walden University
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Abstract

Teachers' and Students' Perspectives About Patterns of Interaction

in Blended Learning Discussions

by

Ena P. Smith

MBA, Keller Graduate School of Management, 2010

BA, DeVry University, 2009

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Social interaction is key to students' learning in blending learning discussions. Although there is research on interactions in online courses and traditional classes, there is little on whether blended learning discussions are meeting students' social interaction and educational development needs. The purpose of this multicase study was to examine attitudes of first-year and final-year business and technology students and faculty members for patterns of interaction and knowledge construction. The study was conducted in the northeastern United States. Piaget's cognitive constructivism, Vygotsky's social constructivism, and Knowles's andragogy constituted the conceptual framework. Using maximum variation sampling, participants were 8 students and 4 faculty for 2 first-year and 2 final-year classes. Data sources were interviews and discussion responses coded using Straus and Corbin's open, axial, and selective coding procedures. Coded data were analyzed using Merriam's cross-case analysis method. The business students displayed the first three phases of knowledge construction: (a) sharing and comparing (b) discovery and exploration, and (c) negotiation of meaning; the technical students progressed to the fourth phase: testing and modification of proposed synthesis. Knowledge construction often occurred in a positive, challenging form of interaction. The professors expressed that gender, VoiceThread media, and discussion content influenced students' learning. These findings contribute to positive social change by informing stronger learning processes that students and teachers can use in their blended learning classes to facilitate collective knowledge construction.

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Dedication

This dissertation is dedicated to my dear parents, Merrick P. Smith and Ena C. Smith, who passed away January 2012 and December 2012, respectively. Thank you for life; without you there is no me. Papa, the music and laughter we shared kept my energy up during challenging moments of my study. You taught me how to love life and how important it is to reward oneself for a job well done. You often sang about smiles and laughter and the power they emit to see us through dark times. Papa, your laughter lives on in my mind, I love you and miss you dearly.

Mama, as I said to you the moment my proposal was approved, thank you for nurturing my instinct for research. You taught me to be patient and look beyond the surface of a body of work. You taught me how to look up ambiguous words and phrases using the concordance and footnotes of the Bible to uncover the full context of the stories. Mama, I cherish your wise counsel. I feel honored to know that you saw it fit for me to bear your name, Ena, meaning, mother, fire, and passion. I miss you and will always love you dearly.

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Finally, thank you mama and papa for your love and support. I can feel your presence. I can tell that you are happy to see that I have completed my dissertation.

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Chapter 1: Introduction to the Study

A popular form of learning environment in higher education is the blended learning delivery mode, which requires much learner-to-learner collaboration, such as in online threaded discussions and virtual group projects to construct knowledge (Allen, Seaman, & Garrett, 2007; Hewett, Becker, & Bish, 2019; Lam, 2015; Manzoor, 2018; Stuart, 2014). The blended learning delivery mode allows instructors and learners to make use of both face-to-face and online learning. Student interaction affects students' learning experiences in online learning environments (Anthony, 2012; Hewett et al., 2019; Song & McNary, 2011; Xia, Fielder, & Siragusa, 2013; Shelton, Hung, & Lowenthal, 2017; Stuart, 2014). Interaction in learning settings is a necessary and fundamental process for knowledge acquisition and cognitive development (Barker, 1994; Hannafin, 2009; Hewett et al., 2019). Online technologies, such as asynchronous discussion forums, provide the opportunity for students to engage in social interaction by reading and responding to peers' and instructors' postings (Gallini & Barron, 2001; Lam, 2015); however, Tallent-Runnels et al. (2006) found that the depth of such interaction or discussion is not equivalent to traditional face-to-face class sessions. The nature and depth of students' interaction in online environments is different from that of the face-to-face portion of the course (Kearsley, 2000). Whereas students in physical classrooms can interact face-to-face or outside of class, students in the online portion of their courses interact with classmates through computer mediated communication (CMC), such as discussion boards. Although asynchronous technology may allow students to compare progress with others, explore topics, and reflect more deeply, other students must share

their own responses to realize the potential of online communication (Johnson & Aragon, 2003; Lapadat, 2006; Shelton et al., 2017). Shelton et al. (2017) found that student success and persistence in an online course does not necessarily hinge on the total amount of student discussion thread posts; instead, student success relies on consistent interaction with each other over time. Since online learning requires a higher level of student interdependence and students must navigate time and space displacements, maintaining online interaction is a challenging task (Bannan-Ritland, 2003; Palloff & Pratt, 1999).

There are a number of important factors that influence the effectiveness of online discussions, such as the role of the instructor, the degree of the instructor's interventions, learner characteristics, the nature of tasks, students' participation, the structure of discussion and the discussion question, group composition and size, and student perceptions (Song & McNary, 2011). Cyberbullying is also a potential barrier to learning, based on the notion that students who are engaged in online discussions display various forms of interactions and individuals with different personality types participate differently in various learning environments (Bolliger & Erichsen, 2013; Fauske & Wade, 2004). As the number of blended learning courses continue to grow in higher education (Allen & Seaman, 2006), it is important to understand the complexities of blending learning interactions. There is a gap in research that compares blended learning business and technology students' and instructors' perceptions about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions. As a result, I addressed this gap in this multiple case study.

The implications for positive social change stemming from this study are directed at education organizations, given that findings may be shared in professional development settings for teachers, administrators, and university school board officials. The results from this study may be used to improve students' communication skills and sense of safety while interacting collaboratively. Creating learning environments that are student-centered and supported by teachers will inspire meaningful interactions among peers. This positive environment, in turn, will result in students sharing their experience, negotiating its meaning, and exchanging resources and perspectives that contribute to facilitating collective knowledge construction (Gunawardena, Lowe, & Anderson, 1997; Kanuka & Anderson, 1998; Hewett et al., 2019; Lee, 2012; Moore & Marra, 2005). In Chapter 1, I include the background of the study, problem statement, purpose of the study, research questions, conceptual framework, nature of the study, definitions, assumptions, scope and delimitations, limitations, significance of the study, and a summary.

Background of the Study

Individuals' behavior may differ in various situations due to their skills and abilities (Quenk, 2010). Thus, students with different skills and abilities may participate differently in numerous learning environments, ranging from supporting to nonsupporting or challenging interactions, where cyberbullying is a potential barrier to learning (Bolliger & Erichsen, 2013). Engineering students are often found to have creative problem-solving skills but lack teamwork and interpersonal thinking skills (Lumsdaine & Lumsdaine, 1995), whereas business students are trained in developing emotional

intelligence (EI; Golemon, Boyatzis, & McKee, 2004). In addition, first-year and final-year students possess different levels of self-evaluation skills (Sharif, Gifford, Morris, & Barber, 2007). Therefore, first- and final-year technical and business students' learning progression over time might affect how they communicate with each other.

Much of the research on face-to-face and online learning interactions focused on the physical harm that results from bullying behaviors, the general emotional damage related to bullying (Glasner, 2010; Shariff, 2005), which gender is likely to commit acts of bullying or be bullied (Nansel et al., 2001), and teachers who have a propensity to bully (Chapell et al., 2004; Twemlow & Fonagy, 2005). However, research related to supportive and challenging patterns of interactions in the online portion of blended learning discussions is lacking, therefore, in this multiple case study, I addressed this gap. Gerbic (2010) claimed that from students' perspectives, face-to-face discussions were effortlessly shared by listening and speaking, however, many times significant ideas were lost or missed. The researcher explained that although online discussions involved more reading for students, participants shared that this environment created better results than face-to-face discussions. Researchers have also found that a blending of both face-to-face and online environments have numerous benefits as the combination of hands-on and student-centered learning help students to actively create knowledge online and in the classroom (Bello-Haas, Proctor, & Scudds, 2013; Botsford, Corn, & Keenan, 2014; McDonald, Straker, Schlumpf, & Plack, 2014; Poutanen, Parviainen, & Aberg, 2011; Rose, 2014; Veneri & Gannotti, 2014). However, purposeful blending of the face-to-face learning approach with online learning activities is required to promote students' learning

through blended learning (Poutanen et al., 2011; Mantiri, 2015). A review of the literature indicated that researchers have not adequately addressed patterns and stages of knowledge construction that occur for students experiencing different classroom interactions in the online portion of their blended learning discussions, thus, additional research is needed in this area.

Problem Statement

Social interaction is key in blended learning discussions, which helps to facilitate students' knowledge construction in the online portion of their courses (Oseguera, Rivero-Villar, Murillo, & de la Torre, 2012). This is because collaboration is often an essential component of any course, which ties in with the constructivism premise of peer interaction (Ali, 2013; Bakhsh, 2015; Lam, 2015; Oseguera et al., 2012; Palloff & Pratt, 2005). However, many learners assume that there will be a clear link between blended learning discussions and the face-to-face portion of such courses (Gerbic, 2010). Isolated and irrelevant discussions can result if the link between the face-to-face and online portion of a blended learning course does not take place (Gerbic, 2010). If learners construct their knowledge collaboratively within a blended learning discussion that is not properly linked and integrated with the face-to-face portion of the course, then such an environment could carry significant implications of poor instructional and educational design (Gerbic, 2010).

Research is lacking on whether there is a potential for negative interactions, such as cyberbullying, in blended learning courses. In the online portion of the course, some students may feel comfortable with conveying antagonism because they are not in a

traditional classroom setting (Ellis, 2001; Lewis, Treves, & Shaindlin, 1997). There is a problem between the United States Supreme Court's First Amendment case law and the prevailing antibullying statutes where learners' free speech rights and controlling bullying in and out of schools is addressed (Butler, 2012; Harawa, 2015; Hvidston, Hvidston, Range, & Harbour, 2013; Jett, 2011; Leong & Morando, 2015; Nash, 2012; Smit, 2015; Snakenborg, 2012; Soutter, 2012). While the Supreme Court works to find a solution to the national issue of bullying, Nash (2012) recommended that each state should take a proactive approach and focus on education. Nash found that on the local level, the occurrence of bullying behaviors is displayed by both students and teachers.

Discussion questions and evaluation criteria often influence students' and teachers' patterns of interactions, and the phase of knowledge construction in online discussions (Lee, 2012). Lumsdaine and Lumsdaine (1995) found that students in the engineering field often lack the required teamwork and interpersonal thinking skills needed in the general industry. On the other hand, business students' training programs teaches components of EI: self-awareness, self-regulation, motivation, empathy, and social skills (Golemon et al., 2004). Although researchers have found that students' knowledge construction occur in certain phases (Gunawardena et al., 1997), no research exists that compares technology and business students' and instructors' perceptions of patterns of interactions that occur in the online portion of their blended learning discussions. Similarly, there is a gap in the research that focuses on how patterns and stages of knowledge construction occur for technology and business students experiencing different classroom interactions in the online portion of their blended

learning discussions. In order to understand the complexities of blending learning interactions, using Piaget's (1953) cognitive constructivism, Vygotsky's (1978) social constructivism, and Knowles's (1980) adult learning theory of andragogy, a multiple case study was needed that compares first-year and final-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions in the online portion of their blended learning discussions.

Purpose of the Study

The purpose of this multiple case study was to compare first-year and final-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions in the online portion of their blended learning discussions at a university in the northeastern United States. Business and technology students' perspectives were compared because of contrasting expectations of the students. In addition, the two time periods (first year and fourth year) were used to get two different perspectives.

Research Questions

In order to compare first-year and final-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions in the online portion of their blended learning

discussions, I addressed the following qualitative research questions in this multiple case study:

RQ1: What are first- and final-year students' supportive and challenging patterns of interactions that occur in the online portion of blended learning discussions?

RQ1.1: What are professors' perceptions of first- and final-year students' interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?

RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?

RQ2: What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions?

Conceptual Framework

Researchers' worldviews are their own set of beliefs that guide their inquiry (Guba, 1990). Piaget's (1953) cognitive constructivism, Vygotsky's (1978) social constructivism, and Knowles's (1980) adult learning theory of andragogy are three of those worldviews. These three worldviews served as the conceptual frameworks of this study. I used these theories to provide insights from blended learning students and teacher's perceptions of supportive and challenging patterns of interaction that occur in blended learning discussions. A brief overview of each theory is provided in this section with a more detailed explanation in Chapter 2. This section is organized into the

following subsections: cognitive constructivism, social constructivism, and adult learning theory of andragogy.

Cognitive Constructivism

Cognitive constructivism is based on Piaget's (1953) work (Clark, 2010; Powell & Kalina, 2009). Two major areas are included in Piaget's theory: the ages and stages component that predicts what children understand at different ages and a theory of development that describes how learners develop cognitive abilities (Clark, 2010). Chen (2000) noted that the theory of development is the major foundation for cognitive constructivist approaches to teaching and learning. The focus of Piaget's constructivism pertains to the individual and how the individual constructs knowledge (Powell & Kalina, 2009). Therefore, Powell and Kalina (2009) stated that, based on Piaget's theory of cognitive development, people cannot be given information that they will immediately understand and use. Instead, learners must construct their own knowledge.

In cognitive constructivism, children's mental development precedes their learning (Piaget, 1969). Piaget (1969) posited that learners construct their knowledge and make sense of the world in which they live. Learning is the compilation of complex knowledge structures (Guzdial, 1997). Guzdial (1997) related that the learner must consciously think about trying to derive meaning, and through that effort, meaning is constructed through the knowledge structures. The researcher noted that Piaget emphasized learning through play, but the basic cognitive theory of constructivism supports learning through lecture, as long as that basic construction of meaning takes place.

The learning process is active, and by interacting with their world, individuals learn and create knowledge through social interaction instead of individual exploration (Piaget, 1969). A researcher with a constructivist worldview will look for a broad complexity of outlooks instead of seeking to narrow them down to a small view of categories (Creswell, 2009). Therefore, in this study, I adopted a broad complexity of outlooks based on blended learning students and teachers' perceptions of patterns of interactions that occur in online discussion forums of their courses and patterns and stages of knowledge construction that occur for students experiencing different classroom interactions. Many constructivist researchers believed that whatever individuals think is real is a result of their culture (Crotty, 1998). Thus, by understanding cultural differences, constructivists use participants' perspectives of the problem under study with open-ended inquiring and listening to what people say and how they behave in their environments (Crotty, 1998).

Social Constructivism

Vygotsky (1978) developed social constructivism because he believed in social interaction and that is was an important part of learning (Powell & Kalina, 2009). In social constructivism, collaboration and social interaction are incorporated; thus, it is an effective method of teaching that benefits all students (Galloway, 2015; Powell & Kalina, 2009). Powell and Kalina (2009) reported that social constructivism pertains to the social interactions of students in the classroom and the process they use for critical thinking.

To understand Vygotsky's theories on cognitive development, it is important to understand two of the main principles of his work: (a) the more knowledgeable other

(MKO) and (b) the zone of proximal development (ZPD; Galloway, 2015; Powell & Kalina, 2009). Vygotsky (1978) suggested that learning is associated with the presence of a MKO. The MKO is an individual other than the learner who has a better understanding of a specific idea, process, or task (Galloway, 2015; Vygotsky, 1978). The MKO could be older individuals, teachers, peers, or electronic tutors (Galloway, 2015; Vygotsky, 1978). Vygotsky's (1978) MKO concept is associated with the ZPD, where he believed learning occurs. Vygotsky defined the ZPD as the distance between the learner's ability to perform a task "under adult guidance or in collaboration with more capable peers" (p. 86). He stated that this capable peer often bears invaluable insights for students in all instructional learning modes.

Culture affects students' cognitive development, where students use tools such as language and writing to navigate their social environments (Vygotsky, 1978). Vygotsky (1978) wrote that language is influenced by culture because it develops from social interactions. Lee (2012) reported that students' language skills and interaction may be influenced by their cultural backgrounds in that students sometimes read their peers' postings and respond selectively according to their interests. The researcher also noted that aggressive behavior within discussion threads may hinder the development of language skills and prevent internalized thoughts from becoming inner speech.

Adult Learning Theory of Andragogy

Andragogy is defined as "the art and science of helping adults learn, in contrast to pedagogy as the art and science of teaching children" (Knowles, 1980, p. 43). The term has a long history of development and evolution (Howard, 1993). In 1833, Kapp devised

the term, which became popular in 1926 when Lindeman expanded on the idea (Howard, 1993; Ozuah, 2016). Finally, in 1959, Knowles took Lindeman's idea on andragogy even further and helped develop the idea into a theory of adult learning (Ozuah, 2016; Zmeyov, 1998).

Traditional theories of teaching and learning are based on research related to children's learning, which are, in turn, derived from theories of animal learning (Knowles, 1984). Such theories are not complex enough to apply to adult human beings (Knowles, 1984). Knowles (1984) believed that adults have a deep psychological need to be self-directed learners. Knowles's (1984) perspective on andragogy is based on six main assumptions: (a) self-concept, (b) role of experience, (c) readiness to learn, (d) orientation to learning, (e) internal motivation, and (f) the need to know (Merriam, Caffarella, & Baumgartner, 2007; Forrest & Peterson, 2006), all of which are discussed in further detail in Chapter 2.

Nature of the Study

I used a multiple case study design because it enabled me to delve into the topic and compare first-year and final-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions in the online portion of their blended learning discussions. I used the maximum variation sampling strategy whereby I included four professors from two technical courses and two business courses from a university in a northeastern state in the United States. From the four courses, eight students were recruited to participate. Two

cases were used: (a) two first- and two final-year technical students (four technical students total) and (b) two first- and two final-year business students in two business courses (four business students total).

In-depth, semistructured, face-to-face interviews with students and professors, as well as students' 8-week session online discussion threads, served as the main data collection instruments for this study. The online discussions included textual posts and occasionally, VoiceThread posts (VoiceThread is a cloud-based interactive and collaborative application). I transcribed each of the interviews. I coded and analyzed the transcription data and discussion thread data and used NVivo to manage the data. Data analysis for this case study was conducted at two levels. At the first level, which is the single-case or within-case analysis, interviews and discussion threads were coded and categorized for each case. At the second level, which is the cross-case analysis, I coded, categorized, and examined data across all sources and cases, using the constant comparative method (Merriam, 2009), to find emerging themes and discrepant data, and to determine the key findings. The study was conducted in accordance with the parameters established by the research site's Institutional Review Board (IRB). After approval from the research site's IRB, I also received approval from Walden University's IRB, and the study was conducted based on the university's guidelines to ensure the ethical protection of research participants. I discuss the nature of the study in further detail in Chapter 3.

Definitions

Accommodation: "The process of changing internal mental structures to provide consistency with external reality" (Bhattacharya & Han, 2012, para. 6).

Assimilation: "Using an existing schema to deal with a new object or situation" (McLeod, 2009, para. 22).

Blended learning: Blended learning is defined as an educational program consisting of a combination of face-to-face and online delivery modes that allow teachers and learners to take advantage of the strengths of both environments with 30% to 79% of the course content delivered online (Allen et al., 2007, p. 5).

Bullying: Refers to behaviors where both the person being bullied and the person doing the bullying are at risk of experiencing severe, adverse, and devastating psychological effects (Warren, Broome, Williams-Evans, Williams, & Godfrey, 2011, p. 22). In some situations, physical harm or death can occur because of bullying (Warren et al., 2011, p. 22).

Challenging or nonsupportive interactions: This term is used to describe how participants disagree with earlier statements made by other participants, thus, offering counterevidence (Burbules, 1993). Challenging interactions in this study also refers to criticizing course texts, digital media, course activities, as well as the course itself. The data analysis plan section describes the five categories that were used to analyze challenging and supportive patterns of interaction.

Cyberbullying: Refers to a form of harassment that include the use of virtual technological gadgets to electronically tease, bully, and harass peers with texting, voicemails, e-mails, and postings (Glasner, 2010, p. 537).

Cybermobbing: This term is used as a combined effort of individuals in virtual environments to mock and exclude others who did not comply with group norms (Fauske & Wade, 2004, p. 137).

Equilibrium: "The force that moves development along" (McLeod, 2009, para. 22).

Knowles's adult learning theory of andragogy: Consists of learning strategies that are focused on adults (Schultz, 2012). "It is often interpreted as the process of engaging adult learners with the structure of learning experience, meaning that adult learners bring certain life experiences with them which younger students have not yet experienced" (Schultz, 2012, p. 47).

More knowledgeable other (MKO): The MKO refers to someone who has a better understanding or a higher ability level than the learner in relation to a task, process, or concept (Galloway, 2015).

Piaget's cognitive constructivism: Pertains to the individual and how the individual constructs knowledge (Powell & Kalina, 2009). People cannot be given information that they will immediately understand and use; instead, learners must construct their own knowledge (Powell & Kalina, 2009, p. 242).

Posturing: Refers to participants displaying arrogance by lecturing or using unfamiliar or technical language, and assuming the role of an authority in a manner to stand out from the group (Fauske & Wade, 2004).

Scaffolding: An assisted learning process that supports the ZPD, or getting to the next level of understanding, of each student from the assistance of teachers, peers or other adults" (Powell & Kalina, 2009, p. 244).

Schema: "A mental representation of some physical or mental action that can be performed on an object, event, or phenomenon" (Bhattacharya & Han, 2012, para. 3).

Supporting interaction: Agreeing with earlier statements, expressing appreciation, and thanking and acknowledging what others have stated (Fauske & Wade, 2004). The data analysis plan section describes the five categories that were used to analyze supportive and challenging patterns of interaction.

VoiceThread: "A collaborative digital media platform that allows users to create a presentation from multiple media, including images, documents, and videos" (Vanderbilt University, 2019, para. 1).

Vygotsky's social constructivism: Social constructivist learning theory seeks to improve social interactions between students and to construct and share knowledge (Vygotsky, 1978).

Zone of proximal development (ZPD): The distance between the "actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86).

Assumptions

Assumptions made for this study were the following five:

- The in-depth, face-to-face interviews with students and teachers and the students' discussion threads were appropriate to compare first-year and final-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions in the online portion of their blended learning discussions at a university in a northeastern state.
- The participants honestly and openly answered the interview questions by sharing their perceptions about the questions being asked.
- The findings from the study may be generalized to similar populations of technical and business students in blended learning courses and teachers who teach technical and business blended learning courses.
- Students and professors were willing to take part in the study because of its significance.
- The results of the study will lead to positive social change by encouraging university school officials and administrators to support teachers through professional development activities and policies that offer appropriate intervention skills and strategies to facilitate an online class environment that serves the academic, social, and emotional needs of students.

Scope and Delimitations

The scope of this multiple case study included first-year and final-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions in the online portion of their blended learning discussions at a university in a northeastern state in the United States. From the professors who met the selection criteria and were interested in participating, only four professors were selected: (a) a professor who taught a first-year technical course, (b) a professor who taught a first-year business course, (c) a professor who taught a fourth-year technical course, and (d) a professor who taught a fourth-year business course. Eight students from these four blended learning classes were recruited to participate in the study, two students from each class. I excluded technical and business courses where I was the teacher and excluded any of my current students from participating in the study. This prevented students from feeling coerced to participate due to my role as their teacher. Data collection included in-depth, face-to-face, semistructured interviews with the eight students and four professors and the 8-week discussion threads of the eight students who took part in the interviews. Thus, all other students' discussion threads in the four courses were excluded from this study's analysis.

Limitations

There are several limitations in this study. One limitation was generalizing the results because a maximum variation sampling of four professors and eight technical and business students in blended learning courses were used and the results of the study were

limited to similar populations of professors and students. Therefore, the results of the study may not be generalizable to other teachers and students who are teaching or taking other courses, respectively. In addition, the results cannot be generalized to teachers and students who are teaching or taking courses that require the use of only one mode, such as courses that are only face-to-face or online.

A second limitation pertains to self-report or social desirability bias as teachers and students may desire to be perceived positively; hence, they may not answer the interview questions honestly. However, I assumed that participants openly and honestly shared their perceptions when answering the interview questions.

A third limitation of this multiple case study design was the possibility of researcher bias because I was the only person responsible for all data collection and data analysis for this study. Merriam (2009) cautioned that researcher bias may occur when data appear to be contradictory to the researcher's preconceived theories, which could result in a determination to exclude data. Merriam added that a single researcher may not realize that personal bias may cloud the data collection and analysis process. Therefore, I addressed the issue of potential researcher bias by describing specific strategies that I used to improve the credibility, transferability, dependability, confirmability, and intracoder reliability of this study in the issues of trustworthiness section in Chapter 3.

I informed my participants that I would be analyzing their 8-week discussion threads. Therefore, the fourth limitation was the possibility that there were observer effects, otherwise called the Hawthorne effect (Paradis & Sutkin, 2016). Paradis and Sutkin (2016) found that the Hawthorne effect had a limited impact on their study. In

addition, Goodwin et al. (2017) revealed that 74% of their participating patients and 55% of their participating physicians reported that there was no observer effect on the interaction during their study. The researchers explained that most of the participants who noted an observer effect, related that it was insignificant. Thus, I assumed that participants behaved as they usually would during 8-week sessions that had no observations.

Significance of the Study

In this section, I identify potential contributions of the study that advance practice and policy in the education field. I also identify potential contributions of the study to advance knowledge in the education field and describe potential implications for positive social change. This section is organized in the following subsections: significance to practice and policy, significance to theory, and significance to social change.

Significance to Practice and Policy

The findings from this study may advance practice and policy. In relation to practice, this study is significant because a better understanding of supportive and challenging patterns of interactions and patterns and stages of knowledge construction that occur in the online portion of blended learning discussions will help instructors, administrators, and instructional designers of blended learning courses to better address issues such as negative interactions that can occur and affect students' learning. Understanding students' online interactions with other students and their instructors is significant because interaction influences the quality of online learning (Trentin, 2000). According to Flottemesch (2000), students tend to judge the quality of online learning

based on their perceived interaction in the online course. In addition, interactions among students in online classes can help motivate them to commit to learning (Gabriel, 2004; Rovai & Barnum, 2003). Students are motivated to be a part of the interaction and to contribute to the online interaction or discussion because it helps them to work collaboratively online with their peers (Gabriel, 2004; Song & Hill, 2009). Therefore, to help facilitate students' online interaction for effective learning, it is important that instructors, administrators, and instructional designers of blended learning courses understand the unique characteristics of the online portion of blended learning courses and take steps to improve it.

In relation to educational policies, this study is significant because it may provide university school board officials, administrators, professors, and legislators with a deeper understanding of the supportive and challenging patterns of interactions that can occur in the online portion of blended learning discussions. Results garnered from this study may encourage university school board officials, administrators, and legislators to revise their current online learning policies or adapt new online policies for students and professors to create a safe and supportive learning environment where new knowledge construction can occur. This may include legislative and policy mandates for research-based bullying reduction programs that improve awareness and response strategies for teachers and students.

Significance to Theory

Although there is an abundance of literature on online learning, this multiple case study adds to the literature and advances knowledge by filling a gap in the education

literature with respect to business and technology students' and professors' perspectives about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions. This study may also influence future studies in a manner that leads to additional research in this area. Findings from this study are beneficial not only to the education field, but to a wide array of other fields, including the fields of public policy and administration and psychology. The findings from the study are also applicable to many agencies and organizations, which include the U.S. Department of Education, the American Educational Research Association, Online Learning Consortium, and distance learning associations.

Significance to Social Change

The implications for positive social change stemming from this study are directed at education organizations because the findings may be shared in professional development settings for teachers, administrators, and university school board officials. University school officials and administrators can support teachers through professional development activities and policies that offer appropriate intervention skills and strategies to facilitate an online class environment that serves the academic, social, and emotional needs of students. Therefore, the results from this study may be used to improve students' communication skills and sense of safety while interacting collaboratively. Creating learning environments that are student-centered and supported by teachers will inspire meaningful interactions among peers. This, in turn, will result in students sharing their experience, negotiating its meaning, and exchanging resources and perspectives that

contribute to facilitating collective knowledge construction (Gunawardena et al., 1997; Kanuka & Anderson, 1998; Kuo, Walker, Schroder, & Belland, 2014; Lee, 2012; Loncar, Barrett, & Liu, 2014; Moore & Marra, 2005).

Summary

In this multiple case study, I compared first-year and final-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions. I also explored how patterns and stages of knowledge construction occur for students experiencing different classroom interactions in the online portion of their blended learning discussions at a university in a northeastern state in the United States. Data were collected using in-depth, face-to-face, semistructured interviews with four professors and eight students, and the eight students' 8-week discussion threads. I conducted data analysis for this multiple case study at two levels: (a) single-case or within-case analysis and (b) cross-case analysis. Findings from this study may encourage university school officials and administrators to further support teachers through professional development activities and policies that offer appropriate intervention skills and strategies in order to facilitate an online class environment that serves the academic, social, and emotional needs of students.

In Chapter 1, I included the background of the study, problem statement, purpose of the study, research questions, conceptual framework, nature of the study, definitions, assumptions, scope and delimitations, limitations, significance of the study, and a summary. In Chapter 2, I include the introduction, literature search strategy, conceptual framework, literature review, and a summary and conclusions. In Chapter 3, I include the

introduction, research design and rationale, role of the researcher, methodology, issues of trustworthiness, and a summary. In Chapter 4, I include the introduction, setting, demographics, data collection, data analysis, evidence of trustworthiness, results, and a summary. In Chapter 5, I include the introduction, interpretation of findings, limitations of the study, recommendations, implications, and a conclusion.

Chapter 2: Literature Review

The purpose of this multiple case study was to compare first-year and final-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions. I also explored how patterns and stages of knowledge construction occur for students experiencing different classroom interactions in the online portion of their blended learning discussions at a university in a northeastern state in the United States. A popular form of learning environment in higher education is the blended learning delivery mode, which offers the advantage of both face-to-face and online learning for teachers and students (Allen et al., 2007). Learners with different personality types participate in blended learning environments (Bolliger & Erichsen, 2013; Cole, Shelley, & Swartz, 2014; Hurley, 2014; Kirwan & Roumell, 2015; Saleh & Sanders, 2014). Students' opinions and comments are often encouraged in online discussions; however, some students may be antagonistic in their communication with other students because they are not in a traditional classroom setting, thus, engaging in cyberbullying (D'Antona, Kevorkian, & Russom, 2010; Ellis, 2001; Fauske & Wade, 2004; Hoff & Mitchell, 2009; Lewis et al., 1997). Cyberbullying is a potential barrier to learning (Fauske & Wade, 2004; Perren et al., 2012).

Student-to-student collaboration is often involved in blended learning courses (Kolloff, 2011; Lee, 2012). Students often meet face-to-face before interacting online and may form first impression biases about each other (Lim, Benbasat, & Ward, 2000). Little research was found on the patterns of interaction that occur in blended learning discussions and how blended learning students construct their knowledge while various

forms of classroom interactions are present. Therefore, this multiple case study that compares first-year and final-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions, filled that gap. In Chapter 2, I include the literature search strategy, conceptual framework, literature review, and a summary and conclusions.

Literature Search Strategy

The literature search strategies I used included in-depth searches in all Walden University research databases, including ProQuest and all EBSCOhost databases, such as Education Research Complete and ERIC, to find peer-reviewed education research journals, as well as conference proceedings and book chapters. I also used Google Scholar to search for scholarly literature. The key search terms used were limited to peer-reviewed works to retrieve studies on patterns of interactions, students of various mindset, and first- and final-year business and technical students. To retrieve studies on patterns of interaction as well as the effect of cultural background on interaction, I used key terms such as *patterns of interaction and online discussions*, *cultural background impact and interaction,* and *first impression bias*. Other search terms included *technical students' emotional intelligence*, *business students' emotional intelligence*, and *college students' emotional intelligence*.

To find studies on first- and final-year students' progression over time, I used search terms such as *freshmen and final year students*. To retrieve literature on bullying and cyberbullying, I used key search terms such as *bullying*, *bullying and college*,

cyberbullying and college, *cyberbullying and school*, *K12 bullying*, *school bullying*, *cyberbullying*, and *cyberbullying in blended learning discussions*. Searches using all key terms in all databases and search engines resulted in more than 296,059 results. These results were further narrowed, and pertinent sources were used in the study.

Conceptual Framework

Constructivism is a learning theory that explains how people might acquire knowledge and learn (University of Sydney, 2015). Therefore, it has direct application to education as theorists such as Piaget and Vygotsky claimed that humans construct knowledge and meaning from their experiences (University of Sydney, 2015). In many schools, constructivism is noted to be the best method for teaching and learning (Powell & Kalina, 2009). According to Powell and Kalina (2009), constructivist strategies, tools, and practices are used to create effective classrooms where teachers and students communicate optimally; thus, it is the next important step in educational reform. For teachers to use constructivism effectively, they must know where students are at a given learning point or the current stage in their knowledge of a subject so that students can create personal meaning when new information is given to them. The two major types of constructivism in the classroom are (a) cognitive or individual constructivism based on Piaget's theory and (b) social constructivism based on Vygotsky's theory.

Thus, Piaget's (1953) cognitive constructivism and Vygotsky's (1978) social constructivism served as two of the main conceptual frameworks of this study. I carried out this study within a college environment; therefore, Knowles's (1980) adult learning theory of andragogy also served as an additional conceptual framework for this research

study. These three theories were used to understand students and professors' perceptions about supportive and challenging patterns and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions. This section is organized in the following subsections: cognitive constructivism, social constructivism, comparison of cognitive and social constructivism, and adult learning theory of andragogy.

Cognitive Constructivism

In this subsection, I discuss the theoretical propositions of Piaget's (1953) cognitive constructivism. I also discuss how Piaget's cognitive constructivism has been applied previously in ways like this study. This subsection is organized in the following areas: theory of cognitive constructivism and research application of cognitive constructivism.

Theory of cognitive constructivism. Cognitive constructivism is based on Piaget's (1953) work (Clark, 2010; Powell & Kalina, 2009). Piaget's theory of constructivist learning has had wide ranging effects on learning theories and teaching methods in education and is an underlying theme of many education reform movements (University of Sydney, 2015). Piaget's theory has two major areas: an ages and stages component that predicts what children understand at different ages and a theory of development that describes how learners develop cognitive abilities (Clark, 2010). Chen (2000) noted that the theory of development is the major foundation for cognitive constructivist approaches to teaching and learning. The focus of Piaget's constructivism pertains to the individual and how the individual constructs knowledge (Powell & Kalina,

2009). Therefore, Powell and Kalina (2009) related that based on Piaget's theory of cognitive development, students must create their own knowledge as they will not immediately understand and use the information given to them.

Four of Piaget's key concepts are related to learning at any age: (a) assimilation, (b) accommodation, (c) equilibration, and (d) schemas (Bhattacharya & Han, 2012). Bhattacharya and Han (2012) stated that schema is "a mental representation of some physical or mental action that can be performed on an object, event, or phenomenon" (para. 3). Assimilation is defined as "using an existing schema to deal with a new object or situation" (McLeod, 2009, para. 22). McLeod (2009) noted that accommodation happens when the existing schema or knowledge does not work and needs to be changed to deal with a new object or situation. Equilibration "is the force that moves development along" (McLeod, 2009, para. 22). McLeod noted that based on Piaget's cognitive constructivism, cognitive development does not progress at a steady rate, but in leaps and bounds. Equilibrium takes place when children schemas can deal with most of the new information through assimilation (McLeod, 2009). However, disequilibrium occurs when children cannot fit new information into existing schemas (assimilation; McLeod, 2009). McLeod related that equilibrium is the force that drives the learning process as individuals do not like to be frustrated and will seek to restore balance by mastering the new challenge (accommodation). The researcher reported that once the new information is acquired, the process of assimilation with the new schema will continue until the next time individuals need to make an adjustment to it.

Based on Piaget's stages of cognitive development, children's schemas are formed through the process of assimilation and accommodation as they go through four stages of development (Wadsworth, 2004). Piaget (1953) posited four stages of development, which Powell and Kalina (2009, pp. 242-243) discussed as follows:

1. Sensorimotor stage: Children go through this stage from birth to 2 years old. "Children begin to discover their environment around them through their own senses, physical activity, and language" (p. 242).
2. Preoperational stage: Children go through this stage from 2 to 7 years old. Children "develop their own language skills but still cannot grasp the thoughts of others" (p. 242).
3. Concrete operational stage: Children go through this stage from 7 to 11 years old. Within this stage, "children begin to replace intuitive thought with their own logical reasoning" (p. 242).
4. Formal operational stage: Children go through this stage from 11 years old to adulthood. They start to use "higher levels of thinking or abstract ideas to solve problems" (p. 242).

In Piaget's cognitive constructivism, two major principles guide intellectual growth and biological development (Bhattacharya & Han, 2012). First, for individuals to survive in an environment, they must adapt to physical and mental stimuli (Bhattacharya & Han, 2012). Bhattacharya and Han (2012) suggested that assimilation and accommodation are both part of the adaptation process as individuals possess mental structures that assimilate external events and change them to fit their mental structures. In

addition, individuals' mental structures accommodate to new, unusual, and constantly changing aspects of the external environment (Bhattacharya & Han, 2012). Bhattacharya and Han noted that the second principle is organization, which refers to the nature of these adaptive mental structures. The researchers reported that the mind is organized in complex and integrated ways, with schema at the simplest level.

Two of Piaget's main principles for teaching and learning are learning is an active process and learning should be whole, authentic, and real (Chen, 2000). Regarding learning is an active process, Chen (2000) noted that individuals' direct experiences, errors, and search for solutions are important for the assimilation and accommodation of information. Thus, the presentation of information is important and the introduction of information as an aid to problem solving functions as a tool instead of an isolated arbitrary fact (Chen, 2000). Regarding learning should be whole, authentic, and real, Chen related that instead of isolated skill exercises, whole and authentic activities, which are interesting and meaningful to the student, and real activities that result in something other than a grade on a test or "great, you did well" (para. 2) from a computer lesson software, are emphasized in Piagetian classrooms.

Piaget's stages of development focus on the ability of children to learn at different ages based on logical development (Powell & Kalina, 2009). Powell and Kalina (2009) noted that Piaget's theory on assimilation, accommodation, and equilibrium pertain to children's ability to cognitively or individually create new knowledge within the stage that they are in and being able to work out conflicts. The researchers noted that by recognizing that this process occurs within each individual student at a different rate,

teachers are then able to facilitate constructivist learning. Piaget's cognitive constructivism theory incorporates the importance of understanding what individuals need to get knowledge and learn at their own pace (Powell & Kalina, 2009). The researchers noted that it is important for teachers to observe their students and understand their level of difficulty. Powell and Kalina related that the main goal of teachers should be to understand the stages and teach within the ability of students so that they can grasp concepts logically and intellectually, thus, resulting in effective learning.

Research application of cognitive constructivism. Bullying behavior is a major concern in schools (Dogini, 2012). Dogini (2012) explored whether a school-based bullying intervention program was an effective method for reducing bullying behaviors within the primary school population. Dogini used the theoretical framework of effectiveness of a school-based bullying intervention program, which was connected to Piaget's constructivist theory. Ormrod (2008) reported that from a constructivist perspective, school-based bullying intervention programs will facilitate moral reasoning and mediation choices underlying the arena of cognitive development. The research population included 10 teachers and 10 administrators. Findings were mixed as some school-based bullying intervention programs were effective in one primary school setting and ineffective in another primary school. Participants shared several challenges for school-based bullying intervention programs to effectively address child bullying experience in a primary school setting, such as stressful school environment and commitments, and teachers and administrators being slow to intervene in bullying incidents. In the study, participants suggested that a better understanding of different

forms of bullying intervention would help to identify an effective method of school-based bullying intervention that would reduce bullying.

Cyberbullying is one form of bullying that takes place in schools (Tangen & Campbell, 2010). Tangen and Campbell (2010) noted that given the severe social, psychological, and physical consequences that all forms of bullying can have on students, several intervention programs have been developed, with most focused on a whole school approach. Tangen and Campbell compared students' self-reports on bullying, including cyberbullying, between schools with and without a philosophy for children (P4C) approach. The researchers related that the P4C approach is based on encouraging children to think for themselves about issues, to question assumptions, and to join with other children in open-ended discussions about these issues; thus, viewing a wide range of viewpoints. Tangen and Campbell noted that there is a structure to the program based on the principles of both cognitive and social constructivism, where both interact and allow students the opportunities to solve real life problems.

Findings indicated that students at the P4C school reported significantly more face-to-face bullying as both bullies and victims than matched students at the other schools (Tangen & Campbell, 2010). However, Tangen and Campbell (2010) reported that no significant differences in reports of cyberbullying were found. The researchers noted that these findings were surprising as students at P4C schools have been participating in the P4C program for their entire school experience. The researchers related that although the P4C program is not an antibullying program, an important feature of the program is weekly discussions with a focus on helping students to become

critical thinkers about their behaviors towards other and how others behave towards them. Subsequently, the researchers noted that it was expected that these students would have developed enough critical thinking by Grades 6 or 7; thus, being consciously aware of the consequences of peer interactions and developed the skills needed to handle conflict with others in more appropriate ways than through bullying.

However, the findings may be attributed to different factors, such as the children's raised awareness of social relationships may have made them more aware of incidents of bullying, which resulted in them reporting all incidents, although other students who were not in the P4C program might not have done so (Tangen & Campbell, 2010). Tangen and Campbell (2010) suggested that another possible explanation for the findings was that students at the P4C school may not see the problem-solving situations from story books as applicable to their own lives; thus, they have difficulty transferring solutions presented in the story to their own lives. Due to the limited research on the effects of the P4C approach on preventing bullying in school, the researchers noted that more research is needed.

Social Constructivism

In this subsection, I discuss the theoretical propositions of Vygotsky's (1978) social constructivism. I also discuss how Vygotsky's social constructivism has been applied previously in ways similar to this study. This subsection is organized in the following areas: theory of social constructivism and research application of social constructivism.

Theory of social constructivism. After Piaget had already described his cognitive constructivism, Vygotsky (1978) developed social constructivism because he believed that social interaction played a significant role in learning (Powell & Kalina, 2009). In social constructivism, collaboration and social interaction are incorporated; thus, it is an effective method of teaching that benefits all students (Galloway, 2015; Powell & Kalina, 2009). Powell and Kalina (2009) reported that social constructivism pertains to the social interactions of students in the classroom and the process they use for critical thinking.

To understand Vygotsky's theories on cognitive development, it is important to understand two of the main principles of his work: (a) the MKO and (b) the ZPD (Galloway, 2015; Powell & Kalina, 2009). The MKO refers to someone who has a better understanding or a higher ability level than the learner in relation to a task, process, or concept (Galloway, 2015). Galloway (2015) noted that the MKO is a teacher or an older adult. However, Galloway related that depending on the task, process, or concept, the MKO could be a child's peers (e.g., may know more about the newest teen-age music groups), an adult's children, electronic performance support systems, or electronic tutors. The author noted that the key to MKOs is that they must have or be programmed with more knowledge about the topic being learned than that of the learner.

The MKO is inherently related to the ZPD and together, they form the basis of the scaffolding component of the cognitive apprenticeship model of instruction (Galloway, 2015). Vygotsky (1978) defined the ZPD as the distance between the "actual developmental level as determined by independent problem solving and the level of

potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (p. 86). Therefore, when students are at the ZPD for a task, providing the appropriate assistance (scaffolding) will give them enough of a boost to achieve the task (Galloway, 2015). "Scaffolding is an assisted learning process that supports the ZPD, or getting to the next level of understanding, of each student from the assistance of teachers, peers or other adults" (Powell & Kalina, 2009, p. 244). Once students can master the task, the scaffolding can be removed, and they will then be able to complete the task on their own. Figure 1 shows the illustration of the ZPD.

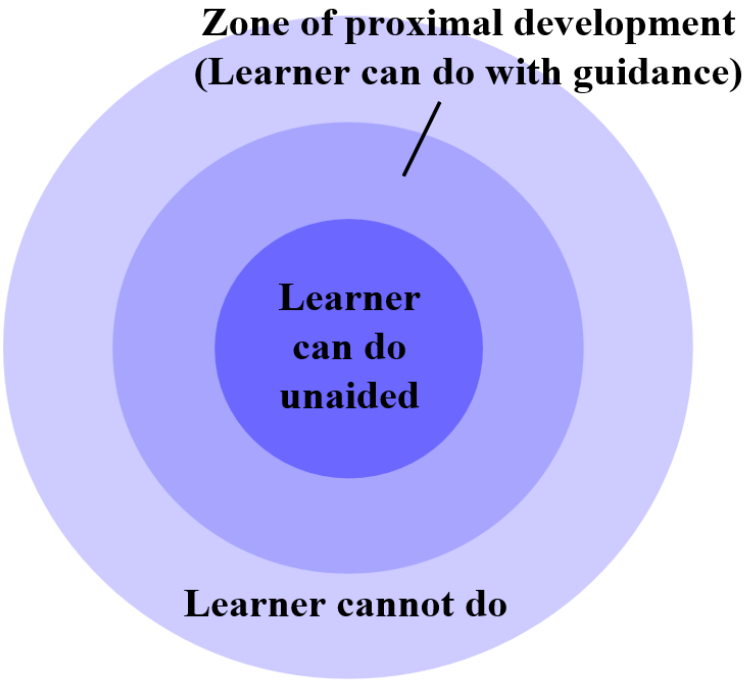

Figure 1. Illustration of the zone of proximal development. Figure by Dcoetzee from Wikimedia Commons is made available under Creative Commons CC0 1.0.

Cooperative learning is an important aspect in creating a social constructivist classroom and creating a deeper understanding (Powell & Kalina, 2009). Powell and Kalina (2009) related that students should individually work with teachers, as well as

work with each other as they have a lot to offer one another. The researchers noted that when students complete group projects or activities, the knowledge gained by each student occurs at a different rate due to their own experience. Thus, social interaction is important for the internalization of knowledge (Powell & Kalina, 2009).

Social interaction and cultural influences are both instrumental to students and how they learn (Powell & Kalina, 2009). As a result, teachers should acknowledge students' diversity and accept their differences (Powell & Kalina, 2009). Powell and Kalina (2009) reported that diversity refers to individuals having different ethnic backgrounds, however, in the classroom, it includes "ethnicity, identity, and biological differences" (p. 245), which provides everyone with different experiences and understanding. The researchers noted that students should first understand themselves and others who are around them, and then they can begin learning the curriculum.

In social constructivist setting, the use of language in the classroom in the most critical process (Powell & Kalina, 2009). Vygotsky (1962) argued that learning is improved using language and that it comes before knowledge or thinking. For efficient communication in the classroom, social interaction is also key to successful language usage and development (Powell & Kalina, 2009). Therefore, Powell and Kalina (2009) claimed that Vygotsky's research and theories both play a role in social constructivism and language development.

Research application of social constructivism. Students' ability to access learning resources anywhere, anytime, and in different formats has the potential to increase students' learning capabilities and to allow students to construct their own

knowledge (Amry, 2014). Amry (2014) explored the impact of using WhatsApp social learning activities on the achievements and attitudes of online students and compared them with face-to-face learning in the classroom. The researcher related that the mobile learning process using WhatsApp mobile learning activities was compared with another process based on the presence of students in the classroom for face-to-face learning of a unit in the course Educational Media (EDCT 346) taught in Taibah University for female students of the faculty of education. The course lasted for one semester.

Findings indicated that mobile learning-based WhatsApp social networking has a high positive effect on the achievement test of students (Amry, 2014). Based on the findings, Amry (2014) found that students preferred this innovative educational technology-based mobile learning. The results of the achievement test showed that arithmetic means of the experimental group were higher than arithmetic means of the control group. The attitudes of students suggested that WhatsApp instant messaging makes learning easy, favors problem solving, and resolves learning difficulties related to the learning process or to learning content distributed through WhatsApp and knowledge sharing (Amry, 2014).

Findings were also interpreted in relation to Vygotsky's social constructivist learning theory. Amry (2014) related that social interactions improve the effectiveness of learning and teaching, which help students to easily construct and share knowledge through WhatsApp social networking. The researcher also pointed out that face-to-face learning in the classroom is a formal academic learning process and used mostly to disseminate information to individuals rather than improve social interaction between

students. On the other hand, Amry noted the social dimension is very important to constructing knowledge and to orientating students towards new educational technologies that use social networks. Subsequently, Amry reported that the WhatsApp mobile learning is a good solution to improving community level interaction and social presence among students.

Comparison of Cognitive and Social Constructivism

It is important that teachers have a comprehensive understanding of both cognitive and social constructivism methods so that they can use both to run an effective constructivist classroom (Powell & Kalina, 2009). Although both types have fundamental differences, they both have constructed learning elements that students can easily understand, where the main premise is that from experiences, ideas are created to have a personal meaning for students (Powell & Kalina, 2009). Powell and Kalina (2009) related that in relation to effectiveness, both cognitive and social constructivism should be clear in communicating concepts, which will allow students to connect them. Thus, the researchers noted that teachers should understand these theories and know how to incorporate constructivist teaching methods, strategies, tools, and practices to develop an effective learning environment.

In both theories, value is placed on the inquiry or question and answer method where teachers present puzzling situations and students problem solve by collecting the data and analyzing the conclusion (Powell & Kalina, 2009). Powell and Kalina (2009) noted that both theories emphasize the importance of guided forms of teaching or facilitation as learners create their own concepts and understanding of what the teacher

imparted. The researchers also noted that both Piaget and Vygotsky agreed about the teacher's role as a facilitator and guide, instead of a director or dictator.

From Piaget's perspective, children's development must necessarily precede their learning, whereas from Vygotsky's perspective, social learning tends to precede development (Galloway, 2015). From a cognitive constructivism perspective, individuals create ideas through a personal process, but from a social constructivism perspective, individuals create ideas through their interactions with teachers and other students (Powell & Kalina, 2009). Powell and Kalina (2009) related that from the cognitive constructivist perspective, as children receive information, they gain knowledge from organizing and reorganizing data. On the other hand, from the social constructivist perspective, the researchers reported that social interaction or collaboration is seen as the main method for learning and emphasis is placed on how language develops.

Furthermore, in Vygotsky's social constructivism, more emphasis is placed on how culture affects and shapes cognitive development (McLeod, 2014). Thus, from Vygotsky's perspective, cognitive development varies across culture, whereas Piaget believes that cognitive development is mostly universal across cultures (McLeod, 2014). McLeod (2014) reported that Vygotsky placed more emphasis on social factors contributing to cognitive development, which stems from social interactions from guided learning with the ZPD as children and their partners construct knowledge. On the other hand, the researchers noted that Piaget maintained that cognitive development mainly occurs from independent explorations in which children construct knowledge on their

own. In addition, Vygotsky claimed that the environment in which children grow up influences their thinking (McLeod, 2014).

Piaget and Vygotsky placed different emphasis on the role of language in cognitive development. For Piaget, language depends on thought for its development, thus, thought comes before language (McLeod, 2014). In contrast, for Vygotsky, cognitive development results from an internalization of language (McLeod, 2014). McLeod (2014) also noted that for social constructivism, adults play an important role in children's cognitive development, but in cognitive constructivism, emphasis is placed on the importance of peer interaction.

Both cognitive and social constructivism should be incorporated in the classroom to achieve the best personal development of students (Powell & Kalina, 2009). Powell and Kalina (2009) noted the importance of communication of information between teachers and students for learning to take place. The researchers recommended the use of constructivism in all student classes and in every teaching activity to facilitate exceptional learning.

Adult Learning Theory of Andragogy

Traditional theories of teaching and learning are based on research related to children's learning, which are derived from theories of animal learning (Knowles, 1984). Knowles (1984) reported that such theories are not complex enough to apply to adult human beings. In this subsection, I discuss the theoretical propositions of Knowles's (1980) adult learning theory of andragogy. I also discuss how Knowles's adult learning theory of andragogy has been applied previously in ways similar to this study. This

subsection is organized in the following areas: theory and research application of adult learning theory of andragogy.

Theory. Adults have a deep psychological need to be self-directed learners (Knowles, 1984). Andragogy is defined as "the art and science of helping adults learn, in contrast to pedagogy as the art and science of teaching children" (Knowles, 1980, p.43). The term andragogy has a long history of development and evolution, where in 1833, Kapp devised the term (Howard, 1993). The term became popular in 1926 when Lindeman expanded on the idea (Ozuah, 2016). Finally, in 1959, Knowles took Lindeman's idea on andragogy even further and developed the idea into a theory of adult learning (Ozuah, 2016; Zmeyov, 1998). Merriam et al. (2007) and Forrest and Peterson (2006) explained that Knowles's perspective on andragogy is based on six main assumptions, which are as follows:

1. Self-concept: Adult learners are self-directed, autonomous, and independent.
2. Role of experience: Repository of an adult's experience is a rich resource for learning. Adults tend to learn by drawing from their previous experiences.
3. Readiness to learn: Adults tend to be ready to learn what they believe they need to know.
4. Orientation to learning: Adults learn for immediate applications rather than for future uses. Their learning orientation is problem-centered, task-oriented, and life-focused.
5. Internal motivation: Adults are more internally motivated than externally motivated.

6. Need to know: Adults need to know the value of learning and why they need to learn (Chan, 2010).

Research application of adult learning theory of andragogy. Adult learners are not being taught effectively (Caruth, 2014). Caruth (2014) examined what educators are doing to prepare for the exponential growth in the number of students, aged 25 years and older, who are enrolling in higher education. Caruth's (2014) explored the literature on andragogy to determine whether educators in higher education are facilitating the needs of adult learners. Findings revealed that there has been a significant increase of adult learners in colleges and that higher education is not providing a suitable environment for adult learners to effectively learn. The author noted that andragogy is not being used in higher education classrooms and recommended that adults should be taught andragogically. The author also noted that although andragogy has been an adult learning theory for over 40 years, insufficient empirical research has been conducted on the theory. Caruth reported that there are available validated and reliable instruments to measure the constructs of andragogy; thus, a clear validation of andragogy in higher education looks promising.

One perspective of adult learning does not explain adult learners, the different contexts where learning occurs, and the learning process (Birzer, 2004; Cross, 1981; Merriam, 2001). Birzer (2004) explored the potentials "of including the adult learning theory of andragogy into the criminal justice classroom" (p. 393). Birzer noted that behavioral and cognitive learning methods have become rooted in criminal justice classrooms and the two approaches have two problems: (a) teachers control how the

teaching is done with little learner input and (b) the learners are taught in the same manner without differentiation between a child and an adult. As a solution to these problems, andragogical approach was used to provide guidance to design learner-centered instruction to enhance criminal justice professionals' competencies and traits. Birzer proposed the application of six principles of the andragogical practice in criminal justice, which are as follows:

1. Establish a physically and psychologically conducive learning atmosphere. In criminal justice classrooms, good physical and psychological climates help the instructor create mutual respect and a collaborative environment to ensure learning effectiveness in the classroom. Moreover, a psychologically conducive atmosphere helps promote trust during the first meeting, which is crucial in the criminal justice program.
2. Involve learners in mutual planning: The instructor and students can jointly plan the learning process and adjust a syllabus based on learning interests and activities.
3. Involve learners in diagnosing learning needs: The instructor can help students determine the level of competency in the area of interest.
4. Encourage students to formulate the learning objectives. Instructors ask what procedures they can use to assist students with interpreting their learning needs into objectives.
5. Encourage learners to identify resources to accomplish the learning objectives: The instructor works closely with students to identify resources

and sets up strategies to use those resources to reach the objectives. However, this requires students to be self-directed and motivated to achieve the objectives with the instructor's assistance.

6. Involve learners in learning evaluation. Like all learning theory, a learning assessment is important in andragogy. However, in andragogy, the instructor assesses the students and the students also assess themselves. The researcher found that this process helped reduce bias from a single judgment of the instructor.

Literature Review

The following section is an extensive review of the current literature that includes a description of studies related to the theories of interest that are consistent with the scope of this study. This review describes how other researchers in education have approached elements surrounding blending learning, the mindset of first- and fourth-year business and technology students, and the patterns of interactions in online discussions of which cyberbullying is a potential barrier to learning. All relevant studies are included, where some researchers found similar findings, and other researchers presented conflicting findings. This section is organized in the following subsections: historical context, patterns of interaction in online forums, students' emotional intelligence and thinking preferences, first versus final year students' self-evaluation, effects of time on students' interactions in online discussions, domination and disconnection in online discussions, first impression bias in online discussions, phases of knowledge construction: Argumentation versus relationship, blended learning and student-to-student interaction,

developing competency within different learning modes, and traditional bullying and cyberbullying.

Historical Context

Students' level of EI varies across different majors and individuals with different personality types participate differently in various learning environments (Bolliger & Erichsen, 2013; Sánchez-Ruiz, Pérez-González, & Petrides, 2010); thus, cyberbullying is a potential barrier to learning. In this technological era, bullying needs to be addressed both in and out of schools (Kwon & Gruzd, 2017), while considering the Supreme Court's First Amendment Act (Nash, 2012). Nash (2012) declared that school administrators are bound by their duty of care, but there is a lack of balance between care and students' free speech rights in relationship to antibullying preventative measures. The researcher related that students have a right to speak freely, but not in a manner that will cause harm to others.

In higher education, there are distinct rules for face-to-face classroom discussions and rules for how students are to behave in online threaded discussions. However, blended learning requires more than a simple combination of these rules. For example, Barton (1995) reported that in face-to-face classroom discussions, teachers often work to create supportive classroom environments by training students and themselves to consistently apply active listening strategies. Within the online portion of a blended learning course, the researcher noted that face-to-face discussion rules will not work because the discourse will be textual.

Similarly, in an online course, the discussion rules are not the best substitute for a blended learning course because students also meet face-to-face (Chen, Wang, & Hung, 2009). These rules do not integrate well into blended learning environments where students participate in face-to-face conversations that tends to be informal and not often remembered, to online communications that are often formal and presented permanently for all students and teachers to see (Chen et al., 2009). Students in blended learning courses often become reserved in online discussions because they worry that their posts might fail to meet the required quality or standard and that their peers will ridicule them (Cassidy, Jackson, & Brown, 2009). Hence, a set of online or face-to-face discussion rules will not resolve issues found in blended learning discussions, such as cyberbullying (Cassidy et al., 2009).

As the blended learning community moves from onsite to online, certain issues may surface. For example, extraverted learners who enjoy immediate feedback in face-to-face environments may become agitated when a classroom dialog moves to the asynchronous online threaded discussion portion of the course where feedback is often not instantaneous (Cassidy et al., 2009). Cassidy et al. (2009) reported that discussion rules for online and face-to-face modes are not applicable to blended learning discussions because research is needed on the effects of the amount of anonymity found in blended learning courses. In addition, the researchers noted that research is lacking about what happens when students in a blended learning course experience negative interaction in the online discussion and then face their bully in the classroom.

Students' progression overtime and the skills they develop along the way may play a role in how they interact with each other in the online discussions of their courses (Sharif et al., 2007). First-year students possess poor self-evaluation skills, unlike final-year students who can perform realistic self-assessments (Sharif et al., 2007). Special training has fostered online communication among students; for example, business students are trained in aspects of EI, whereas engineering students often lacked teamwork and interpersonal thinking skills (Golemon et al., 2004; Herpertz, Schütz, & Nezlek, 2016; Lumsdaine & Lumsdaine, 1995). Therefore, first and final-year technical and business students' skills develop over time and might affect how they communicate with each other (Golemon et al., 2004; Lumsdaine & Lumsdaine, 1995).

In the educational system, team projects have been incorporated into various courses (Graham, 2005). In higher education, these teams often meet virtually through several collaborative tools where members meet freely without instructor monitoring (Graham, 2005). This lack of teacher-presence allows learners to become comfortable and creative; however, this can also lead to other issues such as students ridiculing or excluding others (Lewis et al., 1997; Ellis, 2001). Another factor to consider is that students at times interact outside of their courses on social networking sites such as Facebook, Tweeter, or Instagram and their aggressive behaviors on such sites might affect the online discussion portion of their courses (Glasner, 2010; Kwon & Gruzd, 2017).

Patterns of Interaction in Online Forums

The use of online courses and web-based communication have been growing considerably with the expansion of online technology in colleges and universities (Lee, 2012). Lee (2012) conducted a case study and investigated patterns of interaction and participation in a large online course in Korea. The undergraduate course took place during Spring 2008. It was an elective leadership developmental course which lasted for 16 weeks. The course consisted of 100 students, but only 88 students participated in the online course discussions. Students' ages ranged from 19 to 25 years. Each online discussion score was 5% of final grades and was scheduled in Week 4 and Week 13.

The aim of the study was to analyze students' patterns of interaction for online forums for the course where students' online messages were collected as the main source of data (Lee, 2012). According to Lee (2012), each posted message was coded in accordance with eight variables: (a) author, (b) date, (c) group, (d) number of references, (e) number of responses, (f) interaction type, (g) interaction function, and (h) phase of knowledge construction. There were defined participation protocols and evaluation criteria, which specified how to participate in the online discussion, the due date of discussion, and the least number and the type of posting (Lee, 2012). The researcher related that students were required to post their personal thoughts and more than five responses to get a perfect score (5 points). Irrelevant messages did not get a score and scores were decided based on the number of initiations and response posting.

Findings indicated that (a) there was a comparatively high portion of higher phase of knowledge construction and metacognitive interaction, (b) students posted required

messages in a short time around the due date and did not post any messages during other times within the restricted time, (c) most interactions anchored the first initiation and had little turn-taking, (d) students read many peer's postings but selectively responded according to their interest, and (e) discussion question and evaluation criteria influenced the pattern of interaction and participation, and knowledge construction (Lee, 2012). Based on these findings, Lee (2012) reported there was a relatively high degree of interaction and participation in a large enrollment course. However, the researcher found that many students posted the required number of messages in a short time and spent most time reading and thinking messages without posting any of their own during online discussion. Therefore, Lee suggested that instructors could assign students diverse roles such as summarizer, initiator, or opponent to encourage their participation and prevent lurking. Lee also suggested that the instructor should also take on the role of cheerleader or motivator. The instructor should maintain a minimal degree of intervention because although students relied on the instructor's feedback, learner-to-learner interaction could be decreased with active instructor participation. Thus, Lee noted that the instruction should keep a balance to promote online discussion and design the structure of discussion in advance.

Students' Emotional Intelligence and Thinking Preferences

Students' profiles were investigated from five university majors to see whether: (a) social science students would score higher than technical students in emotionality, (b) students from arts major would score higher than technical students in emotionality, (c) students from arts major would score lower than technical studies in self-control, and (d)

whether there would be an interaction between gender and major, where female students would score higher than male students within the social sciences only (Sánchez-Ruiz et al., 2010). The sample drawn from the five majors (technical programs, natural sciences, social sciences, arts, and humanities) consisted of 512 students (202 males and 310 females) from 17 to 44 years of age. The researchers found statistically significant differences in overall EI as well as in well-being, self-control, and emotionality. The research findings supported all hypotheses except for the hypothesis that stated students from arts major would score lower than technical studies in self-control.

Using the Herrmann Brain Dominance Instrument (HBDI), Lumsdaine and Lumsdaine (1995) conducted a longitudinal study to assess engineering students' thinking preferences at the University of Toledo. Data were collected from the University of Toledo during 1990 to 1994. Results indicated that over time engineering students' thinking shifted from "plug-and-chug" to a "creative" (p. 193) way of thinking (Lumsdaine & Lumsdaine, 1995). Lumsdaine and Lumsdaine also found that poor teamwork skills persisted with uncomfortable classroom climates for some students, most of which were females. In addition, the researchers found that many students were still being influenced in the analytical-logical-quantitative profile of the faculty. Furthermore, engineering students who practiced right-brain thinking as well as those who were involved in creative problem solving became more whole-brained or right-brained than before being engaged in such activities. The authors proposed that whole-brain thinking activities should be integrated into the curriculum each term to help decrease the problem of engineering students' lack of teamwork and interpersonal thinking skills.

Business administration and management students were randomly allocated to a training group or a control group to evaluate a training program designed to improve the skill to perceive emotions in others, which is a component of emotional intelligence (Herpertz, Schütz, & Nezlek, 2016). There were 105 business administration and management student participants engaged in the study. The training occurred in one day with a subsequent online training which lasted for 4 weeks. The participants completed Herpertz et al. (2016) assessment before the training and 1 month and then 6 months after the training. Results showed that the ability to perceive emotions in others improved in the training group but did not improve in the control group and that personality traits weakened the effectiveness of the exercise. These findings suggest that the skill to perceive other people's emotions can be improved through training. Furthermore, personality traits may tone-down the effectiveness of such activities.

First- Versus Final-Year Students' Self-Evaluation

Most universities have policies for improving students' achievement during and beyond the study years (Sharif et al., 2007). Sharif et al. (2007) investigated the self-evaluation skills of several cohorts of pharmacy undergraduates during the first year of their course. The researchers asked students to predict their end of first year and end of course results, and these predictions were compared with their actual grades. Sharif et al. used a researcher-created questionnaire to cross-examine different aspects of students' lives, as well as their views on their present and future academic growth. Findings showed that male students were able to better predict their academic performance for their final degree than females, although females academically outperformed males in

both first and final year. Most students predicted better marks for themselves in the final year of their programs than in the first year. The authors suggested that first-year students do not have good self-evaluation skills and could benefit from ongoing practice of self-evaluation during the time of their programs.

Effects of Time on Students' Interactions in Online Discussions

Online students often developed different roles or interests over time during their collaborative assignments (de Laat, Lally, Lipponen, & Simons, 2007). de Laat et al. (2007) explored advances in social network analysis (SNA) along with networked learning/computer-supported collaborative learning (NL/CSCL) to extend their understanding of teaching and learning processes in online courses. The researchers' aim was to uncover the nature of the interaction patterns within a networked learning community (NLC) and the way its members share and construct knowledge. To understand participation in online collaborative supported learning, the researchers asked who were involved with the collaborative learning task, who were the active participants, and who participated peripherally. In the second segment of their research, de Laat et al. presented a summary of one of their own case studies to illustrate how SNA may be used to explore group cohesion and interaction patterns within an online community.

Results of the study indicated that online learning community members were able to sustain productive collaborative relationships over time without displaying large drop-out rates or without individual participants quieted by dominant participants (de Laat et al., 2007). However, when de Laat et al. (2007) combined these findings of interaction patterns over time with content analysis outcomes, the nature or focus of participants'

discussion posts changed over time; for example, participants gained or lost interest during the collaborative project. Membership role is also transformed over time where some participants gradually moved towards the center of the network, whereas others moved away from the core activity to become peripherally engaged. de Laat et al. also found that the most active members do not always regulate and dominate a discussion. This finding revealed that participants develop different roles or interests during their collaborative work or have different interests as their project develops (Reuven, Zippy, Gilad, & Aviva, 2003).

Domination and Disconnection in Online Discussions

Online courses have become popular at colleges and universities, with the discussion forum being the main tool for demonstrating critical thinking and interaction (Dooley & Wickersham, 2007). Dooley and Wickersham (2007) related that instructors and students who are engaged in online courses are faced with sifting through potentially hundreds of postings when all students are placed within a forum. The researchers determined if the same level of critical thinking and interaction is present using a whole class discussion forum compared to smaller virtual learning communities based on the Newman, Webb, and Cochrane (1996) indicators. “The 10 critical thinking indicators used were relevance, importance, novelty, outside knowledge, lack of ambiguities, linking, justification, critical assessment, practical utility, and width of understanding” (Dooley & Wickersham, 2007, p. 1). The setting was an online graduate course with 28 graduate students during a short semester course, running between 2 to 4 weeks.

Findings indicated that critical thinking was present for whole class discussion forums; however, three clear patterns emerged that have not been seen in the smaller virtual communities: (a) discussions were often off topic, (b) certain students tended to dominate, and (c) there was disconnect between and among the critical thinking indicators with few intense interactions (Dooley & Wickersham, 2007). Dooley and Wickersham (2007) reported that a significant amount of the postings within the whole class discussion forum was distracted or off topic as students may focus on a specific part of the posting that they are interested in, even though it may not be related to the purpose or intent of the discussion topic. As a result, students may not achieve what the instructor's intended discussion goal. The researchers noted that the instructor should be vigilant and move the discussion back on track. The instructor can create an online forum that students can use for self-directed discussions that are not related to the graded forum (Dooley & Wickersham, 2007).

First Impression Bias in Online Discussions

Human information processing is limited in that people are often strongly influenced by the first piece of information they are exposed to, which may lead to subsequent biased evaluations of other individuals (Lim et al., 2000). Lim et al. (2000) generated and tested a set of predictions through a laboratory experiment using a simulated multimedia Intranet. The researchers' experiment was the third in a series of three tests examining media. As a means of enhancing realism and the generalizability of the findings, the researchers collected information from an actual organization, the British Columbia Cancer Research Centre (BCCRC). Participants were asked to take on

roles of newly appointed members of the BCCRC's Board of Trustees and evaluate one of the six department heads at the company.

In the study, information was made available in text or multimedia format where participants using the multimedia system viewed information in a full-motion video format (Lim et al., 2000). According to Lim et al. (2000), using the text-based system, participants used the same network access; however, they viewed the information only in the form of written transcripts of the video clips. In other words, the only difference between the two ways of retrieving the information was the medium, which was written transcripts versus video clips. For participants to reexamine the information, they scrolled to the desired location. In performing the appraisal, participants used an instrument consisting of 11-point Likert scale items.

Results indicated that the multimedia system reduces the influence of a first impression bias (Lim et al., 2000). Lim et al. (2000) found that although all participants were affected by first impression bias, the magnitude of change for those who used the multimedia system nearly doubled the level of change for those who used the text-based system. The researchers concluded that first impression bias occurs through two processes, reinterpreting and ignoring subsequent inconsistent information. The two unique characteristics that multimedia presentations bear are rich language and complementary cues, which enabled participants to suppress or reduce the likelihood of occurrence of these two processes found in first impression bias (Lim et al., 2000). Using multimedia's set of rich languages; participants were able to convey the original meaning of information without little or no distortion or ambiguity. In addition, Lim et al. related

that multimedia systems presented information in vivid ways to participants using audio and video that provided complementary cues for retention and retrieval of information with a potential for committing information to long-term memory.

Phases of Knowledge Construction: Argumentation Versus Relationship

Educators have used argumentation-oriented discourse frameworks to improve online learning outcomes (Barros & Verdejo, 2000; Duffy, Dueber, & Hawley, 1998; Gunawardena et al., 1997; Tan, Turgeon, & Jonassen, 2001); however, this framework did not fully captured how students construct knowledge in online discussions (Paulus, 2006). Paulus (2006) postulated that online learners often engaged in relationship-oriented online discussions rather than an argumentation model. Paulus explained that supporters of the challenge model believed that whenever students are left on their own in online discussions, they tend to speak in a simple exploratory manner. For example, Duffy et al. (1998) explained that students engaged in online discussions tend to "talk past each other" (p.8).

To mitigate these aimless exploratory conversations between students, they were encouraged to be engaged in issue-based discussions with counterarguments (Duffy et al., 1998). Although argumentation was declared an important factor to problem solving, it was believed that students often found it challenging to form sound reasoning and arguments (Tan et al., 2001). Barros and Verdejo (2000) and Gunawardena et al. (1997) defined phases related to how student construct knowledge in online discussions. Barros and Verdejo three phases were proposed, argue, and agree. Gunawardena et al. model is consistent with challenge models and includes five phases: (a) sharing and comparing

information, (b) discovery and exploration of dissonance, (c) negotiation of meaning and coconstruction of knowledge, (d) testing and modification of proposed synthesis or coconstruction, and (e) agreement and applications of newly constructed meaning. Gunawardena et al. model is appealing for use in asynchronous online discussions in higher education classrooms because of its theoretical grounding in social construction (Paulus, 2006).

With the increasing interest to create frameworks for online discussions to improve learning outcomes in higher education, Paulus (2006) explored Gunawardena et al., (1997) model with modifications to see whether such changes may better capture students' knowledge building process in online discussions. The study was conducted at a midwestern American university where 21 students were assigned to small dyads to complete specific tasks. Findings showed that participants often engaged in relationship-oriented discussions. For example, participants mitigated their level of disagreement by responding using phrases such as "I don't quite understand" and "a little unsure" (Paulus, 2006, p.15). This suggested that argumentation models did not capture students' knowledge construction process where there were no categories for coding these types of data (Paulus, 2006). Hence, a relationship-oriented model that includes categories for capturing how students form connections in needed to fully capture the knowledge building process (Park, & Park, 2016; Paulus, 2006). Educators may consider both models and not focus solely on argumentation-based challenge frameworks, which could lead to an increase in aggressive behaviors in online discussions (Paulus, 2006).

Blended Learning and Student-to-Student Interaction

Piaget's (1953) cognitive constructivism often serves as the theoretical foundation of blended learning discussions, where students virtually create new knowledge as a learning community (Oseguera et al., 2012). Blended learning allows teachers and learners to capitalize on the strengths of face-to-face and online classrooms with 30% to 79% of the course content delivered online (Allen et al., 2007). In higher education and corporate training programs, the combination of face-to-face and online learning is widely accepted (Boelens, Voet, & De Wever, 2018; Edginton & Holbrook, 2010; Hewett et al., 2019; Lee, Lim, & Kim, 2016; Manzoor, 2018; Owston, York, & Murtha, 2013; Park, Yu, & Jo, 2016; Poon, 2012, 2013, 2014; Stuart, 2014; Varier et al., 2017; Wolniak & Biały, 2013; Yang, 2015). Blended learning courses often require much student-to-student collaboration, with the guidance of an instructor as seen in online discussions and virtual team projects for knowledge construction (Lee, 2012). According to the Rochester Institute of Technology (RIT, 2014), student-to-student interaction is an important part of any course experience and this happens naturally in a traditional classroom setting. The RIT noted that in a traditional classroom setting, students can listen to each other's comments, ask questions of each other, and build rapport through frequent contact. However, instructors can also foster student-to-student interaction in an online setting by building formal and informal interaction opportunities in their course design (RIT, 2014). The RIT highlighted the importance of a high level of student-to-student interaction online by noting that the university accrediting bodies, to include the

Middle State Commission on Higher Education, require evidence of it in online course and program design.

Research has shown that online courses with high levels of student-to-student interaction have a positive effect on learning (Beaudoin, 2001; Kolloff, 2011; Roblyer & Ekhaml, 2000; Swan, 2002; Zheng, & Warschauer, 2015). Kolloff (2011) reported that student-to-student interaction is important to building community in an online environment, which supports productive and satisfying learning, and helps students develop problem-solving and critical thinking skills. Swan (2002) found that students who had high levels of interaction with other students also had high levels of satisfaction and learning. Beaudoin (2001) related that students in an online course with a high level of interaction achieved higher performance than students in the same online course that only had a moderate level of interaction. Roblyer and Ekhaml (2000) noted that interaction influences student achievement and satisfaction, which is reflected in test performance, grades, and student satisfaction.

Principles of interaction in online education are rooted in Moore's (1989) definition of the three types of interaction: (a) learner-content, (b) learner-instructor, and (c) learner-learner interaction (RIT, 2014). For instructors to support learner-learner or student-to-student interaction online, they must design the course to address rapport building, instructional activities, and use of technology (Roblyer & Ekhaml, 2000; RIT, 2014). To obtain a high level of student-to-student interaction, student must be afforded many opportunities to build rapport, such as through socially-focused exchanges to include guided introductions, exchanges of personal information, and participation in

activities designed to increase social rapport technology (Roblyer & Ekhaml, 2000; RIT, 2014). Student-to-student online interaction is also supported by instructional activities that encourage reflection and discussion technology (Roblyer & Ekhaml, 2000; RIT, 2014). Numerous technologies can be used to support student-to-student online interaction; thus, instructors should select the most appropriate technologies that can be used to achieve course goals and ones that students can use effectively technology (Roblyer & Ekhaml, 2000; RIT, 2014).

Blended learning has grown in popularity and has proven to be in important part of the education system. Allen et al. (2007) examined blended instruction over 3 years based on the responses from a national sample of over 1,000 colleges and universities. Results from surveys indicated that blended courses are not just a steppingstone to offering online courses or programs. Instead, results suggested that institutions choose blended learning based on its own merits. Thus, the researchers noted that blended learning mode will continue to be an integral part of education.

Pharmacokinetics fundamental course is offered in many pharmacy curriculums; however, it is not well received by students due to its foundation in mathematics and challenges in linking basic concepts with clinical relevance (Edginton & Holbrook, 2010). As a result, Edginton and Holbrook (2010) developed a basic pharmacokinetics course that relied on the integration of online modules for the delivery of concepts and practical computational skills with face-to-face problem-solving tutorials. The researchers assessed the attitudes of students to this new method of learning prior to and following course completion. Results revealed that students' concerns about the blended

method of learning had decreased post course, while their enthusiasm for the benefits of blended learning had increased. Edginton and Holbrook found that students' original concerns about blended learning were based on their ability to interconnect with the instructor regarding the online components. However, the researchers noted that these concerns shifted to students' personal time management skills near the ending of the course. Nevertheless, findings indicated that students believed that face-to-face interactions with each other and with the instructor were more important than online interactions in the course. The researchers noted that because students showed evidence of learning and enthusiasm for the blended format, this method could be used in future courses or course sections within a pharmacy curriculum if the content is appropriate. However, Edginton and Holbrook noted that the face-to-face component is expected to be of utmost important in assuring learning gains regardless of the content.

Due to the lack of a research on the use of blended learning in property-related courses, Poon (2012) examined the benefits that blended learning provides to students' learning experience and engagement in property education. The researcher used a mixed method approach and data were collected using interviews and questionnaire surveys with the course directors and the students of property-related courses in the United Kingdom. Findings indicated that blended learning gives greater flexibility for student learning in terms of learning style and study pace. In addition, the researcher found that with the adoption of a wide range of delivery methods, blended learning can successfully improve students' experience and enhance their engagement.

It is important that blended learning includes a good mix of delivery methods (Poon, 2012). Poon (2012) related that face-to-face interaction with students is important as students require reassurance and on-going support from lecturers. The researcher noted that providing training for students regarding the use of software to equip them to fully utilize blended learning is also essential. In addition, Poon reported that the allocation of enough time and resources for the development and maintenance of blended learning programs is also vital to its success.

The role that students and teachers play in blended learning is essential to the success of the course. Poutanen et al. (2011) conducted a case study to explore the conditions that create and support self-organizing learning and creativity in blended learning environments. Participants in the study included 24 students in the course, 10 practitioners, and six teachers or facilitators. Results showed that to create enabling conditions for self-organizing in the context of blended learning, a model of three dimensions should be employed: knowledge, space, and agency. The researchers discussed knowledge management regarding teachers having to handle large amount of Internet and traditional sources of information in blended learning. Participants reported that they generated new knowledge in blended learning and continuously learned from each other as they collaborated online in discussions. Participants interpreted the information from their personal viewpoint, where personal experiences and culture played a significant role.

Student interaction in online discussions are represented by words on a screen, and without clearly defined rules, this interaction could lead to negative behavior within

these discussion threads as students become comfortable due to a certain amount of anonymity (Lee, 2012; Palloff & Pratt, 2005; Wong, Chan, & Cheng, 2014). Students' level of interaction and group collaboration often increase whenever pseudonyms are used in online discussions (Bowen, Farmer, & Arsenault, 2012; Magni, 2013; Miyazoe & Anderson, 2011; Kim, 2014). Miyazoe and Anderson (2011) measured learning outcomes associated with implementing discussion forums and blog writings using pseudonyms in blended learning. Results indicated that online writing assignments using pseudonyms can be an effective teaching strategy to increase online participation, particularly for students who are hesitant to participate in a traditional classroom setting. Results also indicated that students prefer gender-free pseudonyms, bearing no human identities online. Graham (2005) defined six major issues to consider when designing blended learning systems: (a) the role of real-time interaction, (b) the role of learners having a choice and self-monitoring, (c) simulations and models for training and support, (d) defining a good balance between modernism and production, (e) adapting to culture, and (f) handling the digital divide. Hence, there are many known complexities surrounding blending learning and various patterns of interactions that occur in the online discussions of such courses (Graham, 2005).

It is important that instructors understand the advantages and disadvantages of traditional classroom activities compared to taking those activities online (Meyer, 2003). Meyer (2003) compared the experiences of students in face-to-face in class discussions with threaded discussions and evaluated the threaded discussions for evidence of higher-order thinking. Participants were enrolled in graduate-level classes that used both face-to-

face and online modes for course-related discussions and their end-of-course evaluations of both experiences were grouped and analyzed, and themes were constructed based on their comments. Results revealed that both face-to-face and threaded discussions had advantages. Findings indicated that students spent more time on class objectives and appreciated the additional time to reflect on course issues in threaded discussions. Participants noted that the face-to-face format had value because of its immediacy and energy, and some participants found it to be a better fit than the online learning mode. Furthermore, the study provided some support that higher-order thinking can and does occur in online discussions.

For an online class discussion to be truly effective, the discussion activity must be closely connected with student learning goals and course objectives (Zhu, 2006). Zhu (2006) explained that the instructor is tasked with understanding and clearly defining different variables in the online learning environment that can be used to facilitate student learning. Wu and Hiltz (2004) explored whether asynchronous online discussions improve students' perceived learning. Results indicated that such discussions do improve students' perceived learning and variations among instructors or courses are associated with differences in perceptions of student motivation, enjoyment, and learning from online discussions. Alvermann et al. (1996) conducted a multicase study to explore middle and high school students' perspectives on how they experience text-based discussions. The researchers concluded that researchers and teachers should note the importance of data richness found in classroom discussions.

Students and teachers have made continuous implicit and explicit comparisons of face-to-face and online learning (Gerbic, 2010). Gerbic (2010) conducted a case study and explored students' perceptions of the differences between face-to-face and online discussions and how these differences affected their learning. Results indicated that students regarded both face-to-face and online learning environments as different but complementary for their learning. Based on the findings, the researcher related that teachers and course designers were presented with an evidence-based approach for including both face-to-face and online discussions in students' courses.

The increase of information technologies has brought computer-assisted learning and web-based learning to the forefront, which creates new opportunities for students to engage with other students and course content within and outside traditional academic and classroom settings (Bello-Haas et al., 2013). In an instructional evaluation project, Bello-Haas et al. (2013) examined the effects of blended learning (classroom-based and web-based learning) versus traditional classroom-based learning on knowledge and knowledge application confidence in students enrolled in a professional physical therapist education professional issues course. Results indicated that the nature of the discussions in the blended learning group were rich, in that students seemed engaged. Findings from the researchers' study also showed that although a minimum number of posts were required, students went above and beyond by exceeding the performance indicators of the online discussion rubric. Bello-Haas et al. related that an important advantage of the blended learning format that students pointed out was having time to reflect before posting a thought. The researchers found that students who were quieter in groups in

face-to-face interactions, contributed more to online discussions, which was reflected in their responses to the open-ended questions. Another important factor found was that online absence of students who tend to dominate face-to-face interactions allowed quieter students to have an equal share of a discussion. Bello-Haas et al. also found that online, quieter individuals may be less concerned about embarrassment, being judged negatively by their peers, and may feel less inhibited.

Developing Competency Within Different Learning Modes

Competencies are a series of personality traits, as well as skills and abilities, required for the accomplishment of certain activities (Alles, 2002; Argudín, 2009; Ashby & Mintner, 2017; Dragoo & Barrows, 2016; González & Wagenaar, 2003; Levy-Leboyer, 2000; Oseguera et al., 2012; Seemiller, 2017; Silva, 2008). Therefore, it is essential that curriculum developers who implement competency-based curriculum ensure that the competencies consist of knowledge, skills, and abilities and that such elements are aligned with both academic and industry expectations (Dragoo, & Barrows, 2016). Oseguera et al. (2012) conducted a nonexperimental, quantitative, descriptive, and simple cross-sectional research study to reinforce the idea that learning based on competencies can contribute to higher education when the behaviorist elements are separated, and constructivist practices are reinforced. The researchers' aim was to compare the behaviorist and constructivist approaches to develop competencies in the three modalities: face-to-face, e-learning, and blended learning courses, and to identify the prevailing approach in each of them. Students from a business program were surveyed: 119 students from the face-to-face mode, 51 students from the online mode,

and 26 students from the blended learning mode. Student participants were surveyed with a 7-point Likert scale, which was distributed in the four dimensions of the model: (a) communication, (b) thinking, (c) independent learning, and (d) collaborative work. Results indicated that in general terms, the development of competencies in the three modalities was basically behaviorist, but there were more constructivist aspects in the online and blended learning modalities.

Traditional Bullying and Cyberbullying

This subsection is organized in the following areas: traditional bullying, cyberbullying, contagious offensive commenting, gender trends and differences in cyberbullying, and cyberbullying laws and intervention programs.

Traditional bullying. Traditional bullying can be divided into two categories of behavior: direct and indirect (Brunstein Klomek et al., 2016; Cameron, & Kovac, 2017; Chibbaro, 2007; Dedousis-Wallace, Shute, Varlow, Murrihy, & Kidman, 2013; Farrell, & Volk, 2017; Harbin, Kelley, Piscitello, & Walker, 2018; Jenkins, Tennant, & Demaray, 2018; Newman, Fantus, Woodford, & Rwigema, 2017; Quiroz, Arnette, & Stephens, 2006; Slonje, Smith, & Frisén, 2016). Direct bullying tends to be more physical than indirect bullying behavior and includes behaviors such as hitting, tripping, shoving, verbal threats, or stabbing (Chibbaro, 2007). Indirect bullying includes behaviors such as excluding, spreading rumors, or blackmailing (Chibbaro, 2007; Willard, 2006; Dedousis-Wallace et al., 2013). Individuals who display predatory and exploitative behaviors are at risk of manifesting both direct and indirect forms of bullying; being reckless and impulsive is a secondary inclination for direct bullying (Farrell, & Volk, 2017). Males are

more likely to take part in direct bullying whereas females tend to engage in indirect bullying (Chibbaro, 2007; Crawford, 2002; Quiroz et al., 2006).

Childhood bullying was viewed in the past as a normal part of growing up; however, this negative behavior is now associated with teen suicide, which is the third leading cause of death among individuals 10 to 24 years of age (Cooper, Clements, & Holt, 2012; Ertesvåg & Roland, 2014; Olweus & Breivik, 2014; Kerr, Gini, & Capaldi, 2017; Liu, Huang, & Liu, 2018; Sabia & Bass, 2016; Mooren, & van Minnen, 2014; Sinyor, Schaffer, & Cheung, 2014; Stanbrook, 2014; Sugarman & Willoughby, 2013; Vessey, DiFazio, & Strout, 2013). Bullying is not limited to specific schools and school differences contribute little to explaining students' bullying behavior (Shaw & Cross, 2012). Shaw and Cross (2012) found that bullying between students seriously affected students' health and academic outcomes, but little is known about the extent to which bullying behavior is clustered within certain schools. Craig, Pepler, and Atlas (2000) conducted a mixed methods study and compared naturally occurring bullying and victimization episodes in the playground and in the classroom. The researchers found that males were more likely to bully than females. Results also indicated that nonaggressive children were more likely to bully on the playground whereas aggressive children were likely to bully in the classroom.

There are two sides that require consideration when assessing situations that involve bullying behaviors where both the person being bullied and the person carrying out the bullying may experience severe, adverse, and devastating psychological effects (Warren et al., 2011). Warren et al. (2011) noted that in some circumstances, physical

harm or death can occur because of bullying. In addition, the author noted that along with physical harm, mental health problems can result from bullying, which can affect people's performance in school and in other important areas of life.

Cyberbullying. Cyberbullying is defined as "the act of using technologies such as emails, cell phones, or text messaging with the intent of causing harm to others" (Chibbaro, 2007, p. 65). Therefore, cyberbullying can also take place in online threaded discussions. Some students may engage in cyberbullying because they are not face-to-face with other students (Betts, Gkimitzoudis, Spenser, & Baguley, 2016; Ciucci, Baroncelli, & Nowicki, 2014; Conway, Gomez-Garibello, Talwar, & Shariff, 2016; Ellis, 2001; Halpern, Piña, & Vásquez, 2017; Kowalski, Toth, & Morgan, 2017; Lee, 2016; Lee et al., 2016; Lewis et al., 1997; Palloff & Pratt, 2007; Pratt, 1996; Wright, 2017; Wright, Wachs, & Harper, 2018). Chibbaro (2007) compared traditional bullying and cyberbullying with the aim of finding school-wide interventions. The author concluded that if leadership is provided for students, faculty, administrators, and parents in addressing the issue of cyberbullying, the education system may make an important step in ensuring students' safety. In addition, Chibbaro noted that advocating for school cyberbullying policies and working with other school personnel to design and implement prevention and intervention programs, may help school counselors' efforts in preventing cyberbullying.

With advancements in technology, some children and adults are being harassed electronically (Chibbaro, 2007). Cyberbully victims have been found to have an additional risk factor for the development of depressive symptoms (Gradinger,

Strohmeier, & Spiel, 2009; Juvonen & Gross, 2008; Perren, Dooley, Shaw, & Cross, 2010) and psychosomatic symptoms like headaches, abdominal pain, and sleeplessness (Sourander et al., 2010). In addition, adolescent victims of cyberbullying may also increase their alcohol use, smoke, and have poor school grades (Mitchell, Ybarra, & Finkelhor, 2007). Those who are the aggressors have an increased risk for school problems, conduct disorders, and substance use (Hinduja & Patchin, 2008; Sourander et al., 2010).

Cyberbullying is a major concern for families, schools, and social and healthcare professionals (Perren et al., 2012). Perren et al. (2012) presented a summary of the current knowledge on successful responses to cyberbullying by differentiating between three different response domains: (a) reducing risks, (b) combatting the problem, and (c) buffering negative impact. In their literature search, the researchers found general prevention strategies such as antibullying policies or cybersafety strategies. They also found coping strategies such as seeking support, confronting, technical resolutions, and strategies focused on avoidance and emotions. Perren et al. noted that although a few studies reported success, very few of the studies measured how successful the strategies were in relation to risks and outcomes. Thus, the researchers noted that there was a lack of evidence concerning successful responses to cyberbullying.

Legislators, educators, parents, scholars, and students have responded to the deaths of numerous teenagers with vigorous debates over the responsibility of schools in protecting students by stopping cyberbullying behaviors (Belnap, 2011). Belnap (2011) noted that the challenge is educators regulating cyberbullying threats while preserving

acceptable protection for students' rights to free speech. Benzmiller (2013) explored criminal liability for cyberbullying bystanders. The researcher proposed that cyberbullying witnesses be held liable under a Bad Samaritan law because they reasonably believed the victim would suffer physical harm but did not report it.

Since cyberbullying has become a global problem, educators, academics, policymakers, and legal specialists have to develop effective policies and practices to deal with this problem (Bernard, Vernon, Terjesen, & Kurasaki, 2013; Blake, Banks, Patience, & Lund, 2014; Broll & Huey, 2014; Cassidy et al., 2009; Kendrick, 2015; Nickerson, Cornell, Smith, & Furlong, 2013; Pascoe, 2013; Perlus, Brooks-Russell, Wang, & Iannotti, 2014). Cassidy et al. (2009) explored students' experiences with cyberbullying. The researchers conducted comparative analyses with data gathered from surveys administered to 365 students in Grades 6 through 9 from five schools in British Columbia, Canada. The study revealed that students wanted to talk about cyberbullying and wanted to be part of the solution. Students in the study requested a site to report their experiences anonymously because fear is the main reason victims remain silent about their victimization. The authors found that students are more likely to report witnessing another student being victimized in cyberspace than they are to report their own experiences.

Contagious offensive commenting. Kwon, & Gruzd (2017) explored the domino effects of offensive remarks made in an online community from the lens of emotional and behavioral contamination. The authors examined the pollution of swearing which is a linguistic gesture that bears high-arousal emotion. The high-

arousal emotion was based on two mechanisms of contamination: mimicry and social interaction effect. Kwon, & Gruzd (2017) performed mixed-effect logistic regressions to examine the infectious potential of belligerent comments collected from YouTube in response to President Donald Trump's presidential campaign videos posted between January and April 2016. The authors examined non-random incidences of two types of swearing online: public and interpersonal. Findings revealed that a first-level (or parent) comment's public swearing often trigger chains of interpersonal profanity in the second-level (or child) comments. Among the child-comments, a consecutively previous comment's swearing is contagious to the next comment only across the same swearing type. The authors concluded that offensive comments are infectious and have an impact on determining the community-wide linguistic standards of online user interactions.

Gender trends and differences in cyberbullying. Some adolescents who might not normally bully might engage in cyberbullying (Snell & Englander, 2010). Snell and Englander (2010) examined female gender trends in cyberbullying victimization and behaviors. Snell and Englander recruited 213 college students (57 males and 156 females) from Bridgewater State College psychology research pool. Snell and Englander surveyed participants online. The survey consisted of 218 questions pertaining to bullying and cyberbullying victimization and behaviors. The researchers' aim was to uncover gender inclination in bullying behavior to see what gender trends existed in cyberbullying activities. The researchers found that females were both victims and perpetrators in cyberbullying activities. Snell and Englander explained that the amount of time spent on

the Internet and cell phones may be correlated with the frequency of these cyberbullying behaviors. However, the ratio between male and female participants could have influenced the findings for this study as there were more female than male participants.

Computer-mediated discussions (CMD) has the potential to allow for different perspectives, to balance power relations between teacher and students, to give a voice to marginalized groups, and to provide opportunities for the thoughtful, reflective discourse that characterizes critical thinking (Fauske & Wade, 2004). Fauske and Wade (2004) explored discourse strategies that male and female prospective teachers who had completed student teaching used as they discussed educational issues in CMD groups that were similar in size and gender. The researchers analyzed online discussion transcripts of 29 prospective secondary teachers who were placed in five groups and their weekly discussion posts were analyzed for discourse strategies. Findings revealed that both men and women had equal tendencies to mock and exclude those who did not abide by the conventions of the group norms.

Cyberbullying laws and intervention programs. U.S. lawmakers have responded to school bullying by creating antibullying legislation, and since 2011, such laws were enacted by 47 states, though widely varied in scope and content (Weaver, Brown, Weddle, & Aalsma, 2013). Weaver et al. (2013) evaluated each state's antibullying legislation with a focus on how these laws included individual, parental, and systemic protective factors. The researchers analyzed state bullying legislative proposals, acts, and formalized laws for protective factors and discovered that of the 50 states, 47 adopted antibullying legislation, which school officials used as a guide when providing

protections to potential victims. The researchers noted that the states without enacted antibullying legislation included Alabama, which have a harassment law; Montana, where an antibullying law did not pass in 2011; and South Dakota, where an antibullying law failed to pass in 2009. Weaver et al. related that of the 47 states with antibullying laws, 36 states have clearly stated the word bullying in the titles or subtitles of their laws. Results showed that although protective factors were often mentioned, overall states' antibullying language was ambiguous and clear guidelines for school officials were frequently lacking.

Although some states have created laws against cyberbullying and some schools have implemented intervention programs to address this issue, a federal law that clearly addresses the problem of cyberbully does not exist (Cascardi, Brown, Iannarone, & Cardona, 2014; Conn, 2012; Friesen, 2015; Guido, 2014; Lester & Maldonado, 2014; Nathan, 2013; Pelfrey & Weber, 2014). Nathan (2013) noted that many states have enacted laws outlawing cyberstalking and cyberharassment, and laws that explicitly outlaw cyberbullying. According to Kueny and Zirkel (2012), there needs to be deep analysis of antibullying laws in the United States because legal dimension of bullying on a whole is limiting. Kraft and Wang (2009) found that teenagers believed that taking away offenders' access to technology as the most effective measure, regardless of their roles in cyberbullying. Student perceptions are important even as lawmakers seek to find a balance between the Supreme Court's First Amendment case law in relationship to current antibullying rulings where students' free speech rights and controlling bullying in and out of schools is addressed (Nash, 2012). Nash (2012) suggested that while the

Supreme Court works to resolve this issue, each state should take a proactive approach by focusing on education. This is in line with the focus of this study, which is on students' and teachers' perceptions concerning supportive and challenging patterns of interactions in blended learning discussions, which will provide new knowledge and shed light on how to improve positive school environments.

There is a critical need for cyberbullying to be addressed on a nationwide basis (Nickerson et al., 2013; Pascoe, 2013; Perlus et al., 2014; Stuart-Cassel, Bell, & Springer, 2011). Stuart-Cassel et al. (2011) reported that to address cyberbullying in 2010, the U.S. Department of Education along with the U.S. Department of Health and Human Services cohosted the first Federal Partners in Bullying Prevention Summit to explore potential strategies for combatting bullying in schools. The people involved in this summit were government officials, policymakers, researchers, and educational experts. The authors noted that these specialists and officials highlighted the need for full information concerning the current status of state legislation regarding bullying in schools. There was also a request for information on how current laws and policies translate into practice within the kindergarten through 12th-grade (K12) school system. The authors related that officials at the summit revealed that there is a need for more information on how existing laws and policies translate into practice within higher educational systems.

The Erie County, New York Legislature, voted unanimously to pass a law banning cyberbullying against minors (WGRZ, 2013). According to WGRZ (2013), the legislation was drafted after 14-year-old Jamey Rodemeyer committed suicide because of cyberbullying. Under this legislation, cyberbullying outlets include e-mail, social media,

and text messaging (WGRZ, 2013). However, to determine if individuals were bullied, they must first fear that they themselves, their family, or property will be harmed or become ill due to ongoing harassment (WGRZ, 2013). In addition, consideration must be given to what victims have to go through before the law can be applied (WGRZ, 2013).

Summary and Conclusions

Many colleges and universities use blended learning delivery mode that uses both face-to-face and online learning methods and student-to-student collaboration in normally required in online discussions (Allen et al., 2007). As students display various patterns of interaction in online discussions, the presence of challenging and posturing behaviors may have adverse effects on students' learning (de Laat et al., 2007; Fauske & Wade, 2004; Lee, 2012). Researchers have found differences between the way in which men and women communicate in online discussions where students may inquire, support, challenge, and connect with one another (Craig et al., 2000; Fauske & Wade, 2004; Snell & Englander, 2010). Cyberbullying sometimes occur in online learning (Belnap, 2011; Benzmiller, 2013; D'Antona et al., 2010; Fauske & Wade, 2004; Glasner, 2010; Hoff & Mitchell, 2009). Cyberbullying is a form of harassment, which is prevalent in U. S. schools and is a significant barrier to learning (Caldwell, 2013; D'Antona et al., 2010; Fauske & Wade, 2004; Glasner, 2010; Hoff & Mitchell, 2009; Luker, 2015; Piotrowski & Lathrop, 2012; Snell & Englander, 2010). Students with different personality types participate differently in various learning environments (Bolliger & Erichsen, 2013). There is extensive research that focuses on bullying in face-to-face environments (Davies, 2003; Duff, 2002; Meyer, 2003) and research that focuses just on online learning

environments (Alvermann et al., 1996; Wu & Hiltz, 2004; Zhu, 2006). However, research is lacking on patterns of interactions in a blended learning discussion. In addition, no research was found on the patterns and stages of knowledge construction that occur for students experiencing different classroom interactions in blended learning discussions in blended learning courses. Therefore, to fill this gap in knowledge, I conducted a multiple case study to compare first-year and fourth-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions in the online portion of their blended learning discussions. Piaget's (1953) cognitive constructivism, Vygotsky's (1978) social constructivism, and Knowles's (1980) adult learning theory of andragogy served as the conceptual framework of this study.

In Chapter 2, I included the introduction, literature search strategy, conceptual framework, literature review, and a summary and conclusions. In Chapter 3, I include the introduction, research design and rationale, role of the researcher, methodology, issues of trustworthiness, and a summary.

Chapter 3: Research Method

In this multiple case study, I compared first-year and final-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions. I also explored how patterns and stages of knowledge construction occur for students experiencing different classroom interactions in the online portion of their blended learning discussions at a university in a northeastern state in the United States. In-depth, face-to-face, semistructured interviews—with eight students in two technical and two business blended learning courses and the four professors who taught those four courses—served as the main data collection instrument for this study (see Appendices D and E for the interview guides for students and professors, respectively). I also analyzed the eight students' 8-week online discussion threads. The online discussions included textual and VoiceThread posts. I coded and compared interview data and discussion thread data in Microsoft Word, Microsoft Excel, and NVivo. I conducted data analysis for this multiple case study at two levels: (a) single-case or within-case analysis and (b) cross-case analysis.

I conducted this study in accordance with the parameters established by the research site's IRB. After approval from the research site's IRB, I also received approval from Walden University's IRB, and the study was conducted based on the university's guidelines to ensure the ethical protection of research participants. The Walden University IRB approved the application for the study and assigned the following approval number: 11-08-16-0278182. In Chapter 3, I include the research design and rationale, role of the researcher, methodology, issues of trustworthiness, and a summary.

Research Design and Rationale

In this section, I present the research questions for this multiple case study. I also discuss the multiple case study research design rationale. This section is organized in the following subsections: research questions and multiple case study research design rationale.

Research Questions

To compare first-year and final-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions in the online portion of their blended learning discussions, I addressed the following qualitative research questions in this multiple case study:

RQ1: What are first- and final-year students' supportive and challenging patterns of interactions that occur in the online portion of blended learning discussions?

RQ1.1: What are professors' perceptions of first- and final-year students' interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?

RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?

RQ2: What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions?

Multiple Case Study Research Design Rationale

I chose a multiple case study research design because it enabled me to delve into the topic and compare first-year and final-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions in the online portion of their blended learning discussions. I considered all possible research methodologies: mixed methods, quantitative, and qualitative (David et al., 2017; Mertens, 1998; Panda, Begley, & Daly, 2018). I considered a mixed methods approach for this study but did not choose that method because it requires various views as a practical and natural approach to research (Guest, MacQueen, & Namey, 2012). A mixed methods approach was not needed to answer this study's research questions. A quantitative design, which focuses on the relationship among variables (David et al., 2017; Johnson, 2006b; Panda et al., 2018), did not align with the purpose of this study. I applied a qualitative research method in the study because it allowed me to develop a rich, complex, and holistic understanding of the research problem (Tellis, 1997).

Qualitative research designs include narrative, phenomenology, grounded theory, ethnography, and case study (Creswell & Plano Clark, 2004). A phenomenological research design was considered, which is a distinct qualitative method for discovering the

underlying structure of shared essences of some social phenomenon (Worthington, 2010). However, this design was not appropriate for this study as the purpose was not to describe the lived experiences of students and teachers, but rather to describe their beliefs about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions. Narrative, grounded theory, and ethnography were also considered, but rejected.

A multiple case study research design was selected because it is used for in-depth exploration of one or more individuals and is usually bounded by time and a set of activities (Creswell, 2009; Stake, 1995). Data collection was bounded by an 8-week session at the university. In addition, a case study is used to explore the boundaries between the phenomenon and the context, which are often not clear (Yin, 2014). Yin (2014) noted the following in relation to a case study:

> The case study inquiry copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result benefits from the prior development of theoretical propositions to guide collection and analysis. (p. 18)

Two cases were used: (a) first and fourth-year technical students in two technical courses and (b) first and fourth-year business students in two business courses. Yin (2014) noted that a case study relies on multiple sources of evidence to present a rich picture of the phenomenon under investigation. Therefore, data was collected using in-depth face-to-face semistructured interviews and discussion threads.

Role of the Researcher

The role of the case study researcher includes being a teacher, advocate, evaluator, and biographer (Stake, 1995). Stake (1995) noted that from a constructivist point of view, the role of interpreter and gatherer of interpretations is central. Stake added that the goal of research is to build clear and sophisticated realities that can withstand skepticism. I served as a participant-observer during the in-depth face-to-face interviews of this multiple case study; therefore, I was a key instrument in the qualitative data collection process. In addition, I recruited participants and collect all data, which included the interview data and discussion threads. In addition, I transcribed the interviews, conducted transcription reviews with the participants, analyzed the data, and interpreted the findings. I followed specific procedures for data collection and analysis to ensure the trustworthiness of this study. I conducted an ethical research study that relied on informed consent and protected the confidentiality of participant interview responses and discussion threads. I conducted separate interviews in a private meeting room at the research site university's library.

I am a visiting professor at the university, and I teach both technical and business blended courses; therefore, I was aware of potential biases. At the time of recruitment, some of the participants were aware of my visiting professor role; thus, to separate the dual roles and minimize perceived coercion to participate, the research site IRB prepared the participant list and sent out the approved invitation to participate e-mail to potential participants. Hence, to reduce the risk of conflict of interest or perceived coercion to participate, the consent forms stated that the invitation to participate in the study were

sent out by the research site on my behalf; however, the study was not sponsored by the research site. The consent forms also indicated that participants may already know the researcher as a visiting professor at the research site, but conducting this study is separate from that role.

In addition, to minimize the risk of coercion, I requested that all my current students be excluded from the study; thus, I excluded courses where I was the professor. If any of my past students were possibly recruited, there was minimal risks of coercion because final grades were already assigned as those classes were already completed. I also used specific strategies such as voluntary participation and informed consent. I informed potential participants that everyone will respect their decision of whether they choose to be in the study and that no one will treat them differently if they decided not to be in the study. In addition, I did not have any bias against the potential research participants, and I considered all participants' viewpoints. I used specific strategies such as reflexivity where I revealed any experiences, biases, and values pertaining to supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions in the online portion of their blended learning discussions. I did not hold any bias against the students and teachers who participated in this study; hence, there was no apparent conflict of interest in this study.

Participants were offered a healthy snack consisting of a granola bar and a bottle of water for participation in the research study before data collection began, which seemed reasonable to thank participants for their time and effort for taking part in the

study. Therefore, participants could have withdrawn from the study at any time as there was no obligation or coercion to participate to receive a gift of any kind at the end of the research. After the study is completed and approved, I will e-mail an executive summary report of the research findings to each participant and I will also share the findings with Topnotch University leaders.

Methodology

In this section, the methodology is discussed. Sufficient depth is provided so that other researchers can replicate the study. This section is organized in the following subsections: participant selection logic; instrumentation; procedures for recruitment, participation, and data collection; and data analysis plan.

Participant Selection Logic

Maximum variation sampling strategy, which is a subset of purposive sampling, is used when researchers want to understand how a phenomenon is seen and understood among different people, in different settings, and at different times (Cohen & Crabtree, 2006; Martin, Kumar, Lizarondo, & Baldock, 2019; Morsa et al., 2018). Cohen and Crabtree (2006) reported that when using a maximum variation sampling method, the researcher selects a small number of cases that maximize the diversity relevant to the research question. The maximum variation sampling strategy was used in this study. In this study, four professors from Topnotch University (pseudonym for the university), a university in a northeastern state in the United States, were included in the study. From the four courses that the four chosen professors taught, eight students were recruited to participate in this multiple case study. Two cases were used: (a) two first and two final

year technical students (four technical students total) and (b) two first and two final year business students (four business students total). First and final-year technical and business students were used in the study to obtain diverse perspectives about patterns of interactions in blended learning discussions. Technical students often lacked teamwork and interpersonal thinking skills that are required in the industry, whereas business students are trained in programs that have been designed to teach aspects of EI, which consists of five components: (a) self-awareness, (b) self-regulation, (c) motivation, (d) empathy, and (e) social skills (Golemon et al., 2004; Herpertz et al., 2016; Lumsdaine & Lumsdaine, 1995). Figure 2 shows the breakdown of the participants and pseudonyms were used for research participants to protect their identities.

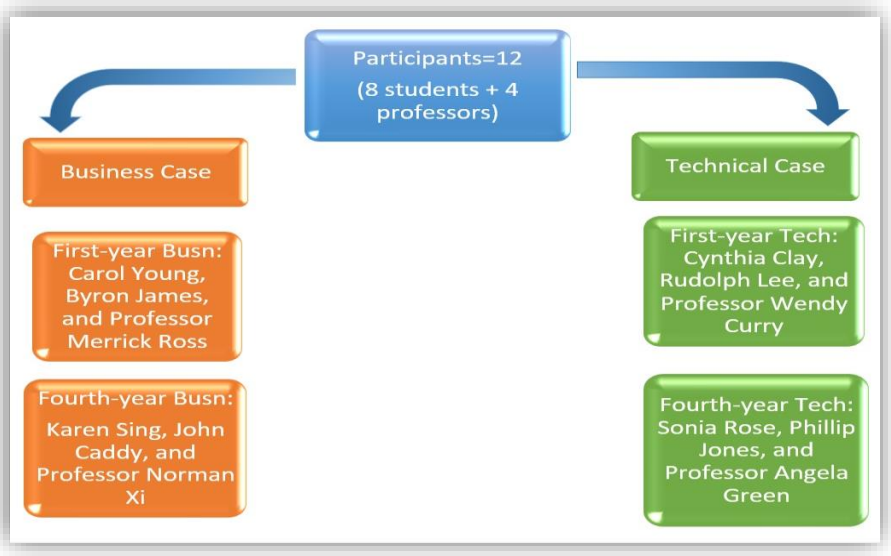

Figure 2. Total participants in the study.

Professors who met the selection criteria, such as those who were teaching a first-year or fourth-year technical or business blended learning course during an 8-week

session at the university, were e-mailed an invitation to participate in the study. The invitation letter to the faculty was sent out on my behalf by a campus representative from the research site's IRB. From the professors who met the selection criteria and were interested in participating, four professors were selected: (a) a professor who was teaching a class that included first-year technical students, (b) a professor who was teaching a class that included first-year business students, (c) a professor who was teaching a class that included fourth-year technical students, and (d) a professor who was teaching a class that included fourth-year business students. Exactly eight students from these four blended learning courses participated in the study: (a) one male and one female first-year technical students, (b) one male and one female first-year business students, (c) one male and one female fourth-year technical students, and (d) one male and one female fourth-year business students. To participate in the study, students had to meet the minimum discussion post requirement in the first 2 weeks of the course. Students who did not meet the minimum discussion post requirement were excluded from taking part in the study. Saturation is the point in data collection where the collection of new data does not shed any further light on the issue under investigation (Glaser, Strauss, & Strutzel, 1968; Moghaddam, Manzari, Heydari, & Mohammadi, 2018). The relationship between saturation and sample size was sufficient in this study because I purposefully selected 12 participants (four professors and eight students) in order to obtain the richest data possible.

According to Yin (2014), a case study relies on multiple sources of evidence to present a rich picture of the phenomenon under investigation. To present a rich picture of

the phenomenon under investigation, I created pseudonyms for each participant in this study. I called each nonparticipating student peer/student. Using pseudonyms facilitated not only a rich presentation of the phenomenon but also protected participants' and nonparticipants' identities. The same students and professors who met the selection criteria also took part in an in-depth face-to-face semistructured interview. First, the campus representative arranged for me to send an invitation e-mail to recruit potential student and professor participants and then arranged for me to send consent forms to those who expressed an interest to participate in the study. Potential participants who signed the consent form were asked to take part in a semistructured interview and were told that their discussion threads from the online classroom would be used in the study. This is discussed in further detail in the procedures for recruitment, participation, and data collection section.

Instrumentation

For this multiple case study, I collected data from two data collection sources: (a) two 45-minute researcher-created interview guides for the in-depth semistructured face-to-face interviews with students and professors and (b) students' 8-week session online discussion threads. VoiceThread posts surfaced within the discussion threads; however, I did not include the actual media in this study. I present an explanation of these two data collection instruments in the following areas: interviews and discussion threads.

Interviews. Interviewing is necessary when the researcher cannot observe behaviors, feelings, or how people interpret the world around them, and that it is sometimes the only way to get data (Merriam, 2009). Merriam (2009) also noted that the

researcher should determine the amount of structure desired in the interview, such as highly structured, semistructured, or unstructured. In this multiple case study, in-depth semistructured face-to-face interviews with students and professors were used (see Appendices D and E for the students' and professors' interview guides, respectively). Probing questions were used to elicit more in-depth responses from participants if needed. The interviews took approximately 45 minutes. The interviews allowed me to obtain the perceptions of the students and professors about supportive and challenging patterns of interactions and patterns and stages of knowledge construction in the online portion of technical and business blended learning discussions. Students were also asked to share from their perspectives, the impact of VoiceThread application on how students interact and construct their knowledge together. The semistructured interview questions were closely aligned to the two research questions (see Appendices F and G for the alignment of the students' and professors' interview questions with the research questions, respectively).

Interviews are one of the most popular data collection tools in qualitative research (Locke, Silverman, & Spirduso, 2010; Marshall & Rossman, 1999). In-depth interviews are a qualitative method of inquiry used to combine a predetermined set of open-ended questions that prompt discussions, allowing interviewers to explore themes (Creswell, 2012). The use of open-ended questions allowed participants the opportunity to speak freely about experiences within the online portion of their courses and allows me to collect in-depth information on the topic. Open discussions are an effective method of

gathering data related to nonverbal behavior (Creswell, 2009). Open discussions also allowed me to build rapport with participants.

Discussion threads. One area that has been identified as an important factor affecting students' learning experiences in online learning environments is student interaction (Song & McNary, 2011). Interaction in learning settings is a necessary and fundamental process for knowledge acquisition and cognitive development (Barker, 1994; Hannafin, 2009; Hewett et al., 2019). Understanding students' online interaction is important because interaction influences the quality of online learning (Trentin, 2000). To help facilitate students' online interaction for effective learning, it is important that we understand its unique characteristics. In this study, student participants' 8-week discussion threads in the online portion of the technical and business blended learning discussions were used. The online discussions encompassed textual posts and occasionally, VoiceThread posts (VoiceThread is a cloud based interactive, collaborative application). The discussion threads provided further insights into the complexities of supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions.

Procedures for Recruitment, Participation, and Data Collection

I completed the National Institutes of Health (NIH) Office of Extramural Research human research protections training before beginning data collection (see Appendix K). I also abided by all federal and state regulations, which included keeping participants' identities confidentiality. I applied for IRB approval at Topnotch University, the research site in a northeastern state in the United States. I obtained approval from the

university's IRB to conduct my study and received a letter of cooperation from the dean of academic affairs. After receiving IRB approval from Topnotch University, I obtained approval to carry out the study from Walden University's IRB.

After receiving IRB approval to conduct the study from the research site as well as Walden University, a research site representative arranged for me to send an invitation letter to each professor who was known to meet the selection criteria (see Appendix B). The invitation letter for professors had a link to questions that those who were interested in participating in the study were instructed to complete online. In the invitation letter, professors were informed that if they agreed to be in the study, they would be asked to do the following:

1. Coordinate with the university's academic dean, the university's IRB, and me to obtain participating students' discussion threads. All names were removed and replaced with pseudonyms to protect participants' and nonparticipants' identities. After the first 2 weeks of the 8-week session for the study, I asked professors to remove students' names from the discussion threads and replace them with certain unique identifiers in order to analyze the patterns of their interaction. Students who met the minimum discussion post requirement in the chosen classes were potential candidates to take part in the study. Participants were chosen on a first-come-first-serve basis. I also interviewed the same students I chose based on the discussion threads. Through coordination with professors and the research site, I obtained the eight participating students' discussion threads and was able to interview the same eight students.

2. Professors tool part in an in-depth face-to-face semistructured interview that took approximately 45 minutes. Interviews took place in a private meeting room at the university's library and was conducted at a time that was convenient for the participant.
3. Professors took part in a transcription review process to verify the accuracy of their interview transcript, which were e-mailed to them at a later date after the interview had been completed and the interview had been transcribed. Participating professors provided their feedback about the accuracy of the transcript through a transcription review, which took approximately 25 minutes. I made arrangements by e-mail or telephone with each student and professor participant by setting up a convenient time for them to review the transcripts for accuracy. Professors were told in their invitation letter to e-mail the campus representative if they had any questions about the study.

Once I received the responses to the questions asked from the invitation to participate letter from professors, I selected (a) a professor who taught first-year technical students, (b) a professor who taught first-year business students, (c) a professor who taught fourth-year technical students, and (d) a professor who taught fourth-year business students. A campus representative sent out an e-mail on my behalf to the four professors who were selected to participate in the study. The campus representative also sent a consent form that had my electronic signature, requesting their electronic signatures for consent. Participants were informed that they could ask questions about the study by e-mail or by telephone before signing the consent form and that they could

withdraw at any time without any penalty. I collected and stored all professors' signed consent forms in my password protected computer.

After the first 2 weeks of the 8-week session, I created pseudonyms for each participant in this study. I requested that participating professors assisted me with replacing participating and nonparticipating students' names with these assigned pseudonyms in the discussion threads for me to analyze participating students' patterns of their interaction. I called each nonparticipating student peer/student. Using pseudonyms facilitated not only a rich presentation of the phenomenon but also protected participants' and nonparticipants' identities. Students who met the minimum discussion post requirement in the chosen classes were potential candidates to take part in the study.

The research site's representative e-mailed an invitation letter to students on my behalf (see Appendix C). The invitation letter to students had a link to questions for students who were interested in participating in the study to complete online. In the invitation to participate in the study letter to students, students were informed that if they agreed to be in the study, they would be asked to do the following:

1. Take part in a semistructured interview and give permission to use their discussion threads.
2. Students took part in an in-depth face-to-face semistructured interview that took approximately 45 minutes. Interviews took place in a private meeting room at the university's library and were conducted at a time that was convenient for the participant.

3. Students took part in a transcription review process to verify the accuracy of their interview transcript. I made arrangements by e-mail or telephone with each student participant to set up a time to review the transcripts for accuracy. Transcript reviews took place in a private room at the research site's library. Participants provided their feedback about the accuracy of the transcripts, which took approximately 25 minutes. Students were told in their invitation letter to e-mail the campus representative if they had any questions about the study.

Once I received the responses to the questions asked on the survey from invitation to participate letter from students, I selected (a) one male and one female first-year technical student, (b) one male and one female first-year business student, (c) one male and one female fourth-year student, and (d) one male and one female fourth-year business student. The campus representative e-mailed a consent form that had my electronic signature to the eight students who were selected to participate in the study, requesting their electronic signatures for consent. Participants' names were revealed when they signed the consent forms; however, their names were replaced with pseudonyms in the online discussions and during documentation of the study. Participants were informed that they could ask questions about the study by e-mail or by telephone before signing the consent form and that they could withdraw at any time from the study without penalty. I collected and stored all the students' signed consent forms in my password protected computer.

All participants were chosen on a first-come-first-serve basis. I received slightly more interest than needed for this study and created a wait list related to templates of how I would reply to students or professors who I did not tentatively include in my research study (see Appendix A for criteria for choosing participants and wait list protocol). I notified students and professors who were not selected for the study, thanking them for their interest, letting them know that they were not selected at that time due to high interest in the study, and informed them that if the opportunity arose that other participants could not complete the study, that they could still be invited to participate at a later date. Beginning at Week 5 during the 8-week session, the campus representative contacted each of the four professors and the eight students by telephone or e-mail to set up an appointment to conduct individual semistructured interviews at a time that was convenient for them. The interviews took place in a private meeting room at the university's library. Interviews were audio-taped and took approximately 45 minutes (see Appendix D for the student interview guide and Appendix E for the professor interview guide). Before conducting the interviews, participants were given a healthy snack consisting of a granola bar and a bottle of water prior to data collection. Therefore, participants could withdraw from the study at any time as there was no obligation or coercion to participate to receive a gift of any kind at the end. Participants were asked if they had any other questions or concerns before the interviews began. At the end of the interviews, I addressed any questions or concerns that the participants may have had and thanked participants for their participation. It was unlikely that any acute discomfort arose from participating in the interviews or use of their discussion threads; however, to

provide participants within reasonable protection from distress or psychological harm, participants were informed of the free onsite counselor available to students and professors at the university should they experience any negative effects from taking part in this research endeavor.

After I transcribed the interviews, I contacted each student and professor participant by e-mail or telephone to set up a time to review the transcripts for accuracy. Transcript reviews took place in a private room at the research site's library. Thus, participants took part in a transcription review process, where the goal was to confirm the accuracy, credibility, and validity of the recorded interviews (Harper & Cole, 2012). The transcription review process took approximately 25 minutes. I coordinated with the four professors and obtained the eight students' 8-week discussion threads.

After the study is approved, an executive summary report of the research findings will be e-mailed to all participants (four professor and eight students) and I will also share the findings with Topnotch University leaders. I have stored all hard copy data, flash drives, and electronic data in a locked file cabinet and password protected computer in my personal home office, and I am the only one with access to the data. I will keep all data secured for at least 5 years based on Walden University's guidelines.

Data Analysis Plan

The data analysis in qualitative research is an ongoing process of applying inductive reasoning as opposed to the deductive reasoning that is applied in quantitative studies (Mayring, 2000; Nassaji, 2015). First, I audio-recorded and transcribed each in-depth interview. Next, I coded and analyzed the interview and discussion thread data. I

then used the NVivo software to manage the data. The data analysis plan is discussed in further detail below and is organized in the following areas: Research Question 1 categories for analysis, Research Question 2 categories for analysis, and two stages of analysis and discrepant cases.

Research Question 1 categories for analysis. Coding by means of categories is often used by researchers in qualitative studies to group consistent responses and summarize significant ideas to identify themes and differences between the stories of the participants (Denzin & Lincoln, 1994). Coding categories that I used for Research Question 1 included the following: (a) argumentative-oriented responses, (b) relationship-oriented responses, (c) affable-oriented responses, (d) inquiry-oriented responses, and (e) and active or passive participation (see Appendix H for the categories for discussion threads to answer research questions and Appendix I for categories to capture data related to Research Question 1). The first four categories are support-oriented and challenge-oriented categories that captured data where participants may agree with earlier statements (Fauske & Wade, 2004); display self-doubt, challenge themselves, or disagree with others (Burbules, 1993; Dedousis-Wallace et al., 2013; Herring, 1994; Kendall & Tannen, 2001); exhibit nonsupportive attitudes; or might exhibit a posture that shows an authoritative role (Fauske & Wade, 2004). Compared to women, men's discourse tends to fall in the nonsupportive orientation category (Herring, 1994; Kendall & Tannen, 2001; Wong et al., 2014). Below is a more in-depth discussion of the five categories that were analyzed for Research Question 1:

1. Argumentative-oriented category: This category may capture students using mockery against their peers or isolating student by siding with others against those individuals. Such harassing behavior is viewed as cyberbullying and the alignment with others to mock and reject individuals who do not conform to group norms is viewed as cybermobbing (Benzmiller, 2013; Glasner, 2010). When students question their own assumptions and share disclaimers about their own knowledge, this could reflect open-mindedness (Burbules, 1993). Students who challenge their own viewpoint could also reflect self-doubt, which is more characteristic of women's communication style (Herring, 1994). Gender attitudes of students in blended learning discussions might also be captured in this category (Herring, 1994).
2. Relationship-oriented category: This category may capture data pertaining to students' social connection level within blended learning discussions (Fauske & Wade, 2004; Palloff & Pratt, 2007). It is important to note that although community building in online discussions may result in strong social connections among members, at times little learning may occur (Fauske & Wade, 2004; Palloff & Pratt, 2007). It is the instructor's duty to remain engaged in virtual interactions to guide learners who get off topic and redirect them towards the learning goals (Fauske & Wade, 2004; Palloff & Pratt, 2007). Hence, some students may stray from the learning goals within blended learning discussions because they are focused on connecting with others socially (Fauske & Wade, 2004; Palloff & Pratt, 2007). When this occurs, the

teacher's presence and guidance are needed to overcome unproductive social connections and to ensure that learning takes place through shared collaboration (Fauske & Wade, 2004; Palloff & Pratt, 2007).

3. Affable-oriented category: This category may capture data where participants who are engaged in blended learning discussions display support for each other and show consideration for other individuals' perspectives (Fauske & Wade, 2004). Participants may agree with earlier statements, express appreciation, thanks, or acknowledge what others have said (Fauske & Wade, 2004).
4. Inquiry-oriented category: This category may capture data where a participant engaged in blended learning discussions ask a question to the entire group that does not have any underlying pretentious or self-promoting aim (Fauske & Wade, 2004).
5. Active or passive participation category: The 8-week discussion threads were analyzed for each participant based on their weekly postings. Posting in a manner to avoid responses from other students was considered passive participation in this study. Posting in a manner that elicited responses from other students was considered active participation in this study.

Research Question 2 categories for analysis. Gunawardena et al. (1997) research on five phases of student knowledge construction was used in this study to analyze Research Question 2: (a) sharing/comparing information, (b) discovery and exploration of dissonance, (c) negotiation of meaning/coconstruction of knowledge, (d)

testing and modification of proposed synthesis or coconstruction, and (e) phrasing of agreement statements and applications of newly constructed meaning (see Appendix J for categories to capture data related to Research Question 2). However, because Gunawardena et al. research was grounded in an argumentation discourse framework, the researchers did not fully capture students' knowledge construction process as students were often engaged in relationship-oriented online discussions (Paulus, 2006). Therefore, to ensure that students' knowledge construction process was fully captured in this study, I extended phase two to include *mitigating disagreement* as an additional category. Below is a more in-depth discussion of the five categories that I analyzed for Research Question 2:

1. Sharing/comparing information category: Statement of observation or opinion; statement of agreement between participants (Gunawardena et al., 1997). Citation of information/presenting opinion, agreeing with other's opinion, providing examples to support other's opinion, asking detailed explanation regarding opinion, and description of the discussion question (Lee, 2012).
2. Discovery and exploration of dissonance or mitigating disagreement category: Discovery and exploration of dissonance include identifying areas of disagreement and asking and answering questions to clarify disagreement or inconsistency among participants (Gunawardena et al., 1997). Thus, discovery of exploration of dissonance include stating of disagreement, asking to clarify the reason for disagreement, and restating own opinion or supporting by

suggestion (Lee, 2012). Mitigating disagreements in this study pertained to participants' use of strategies to soften their claims within the discussion threads. For example, a student might mitigate his or her response by stating "I think," or may explain that this is just his or her perception of things (Paulus, 2006, p. 14). My aim is to capture data that show students' use of mitigating strategies, which was not fully captured by Gunawardena et al. (1997) model of knowledge construction.

3. Negotiation of meaning/coconstruction of knowledge category: Negotiating meaning of terms and negotiation of the relative weight to be used for various agreements (Gunawardena et al., 1997). Thus, this category includes the clarification of the meaning of terms, a statement of agreement and relative weight to disagreement, identification of specific disagreement, and proposal of new statements embodying negotiation (Lee, 2012).
4. Testing and modification of proposed synthesis or coconstruction category: Testing the proposed new knowledge against existing cognitive schema, personal experience, or other sources (Gunawardena et al., 1997). Hence, this category entails testing against facts that participants already knew, testing against previous knowledge and concept, testing against previous experience or recent experience, testing against resource provided, and testing against contradictory testimony in the textbook (Lee, 2012).
5. Phrasing of agreement statements and applications of newly constructed meaning category: Summarizing agreement and metacognitive statements that

show new knowledge construction (Gunawardena et al., 1997). Therefore, this category includes convergence and summarization of participants' agreements, application of new knowledge, and statements by participants showing their understanding that they experienced critical reflection.

Two stages of analysis and discrepant cases. Based on Strauss and Corbin's (1998) coding process, I started the overall coding process with open coding that involve defining line by line the actions and events with data. I was able to discover, name, and categorize the phenomena according to properties and dimensions. The axial coding process helped me to establish theoretical and conceptual connections in the transcriptions and discussion threads. Finally, selective coding helped me to systemically validate the relationships by searching for and confirming examples in the presentation of the data.

More specifically, Merriam (2009) described two stages of analysis in case study research. The first stage is a within-case analysis or single-case analysis in which "each case is treated as a comprehensive case" (p.204). For this study, I analyzed interview responses from students and professors and the discussion threads separately for each of the two cases: (a) first and fourth-year technical students and (b) first and fourth-year business students. Level 1 analysis of the two cases included coding and categorization of all interviews and discussion threads. The coding process followed Strauss and Corbin's (1998) coding process, which included line-by-line identification of free codes. I continued Level 1 coding analysis with axial coding in which I condensed and categorized common themes and patterns. I analyzed all documents using content

analysis, which involved a description of the purpose of the document, the organization and scope of the topics, and the use of the document.

The second level of data analysis involved a cross-case analysis. Yin (2014) and Merriam (2009) believed the second level of data analysis is dependent on theory development or the development of theoretical propositions that "helps to focus on certain data and to ignore other data" (Yin, 2009, p. 130). I examined coded and categorized data across all sources of data for both cases to determine themes and discrepancies. Maxwell (2013) reported that identifying and analyzing discrepant cases is a key part of the logic of validity testing in qualitative research. Instances that cannot be accounted for by a particular interpretation or explanation can point to important defects in that account. Patton (2001) related that often during data analysis, qualitative researchers may come across deviant cases that do not follow the main emerging patterns within their studies, which can lead to issues of trustworthiness if researchers do not handle such negative cases openly and honestly. Patton suggested that to increase trustworthiness, qualitative researchers may include in their report alternative explanations of why certain cases do not follow the main emerging patterns that surface in their studies. I adopted Patton (2001) principles on how to address discrepant cases for this study. I used Merriam (2009) constant comparative method to identify emerging themes and discrepant data, which was the basis for the findings of this study. These findings were presented in relation to the two research questions.

Issues of Trustworthiness

I organized this section in the following subsections: credibility, transferability, dependability, confirmability, intracoder reliability, and ethical procedures. In quantitative studies, researchers often use reliability and validity when evaluating threats to their research, whereas in qualitative studies, researchers appraise their research with trustworthiness (National Institute of Health, 2010). Trustworthiness pertains to how truthful the findings of the study are or the accuracy of the researcher's interpretation of participants' experiences (Lincoln & Guba, 1985). Hence, the researcher assesses the trustworthiness of the study through credibility, transferability, dependability, and confirmability (Cutcliffe & McKenna, 1999; Lincoln & Guba, 1985; Rodgers, 2008; Sandelowski, 1986; Streubert-Speziale, 2007).

Credibility

Credibility, which is the qualitative counterpart to internal validity, refers to the study's findings being believable or truthful (Polit & Beck, 2006; Sandelowski, 1986; Streubert-Speziale, 2007). Credibility is often established by using triangulation strategies such as using multiple sources of data or methods and having repeated contact with participants, such as peer debriefing where questions are shared about the research process, additional perspectives on analysis and interpretation are obtained, and through the use of participant member checks in order to verify with participants if the findings are a correct reflection of their experiences (National Institute of Health, 2010). I established credibility in this study by using triangulation, where multiple data sources

were used, specifically, in-depth face-to-face semistructured interviews from students and professors and students' discussion threads.

I also established credibility with transcription reviews, which is an important provision that can be made to bolster the credibility of the study (Lincoln & Guba, 1985). I contacted each student and professor participant by e-mail or telephone and set up a convenient time to review the transcripts for accuracy. Transcript reviews took place in a private meeting room at the research site's library. I did not use member checking or peer debriefing because the majority of the fourth-year student participants would graduate before I complete my data analysis draft.

Transferability

Transferability refers to the scope or range that a qualitative researcher's findings can be used in similar settings (Byrne, 2001; Merriam, 2009; Streubert-Speziale, 2007). Merriam (2009) noted that strategies to establish transferability include rich, thick description in reference to the setting, the participants, and the findings of the study. It is also the responsibility of the qualitative researcher to describe the context of the study and its participants in detail so that the possibility of replication exists. To ensure transferability, I provided a rich description of the context of the study and the participants from each course. I also supported the findings of this study using direct discussion thread quotes and summaries of participants' interview responses.

Dependability

Dependability can be perceived as qualitative researchers' version of quantitative researchers' reliability. Based on Shenton (2004), if the methods of the research are

described in detail, this will allow researchers in the future to replicate the work, even though the results might not be the same. I established dependability in this study using audit trails, which "consist of a thorough collection of documentation regarding all aspects of the research" (Rodgers, 2008, para. 1). The documentation that I used in this study included tape-recorded student and professor interviews, the transcriptions of those interviews, and the online discussion threads related to the eight student participants and four professor participants. Therefore, I used the strategy of triangulation by comparing these multiple data sources.

Confirmability

Confirmability is the qualitative counterpart to objectivity. To establish confirmability, reflexivity, which is "the process of reflecting critically on the self as researcher" (Merriam, 2009, p. 219), is recommended to maintain the integrity of a research study. Hence, reflexivity is related to researchers' self-awareness and the strategies they use to manage potentially biasing factors within the study (Jootun, McGhee, & Marland, 2009; Porter, 1993). Merriam (2009) argued that researchers need to explain their biases, dispositions, and assumptions in relation to their investigation. Merriam also noted that this clarification of the researcher's position allows the reader to better understand how the researcher might have arrived at a particular interpretation of the data. I used the reflexivity strategy for this study where I reflected on any biases that I might have had about students' and professors' perspectives about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions.

Intracoder Reliability

Intracoder reliability refers to consistency within a single coder (Johnson, 2006a). Therefore, in this study, I established intracoder reliability through the consistent coding of the data (van den Hoonaard, 2008), using the coding categories for Research Questions 1 and 2 that are discussed in the data analysis plan subsection. I used NVivo to manage the data.

Ethical Procedures

I completed the NIH training before beginning data collection (see Appendix K). I abided by all U.S. federal and state guidelines. I conducted the study within the constraints that the research site's IRB and Walden University's IRB set in place to guarantee that my research was carried out ethically and that my participants were protected. After I received approval from the research site's IRB, I obtained approval to conduct the study from Walden University's IRB. Thus, I began data collection after I obtained the necessary IRB approval from the community partner and my university's IRB.

Before I collected data for this study, I gave all participants a consent form as a means of obtaining their permission to participate in my research study. The consent form outlines participants' protections and ethical guidelines followed during the research study, such as the voluntary nature of the study and participants having the right to withdraw at any time. The consent form also outlined any physical or psychological risks that the participants might experience and indicated that they were not obligated to complete any parts of the study with which they were not comfortable.

It is unlikely that any acute discomfort arose from participation in this study as participants were not obligated to answer any interview questions that they did not feel comfortable addressing. Participants had the right to stop the interview at any time. Students' and professors' participation in this study did not result in risk to their safety or well-being. However, participants were informed of the free onsite counselor at the university should they experience any negative effects from taking part in this research endeavor. Participants could discuss their concerns with a counselor and the best plan of action. Often, one session is enough to gain perspective and deal with the problem. If additional sessions were needed or desired, the counselor could provide several referrals to community mental health professionals.

I showed respect to all individuals during the research process and data collection stage. After the data was collected, I eliminated all identifiable information. I used pseudonyms to deidentify the interviews and the discussion threads to match each participant; thus, protecting participants' identities. However, because I know the participants' identities, participants' participation was not anonymous, but confidential. I informed participants that I would be audio-taping the interviews and that I would create a verbatim transcription for analysis at later date.

I will keep all audio-recorded data, transcriptions, and discussion threads secured in a locked file cabinet and password protected computer in my personal home office for at least 5 years per Walden University guidelines. After 5 years, the data on my computer will be sanitized, thus, I will securely remove research files from the processer. Thus, I will securely erase my secured offline computer's hard-drive clean with a boot disk

called Dban. Dban is an open source boot disk that automatically deletes the contents of any hard disk. I will shred paper data and securely destroy audio tapes.

Only my supervising committee and the research site's and Walden University's IRB have access to the data. In the consent form, I provided participants with my contact information and the dissertation chair's contact information so that they can reach us if they have any further questions or concerns about the research study. I also provided participants with the Walden University representative contact information with whom they could talk privately about their rights as participants. After the study is completed and approved, I will e-mail a summary report of the research findings to student and teacher participants.

Summary

The purpose of this multiple case study was to compare first-year and final-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions. I also explored how patterns and stages of knowledge construction occur for students experiencing different classroom interactions in the online portion of their blended learning discussions at a university in a northeastern state in the United States. My data collection included in-depth face-to-face semistructured interviews with students and professors, and students' 8-week discussion threads. I analyzed transcribed interview data and discussion thread data using two stages of analysis in case study research: (a) within-case analysis or single-case analysis and (b) cross-case analysis. The NVivo software was used to manage the data. The study was conducted in accordance with the parameters established by the research site's IRB and

Walden University's IRB. Prior to beginning data collection, participants' consent was obtained. I have kept all data secured in a locked file cabinet and password protected computer.

In Chapter 3, I included the introduction, research design and rationale, role of the researcher, methodology, issues of trustworthiness, and a summary. In Chapter 4, I include the introduction, setting, demographics, data collection, data analysis, evidence of trustworthiness, results, and a summary.

Chapter 4: Results

The purpose of this multiple case study was to compare first-year and final-year business and technology students' and professors' perceptions about their supportive and challenging patterns of interactions. In addition, I explored how patterns and stages of knowledge construction occurred for students who were experiencing different classroom interactions in the online portion of their blended learning discussions at a university in a northeastern state in the United States. I used two research questions and two subquestions to guide this study. Research Question 1 addressed first and final-year students' supportive and challenging patterns of interactions that occur in the online portion of blended learning discussions. In addition, I explored two subquestions for Research Question 1: (a) What are professors' perceptions of first- and final-year students' interactions with other students and with their instructors in the online portion of technical and business blended learning discussions and (b) What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions? Research Question 2 addressed patterns and stages of knowledge construction that occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions.

Using single-case or within case-analysis and cross-case analysis, I analyzed students' and professors' interviews and students' discussion threads. The emerging themes are presented based on the respective research questions. In Chapter 4, I include

the setting, demographics, data collection, data analysis, evidence of trustworthiness, results, and a summary.

Setting

Topnotch University is a private, for-profit institution located in the northeastern United States. It has a diverse student body that includes foreign exchange students, recent immigrants, recent high school graduates, and working adult learners. The school has a wide array of programs that are grounded in business and technology and offers various forms of instructional modes. The primary instructional methods are fully online learning, face-to-face learning, extended virtual classrooms (a combination of two or more classes in separate cities), and blended in-person and online learning. Fully online courses and virtual extended classes typically consist of about 30 to 40 students, whereas face-to-face courses and blended learning classes include approximately 10 to 20 students. For this study, I explored students' and professors' perspectives about the patterns of interactions in the online portion of their blended learning discussions at Topnotch University.

I used the maximum variation sampling strategy to obtain a sample of four professors from two technical courses and two business courses as well as eight students from those courses (two first- and two final-year technical students and two first- and two final-year business students). Interviews were conducted from January 14, 2018, to February 26, 2018. Interviews were conducted in a private meeting room at the university's library. In addition, I obtained students' discussion threads. Obtaining data from student and professor interviews and student discussion threads was helpful in

establishing credibility because I used triangulation strategies such as multiple sources of data (Yin, 2012). I did not experience any personal or organizational factors that affected participants or their experience during the study that could have influenced the interpretation of the study's findings.

Demographics

From the 6 professors and 69 students who were initially contacted, four professors and eight students enrolled in four blended-learning courses that involve both online and face-to-face instruction at Topnotch University participated in the study. I used two cases in this study: (a) a business case and (b) a technical case. Four student participants majored in technical undergraduate programs at the university and four majored in business undergraduate programs. Figure 3 depicts the configuration of the sample and pertinent participant demographic information. Pseudonyms were used for research participants to protect their identities.

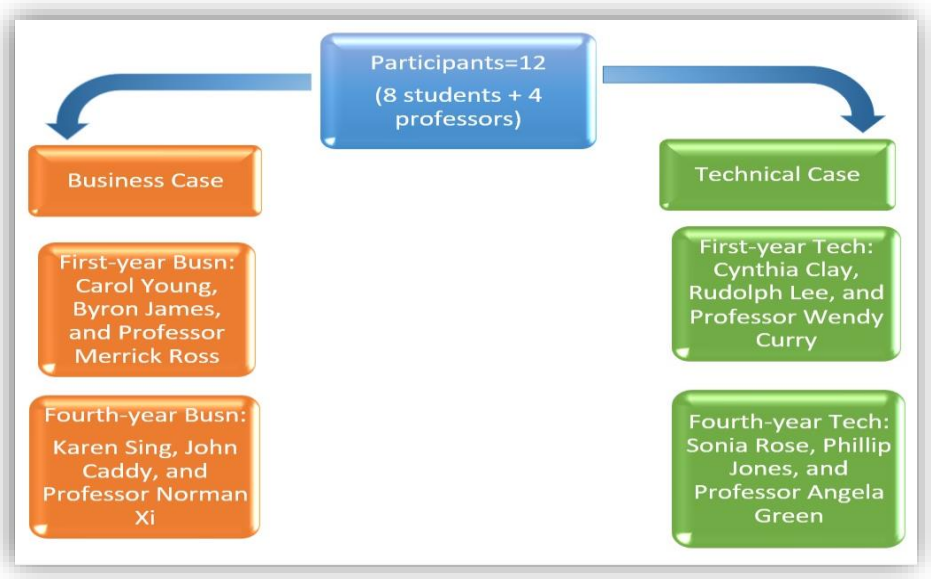

Figure 3. Total participants used in the multiple case study.

In the sample, four participants (50%) were male and four participants (50%) were female. Thus, the gender configurations for the four chosen classes were: (a) one male and one female first-year technical students, (b) one male and one female final-year technical students, (c) one male and one female first-year business students, and (d) one male and one female final-year business students. Similarly, 50% of the professors were male and 50% of the professors were female. Thus, the two professors who taught the first-year and fourth-year business students were males whereas the two professors who taught the first and fourth-year technical students were females.

Table 1 shows student participants' profiles, which is followed by brief descriptions of their background. Throughout the study, I used pseudonyms when discussing the participants to protect their identities and ensure confidentiality. The eight participants in this study were enrolled in an 8-week session that began in January 2018

at Topnotch University. The participating students were all adults and who were diverse in terms of age and experience in their field of study. Some students were also recent immigrants and spoke English as their second language.

Table 1

Student Participants' Profiles of Class Standing, Major, Gender, and Role

Participants' pseudonyms	Class standing	Major	Gender and role	Acronym
Cynthia Clay	1st Year	Technical	Female student	1YTFS
Rudolph Lee	1st Year	Technical	Male student	1YTMS
Sonia Rose	4th Year	Technical	Female student	4YTFS
Phillip Jones	4th Year	Technical	Male student	4YTMS
Carol Young	1st Year	Business	Female student	1YBFS
Byron James	1st Year	Business	Male student	1YBMS
Karen Sing	4th Year	Business	Female student	4YBFS
John Caddy	4th Year	Business	Male student	4YBMS

Note. 1st Year = 1Y; 4th Year = 4Y; T = technical; B = business; F = female; M = male; S = student; 1YTFS = 1st year technical female student; 1YTMS = 1st year technical male student; 4YTFS = 4th year technical female student; 4YTMS = 4th year technical male student; 1YBFS = 1st year business female student; 1YBMS = 1st year business male student; 4YBFS = 4th year business female student; 4YBMS = 4th year business male student.

Cynthia Clay (1YTFS) was a recent immigrant from Asia and spoke English as a second language. She was in her late 20s or early 30s. Cynthia was a first-year technical student at Topnotch University. She was one of the first students who registered online to participate in my study and the fifth participant I interviewed. We met on a Saturday afternoon from 2:07 p.m. – 2:42 p.m. She was fully engaged in the interview and provided detailed information when answering each interview question.

Rudolph Lee (1YTMS) was also a first-year technical student at Topnotch University. He was adult in his late teens to early 20s. He was an U.S. citizen and was the

seventh participant I interviewed. We met on a Tuesday afternoon, the interview lasted approximately 30 minutes, and he provided in-depth information.

Sonia Rose (4YTFS) grew up in the western region of the United States and moved to the northeast region when she enrolled at Topnotch University. Sonia was a fourth-year technical student and was in her early 20s. She was the ninth participant I interviewed. The interview took place on a Thursday, from 8:48 p.m. – 9:22 p.m. She provided in-depth information from her perspective.

Phillip Jones (4YTMS) was a fourth-year technical student enrolled at Topnotch University. He grew up in Central America and learned English while residing in a northeastern state in the United States. Phillip was in his early 20s and appeared enthusiastic throughout the interview as he answered all questions. The interview lasted for 57 minutes.

Carol Young (1YBFS) was a first-year business student and was born and raised in a northeastern state in the United States. Carol was a mother and may have been in her mid-40s. She enrolled at Topnotch University to enhance her business career. Even though Carol had much experience, she noted during the interview that at one point, she felt intimidated by her classmates' posts. She was the 11th participant I interviewed. The interview took place on a Saturday morning from 11: 21 a.m. – 11:52 am., where she shared valuable information.

Byron James (1YBMS) was a first-year business student who had recently graduated from high school and was in his late teens. Byron was the 10th participant I

interviewed. The interview took place on a Friday from 8:44 p.m. – 9:22 p.m. Although English was his second language, he articulated his answers well during the interview.

Karen Sing (4YBFS) was a fourth-year business student at Topnotch University. Karen was born and raised in the United States and could have been in her mid-20s. I interviewed her on a Saturday morning from 11:20 a.m. – 11:42 am. She understood the questions well and offered many insights in relation to questions that were asked.

John Caddy (4YBMS) was a fourth-year business student who was born and raised in the United States. He was in his late 20s or early 30s and was newly married with a 1 month-old baby at the time of the interview. The interview took place on a Saturday afternoon and lasted for 53 minutes. He was fully engaged in the interview and discussed the topics in-depth.

Table 2 shows professor participants' profiles, which is followed by brief descriptions of their background. All professors had over 10 years of teaching experience in the education field. I used pseudonyms when discussing the professors who participated in the study to protect their identities and ensure confidentiality. I did not disclose their specific years of experience or their specific area of expertise. The four professor participants in this study taught an 8-week session that began in January 2018 at Topnotch University.

Table 2

Professor Participants' Profiles of General Area of Expertise, Gender, and Role

Participants' pseudonyms	Major taught	Gender	Role	Acronym
Wendy Curry	1st Year tech students	Female	Professor	1YTFP
Angela Green	4th Year tech students	Female	Professor	4YTFP
Merrick Ross	1st Year business students	Male	Professor	1YBMP
Norman Xi	4th Year business students	Male	Professor	4YBMP

Note. 1st Year = 1Y; 4th Year = 4Y; T = technical; B = business; F = female; M = male; P = professor; 1YTFP = 1st year technical female professor; 4YTFP = 4th year technical female professor; 1YBMP = 1st year business male professor; 4YBMP = 4th year business male professor.

Wendy Curry (1YTFP) taught the two first-year technical students who participated in the study. Curry volunteered to participate in my study. She lived far away from campus and was one of the last participants I interviewed. The interview took place on a Thursday at 7:32 p.m. and lasted for approximately 54 minutes.

Angela Green (4YTFP) taught the two fourth-year technical students who participated in the study. Green interests included the arts. She taught an advanced technology course for fourth-year students and was the last participant whom I interviewed. The interview took place on a Monday afternoon at 3:30 p.m. and lasted for approximately 30 minutes. The information obtained during the interview was insightful.

Merrick Ross (1YBMP) taught the two first-year business students who participated in the study. Ross background was rooted in social sciences and he provided

in-depth answers to the interview questions. He was the 11th participant that I interviewed. The interview took place on a Friday night at 8:49 p.m. and lasted for 1 hour 6 minutes.

Norman Xi (4YBMP) taught the two fourth-year business students who participated in the study. Xi had experience in the business field. The interview took place on a Saturday at 11:30 a.m. and lasted for 56 minutes. Information obtained during the interview was insightful.

Data Collection

I collected data using face-to-face interviews with two technical and two business professors and eight students from those four blending learning courses (two students from each course). I also used the eight students' online discussion threads from their 8-week blended learning courses. I conducted the interviews in a private room at the university, which lasted approximately 45 minutes. I interviewed each participant using semistructured interview questions and I audio recorded all interviews using a high-quality digital recorder. I collected discussion-thread data from the online forums associated with the four chosen blended learning courses. The online discussions threads were significant because they worth over 20% of students overall grades. The university hosted the discussion threads and the four professors were the moderators.

The data collection involved the recruitment of professors and students from four classes. The classes used in this study included a first-year technical course, a first-year business course, a fourth-year technical course, and a fourth-year business course. Slight deviations occurred during the data collection process, such as some interviews lasting

shorter or longer than 45 minutes. In addition, interviews took place at different times, such as some interviews taking place at nights. Overall, participants appeared to have understood the questions. However, when participants were slow or hesitant in answering interview questions or if additional information was needed from participants, I would ask follow-up or probing questions. Scheduling a convenient date and time to meet with some of the students and professors was challenging due to their busy schedule. However, with back-and-forth communications, I was able to successfully conduct the semistructured interviews with all four professors and eight students within the first 4 weeks of the 8-week session.

Data Analysis

Data analysis included organizing the data and then analyzing the data against the research questions in this study. I transcribed verbatim each interview and then prearranged them in Microsoft Word and Microsoft Excel. I deidentified participants within the discussion threads for the chosen classes and managed all data in NVivo.

The first level of analysis included categorization of all interview transcripts and discussion threads. I aligned all interview questions and participants' responses concerning their corresponding research questions in Microsoft Excel. I drew comparisons of each interview question and participants' responses linked to the aligned research question in Microsoft Word. Following Strauss and Corbin's (1998) coding process, I started with line-by-line coding within each case. I also implemented axial coding so that common themes and patterns could be categorized and summarized. All saved data collection files were analyzed, which involved a description of the purpose of

the record, how I organized it, its range of the topics, and its purpose. After arranging the data in Microsoft Word and Microsoft Excel, I coded the collected data in NVivo. Using NVivo enabled me to compare the perspectives of the business case participants and the views of the technical case participants. I gathered all that participants stated in the interviews and discussion threads and placed them in thematic nodes that I created in NVivo. I then ran various queries in NVivo to increase efficiency as I analyzed the data.

The second level of data analysis involved a cross-case analysis based on Yin's (2014) and Merriam's (2009) data analysis strategies. The second level of cross-case data analysis compared: (a) the perspectives of first-year technical and first-year business students and (b) the views of final-year technical and final-year business students. This cross-case analysis strategy helped to "focus on certain data and to ignore other data" (Yin, 2009, p. 130). I compared the business case against the technical case using quotes from participants' interview and discussion thread data that I organized in nodes within NVivo. I ran queries of the coded and categorized data across all sources of data for both cases to determine themes and discrepancies. I used Merriam's (2009) constant comparative method to identify emerging themes and discrepant data as the foundation for the findings of this study.

Evidence of Trustworthiness

In qualitative research, credibility refers to the study's findings being believable or truthful (Polit & Beck, 2006; Sandelowski, 1986; Streubert-Speziale, 2007). I established credibility by using triangulation strategies such as applying multiple sources of data or methods including in-depth, in-person, semistructured interviews with students

and professors as well as students' online discussion threads. I further established credibility through transcription reviews, where I met with each participant in a private room at the university library for approximately 25 minutes and reviewed the participant's interview transcript for completeness and clarity based on what each participant wanted to share. Overall, all participants were satisfied with their transcripts. The only participant who made changes through the transcription review process was Ross (1YBMP) who taught the first-year business class. The changes Ross made were minimal, where he added punctuation marks such as commas.

Transferability refers to the scope or range that a qualitative researcher's findings can be used in similar settings (Byrne, 2001; Merriam, 2009; Streubert-Speziale, 2007). To ensure transferability, I used direct quotations from participants to support the findings of the study. I established transferability to facilitate replication of the study by providing rich descriptions of the context of the research and participants' reports.

I addressed dependability for this study's results when I created audit trails, which included tape-recorded student and professor interviews, transcriptions of the interviews, and student discussion threads. My detailed description of how I coded interview data and discussion thread data in Microsoft Word, Excel, and the NVivo software, will allow researchers to replicate my work in the future even though the results might not be the same.

I addressed confirmability by using the reflexivity strategy (Merriam, 2009), where I performed critical self-reflection in relation to any bias that I may have about students' and professors' perspectives on supportive and challenging patterns of

interactions, and about how patterns and stages of knowledge construction occur for students experiencing different classroom interactions. Intracoder reliability, consistency within a single coder (Johnson, 2006a), was established through the constant coding of the data (van den Hoonaard, 2008). Thus, I established intracoder reliability when I consistently coded and compared interview data and discussion thread data in Microsoft Word, Microsoft Excel, and NVivo. First, I created a color code book that mapped each pattern of interaction and phase of knowledge construction to a specific color. For the next step, I color coded all participants' interview responses and discussion thread data in Microsoft Word and Microsoft Excel, and then in NVivo to compare the similarities and differences among the two cases in this study. Coding interview data and discussion thread data in NVivo helped me to uncover emergent themes and subthemes, which facilitated answering the research questions for this study.

Results

The display of results is categorized based on the research questions for this study. Four major themes and 13 subthemes emerged during the process of organizing the collected data. Research Question 1 yielded two major themes and seven subthemes, whereas Research Question 2 yielded two major themes and six subthemes. Figure 4 shows the major themes and subthemes for Research Questions 1 and 2. Number of frequencies pertain to the number of references for that theme across all interview data. Percent of frequencies refers to the total occurrences of the theme across all interviews divided by the total occurrences of all themes.

Results for Research Question 1 included technical and business students' and professors' perspective on supportive and challenging patterns of interaction within the online portion of their blended learning courses. Results related to Research Question 2 included students' and professors' perspectives about the patterns and stages of knowledge construction that occur when first- and final-year students are experiencing different classroom interactions in the online portion of their blended learning courses. All results from my interviews were shown to answer the research questions. Likewise, all results from the discussion threads from the four chosen courses were shown to answer the research questions. Thematic analysis Step 1 or categorization of text appears in Appendix L, which shows all the participants' responses that went with each major theme and subtheme from the interview data. I organized this section as follows: Research Question 1, Research Question 1.1, Research Question 1.2, Research Question 1 discussion thread data, within-case and cross-case analysis to answer Research Question 1, Research Question 2, all participants' discussion data to answer Research Question 2, and within-case and cross-case analysis to answer Research Question 2.

Figure 4. Major themes and subthemes in the study.

Research Question 1

What are first- and final-year students' supportive and challenging patterns of interaction that occur in the online portion of blended learning discussions? Based on this overarching research question, one major theme and two subthemes emerged. The major theme was general perceptions about blended learning discussions. The two subthemes were (a) student-to-student support and (b) student-to-student challenge. I organized this subsection based on the major theme and two subthemes.

To answer Research Question 1, I asked participants to describe their general perspectives about blended learning discussions, describe student-to-student support, and describe student-to-student challenge. Results showed that students and professors interacted with each other by asking questions to inspire conversations. In general, students communicated with each other mostly by agreeing with each other, and

whenever they disagreed, they were often civil. Table 3 depicts the frequencies and percentages for the major theme and subthemes in relation to Research Question 1.

Table 3

All-Participant Interview Data to Answer Research Question 1

Major themes and subthemes	Codes	No. of frequencies (N = 101)	% of frequencies
General perceptions		12	12
Student-to-student support			
	Active participation	10	10
	Affable-oriented responses	41	41
	Inquiry-oriented responses	7	7
	Passive oriented responses	6	6
	Relationship-oriented responses	9	9
Student-to-student challenge			
	Student-to-student positive challenge	11	11
	Student-to-student negative challenge	5	5
Total frequencies and percentage		101	100

Major Theme 1: General perceptions about blended learning discussions.

Two first-year students and a fourth-year student expressed they strongly liked the online discussion forums of their blended learning courses. Cynthia (1YTFS) stated, "Yeah, I think discussions is a very good place. You can express your feelings, you can express your thoughts, and a person like me who has just come from another country so that I can improve my English." Similarly, Karen (4YBFS) related, "I enjoy it because, in addition to the lessons that are learned, the discussion boards allow me to get a clearer understanding from what the professor is providing as well as the classmates' interactions."

On the contrary, some students voiced disdain for portions of the discussion forum. For instance, Carol (1YBFS) shared, "I felt intimidated somewhat by what other people were posting" and "I hate VoiceThread." Later, in the interview, Carol explained that the first time she attempted to use VoiceThread, she was frustrated because she had compatibility issues with her Mac computer. Carol also explained that she had personal critique issues. For example, she would say, "Oh wait, maybe I should brush my hair." Rudolph (1YTMS) might have also felt intimidated by the VoiceThread tool because he stated, "What I've seen with the last semester, they've added VoiceThread now. So, it takes a little bit of getting used to, and I didn't really like it."

The professors' general perceptions about the online threads aligned with students' responses. For example, Ross (1YBMP) shared that although the discussions were positive, they were "also negative because you would have the students resisting some options which might be somewhat mandatory or required." Xi's (4YBMP) reported

that students tend to criticize openly or put up a challenge against the VoiceThread multimedia tool.

Subtheme 1: Student-to-student support. This subtheme helped me to answer the first portion of Research Question 1 pertaining to students' supportive patterns of interaction. When I asked the participants about their views of student-to-student support during the interview, their descriptions were analyzed in relation to Fauske and Wade's (2004) five patterns of interaction categories: (a) active participation, (b) affable-oriented responses, (c) inquiry-oriented responses, (d) passive oriented responses, and, (e) relationship-oriented responses.

Active participation relates to a discussion post that was intended to prompt or elicit a response from other students. For example, Cynthia (1YTFS) stated, "Sometimes some students do not agree. So, they can explain [to] me what I'm doing wrong. Maybe my point of view is not that correct. So, it helps me a lot." An affable-oriented pattern of interaction is a post where a student agrees, praises, thanks, or shows acknowledgment for what another student stated. For example, John (4YBMS) explained that students showed acknowledgment for each other's posts and assisted each other within the discussion threads. In addition, Rudolph (1YTMS) shared that he could usually find a "good response" that he can post to on any given day. A "good response" suggested that validation was needed, which is an aspect of an affable-oriented pattern of interaction. An inquiry-oriented pattern of interaction is a post that offers supportive challenge in the form of questions. Ross (1YBMP) explained during his interview that he encouraged students to ask more questions but pointed out that it does not always work.

A passive pattern of interaction is a post that a student makes with no intention of prompting responses from other students. Sonia (4YTFS) pointed out that she rarely sees other students disagreeing with each other. She stated, “I feel like if they’re going to disagree, they wouldn’t respond to that person. They’ll only pick the person they agree with and go off that.” She explained that agreeing with another student’s post is easier than disagreeing because students would have to conduct further research to show evidence to their claims. A relationship-oriented pattern of interaction is a post where a person shows strong social connections. All eight student participants expressed in their interviews that they saw relationship-oriented interactions. For example, Karen (4YBFS) stated, “usually those students’ feedback is supportive to the comments.” The professors confirmed that students’ interactions were relationship-oriented. Curry (1YTFP) stated, “So, if a student is sharing an interesting idea, other students would kind of jump in and add to that.”

Subtheme 2: Student-to-student challenge. The student-to-student challenge subtheme helped me to answer the second portion of Research Question 1 pertaining to students’ challenging patterns of interaction. Students challenged each other at times but in a respectful manner. For example, Karen (4YBFS) related that she did not see many people disagreeing and stated, “and everyone is respectful when critiquing another person’s post, you know; it’s like the sandwich effect. If you must give advice, you give good, maybe a little bit of bad, and more good at the end.” Karen shared that for the most part, everyone seems to be on board with giving positive feedback.

Student-to-student negative, challenging patterns of responses are those that are not only adverse but also impede learning. For example, Sonia (4YTFS) admitted that she often challenged other students. Sonia said she deliberately made aggressive posts just before the discussion expired to avoid getting a response from her peers.

Research Question 1.1

Research Question 1.1 is the first subquestion of Research Question 1: What are professors' perceptions of first and final-year students' interactions with other students and with their instructors in the online portion of technical and business blended learning discussions? Based on analyzed interview data, Major Theme 1: General perceptions about blended learning discussions from Research Question 1 also applied to Research Question 1.1. Major Theme 1 had two additional subthemes: (a) support from professors and (b) professor-to-student challenge. In addition, a second major theme emerged: Major Theme 2: Perceptions about impact from certain elements. The second major theme had three subthemes: (a) gender impact, (b) discussion thread content and design, and (c) VoiceThread impact. I organized this subsection by the major themes and subthemes.

The major themes and subthemes helped me to answer Research Question 1.1 as I asked the professors to share their perceptions of how first and final-year students interact with other students and their instructors in the online portion of their blended learning discussions. The professors explained that they and their students interacted amicably with each other by asking questions to encourage conversations. They reported that nonsupportive or aggressive challenges happened infrequently and that they were never

out of control where there were severe conflicts. The professors also expressed that gender, discussion thread content and design, and the VoiceThread multimedia tool impacted students' learning. Table 4 depicts the frequencies and percentages for the major theme and subthemes in relation to Research Question 1.1.

Table 4

Professors' Interview Data to Answer Research Question 1.1

Themes and subthemes	Codes	No. of frequencies (N = 35)	% of frequencies
General perceptions			
Support from professors		4	11
Professor-to-student challenge			
	Prof-to-student positive challenge	4	11
	Prof-to-student negative challenge	3	9
Perceptions about impact from certain elements			
Gender impact		4	11
	No gender-impact	1	3
Discussion thread content and design		3	9
VoiceThread multimedia impact			
	First experience using VT	4	11
	VT impact on communication	4	11
	Best and least about VT	4	11
	Perceptions if VT becomes the only form of communication	4	11
Total frequencies and percentage		35	100

Note. Prof = professor; VT = VoiceThread.

Major Theme 1: General perceptions about blended learning discussions.

This theme from Research Question 1 also applied to Research Question 1.1. Major Theme 1 had two additional subthemes: (a) support from professors and (b) professor-to-student challenge. Professor participants' responses are categorized in the two subthemes.

Subtheme 3: Support from professors. All four professors in this study shared that they facilitated students' learning within the discussions thread area of their blended learning courses. Xi (4YBMP), for example, stated, "So, for me, besides actually posting a question, I often reply back and make the student think a little bit more on it, especially if they give a vague point of view." Professor-to-student support displayed patterns of interactions that showed argumentative-oriented, relationship-oriented, affable-oriented, inquiry-oriented, and active participation responses. Eleven percent of the 35 total occurrences arose for the support from professor subtheme. Green (4YTFP) posted the highest number of supportive responses to students (8.3%), followed by Curry (1YTFP) with 4.4%, Xi (4YBMP) with 3.21%, and Ross (1YBMP) with 1.47%.

Subtheme 4: Professor-to-student challenge. Positive, challenging pattern of interaction was depicted by all four professors when they explained that they challenged students in the discussions with follow-up questions. For instance, Green (4YTFP) explained if students "do a counterpoint, they'll come up with some research." She further stated, "but I haven't required that, but as time goes on, I'll probably will start requiring it." Ross (1YBMP) shared that students get "a bit tangential" with their posts, which is not always a "bad thing." He explained that sometimes it is best to let the interaction "play itself out."

Negative, challenging patterns of interaction were noted by three professors when they described professor-to-student interactions within their online discussion threads. One example was when Ross (1YBMP) declared that students could not challenge him. He stated, “The degree of comfort I feel in my own competence and level of skills, so, that for me, students cannot challenge me.” He explained that students might challenge ideas, but they need to show empirical evidence. Cynthia (1YTFS), the first-year technical female student confirmed that some professors had a problem with students challenging them in the online discussions.

Major Theme 2: Perceptions about impact from certain elements. This major theme has three subthemes, which are as follows: (a) gender impact, (b) discussion thread content and design, and (c) VoiceThread multimedia impact. Professor participants’ responses are categorized in the three subthemes.

Subtheme 5: Gender impact. Ross (1YBMP) had rich information to share about how gender influence interactions within the discussion. He shared that there were linguistic approaches (word choices), assertiveness (females being less assertive than males), length of what is being said (women being more verbose than men), how what is said, how people respond, what comes first, and the kinds of examples used to show support. When Ross (1YBMP) was asked about whether gender from a cultural point of view has an impact as well, he stated, “It may not, I’ll tell you why. It’s diverse culturally, but it’s not in the sense that most societies are patriarchal.” Curry (1YTFP) related that if given the opportunity to posture, that some people would posture. Green (4YTFP) shared that women are more participative in the discussions than in the

classroom, but there is not a difference for men. She stated that based on what happens in her classes, personality-wise, she thinks that shy students talk a lot more online than in the onsite classroom.

Three percent of the total occurrences arose for the no impact from gender code. Xi (4YBMP) shared that gender did not affect how people interacted with each other in the discussions. Xi (4YBMP) noted that instead of gender, he believed that the discussion topic played a significant role. He stated, "but I think as far as the interactions, I see a 50/50 equal quality there. I don't see males or females being more aggressive or less aggressive or more passive or less passive."

Subtheme 6: Discussion thread content and design. All four professors believed that the discussion thread content had an impact on how students interacted with each other within their blended learning courses. Curry (1YTFP) explained that posturing infrequently occurred because her courses were not content-based. Xi (4YBMP) believed that often interactions occurred based on content and not based on people's genders. Green (4YTFP) stated some professors would write long-winded intellectual posts that would discourage students from posting to the discussion threads. She said, "I see some professors, I think they write way too much in the discussions. Because if they're writing something long and intellectual, students are going to say, 'I'm out, I'm done."

Subtheme 7: VoiceThread multimedia impact. VoiceThread is a multimedia application for collaborators to include video, voice, and text commenting into their collective spaces (Vanderbilt University, 2019). Topnotch University leaders recently integrated the VoiceThread tool in the online environment of the school. Professors and

students were required to use VoiceThread often within their online discussions. Based on my interview data, some professors believed that VoiceThread added some amount of value to the forums, but in general, students found the tool to be cumbersome. The professors also believed that VoiceThread might be unnecessary for blended learning classes.

All the professors, except Curry (1YTFP), believed that using VoiceThread for the first time was simple. Curry (1YTFP) stated, "Yeah, for an online course, I think that it makes perfect sense. What seems a little weird, is when you're meeting face-to-face for several hours a week, and then you're, you're talking strangely into the discussions." She said she was not trying to be critical, but she wanted me to have an idea of some of the things that students say about VoiceThread such as "why am I doing that when we meet face-to-face already in class."

Overall, professors believed that VoiceThread impact on how students interact with each other depends on the nature of the class, the kind of students, and the nature of the discussion questions. Green (4YTFP) also mentioned that only visually impaired students would genuinely benefit from using VoiceThread. Ross (1YBMP) believed that fully online classes benefitted more from VoiceThread than the blended face-to-face courses. He stated, "The question would be, what does the blended version gain from having a VoiceThread?"

Green (4YTFP) related that there was nothing she liked least about VoiceThread because it was merely a tool. She explained that VoiceThread challenged students to speak effectively, which she viewed positively. Ross (1YBMP) related that he had "no

affective connection to VoiceThread" but thought VoiceThread was useful and maybe useful for a blended class. Ross (1YBMP) pointed out technical shortcomings of the VoiceThread tool. Xi (4YBMP) and Curry (1YTFP) believed that VoiceThread allows collaborators to express their tones and demeanor within the discussion threads. All professors, except Curry (1YTFP), believed that making VoiceThread the only form of communication at Topnotch University would be problematic. Curry stated, "Oh, I think that would be a good idea." She explained that the success of such a change would depend on whether "the professors could do an excellent job of helping students see how it would work out well."

Research Question 1.2

Research Question 1.2 is the second subquestion of Research Question 1: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions? Based on analyzed interview data, Major Theme 1: General perceptions about blended learning discussions from Research Question 1 also applied to Research Question 1.2. Major Theme 1 had two subthemes: (a) support from professors and (b) professor-to-student challenge. In addition, Major Theme 2: Perceptions about impact from certain elements, also applied to Research Question 1.2. The second major theme had three subthemes: (a) gender impact, (b) discussion thread content and design, and (c) VoiceThread impact. I organized this subsection by the major themes and subthemes.

The major themes and subthemes helped in answering Research Question 1.2, where students described support and challenges from their learning community and the

impact that discussion thread content and design, as well as VoiceThread might have on their learning. Findings indicated that students believed that the exchanges within their blended learning discussions fluctuated between supportive and challenging interactions. Students perceived various forms of supportive interactions as those that increased their learning, whereas nonsupportive or aggressive interactions were almost absent from all four classes. The students from all four courses believed that the interactions with their professors were supportive in that the professor would ask questions or steer students in the right direction. Table 5 depicts the frequencies and percentages for the major theme and subthemes in relation to Research Question 1.2.

Table 5

Students' Interview Data to Answer Research Question 1.2

Themes and subthemes	Codes	No. of frequencies (N = 70)	% of frequencies
General perceptions			
Support from professors		8	11
Professor-to-student challenge			
	Prof-to-student positive challenge	9	13
	Prof-to-student negative challenge	5	7
Perceptions about impact from certain elements			
Gender impact		7	10
	No gender-impact	7	10
Discussion thread content and design		2	3
VoiceThread multimedia impact			
	First experience using VoiceThread	8	11
	VT impact on communication	8	11
	Best and least about VT	8	11
	Perceptions if VT becomes the only form of communication	8	11
Total frequencies and percentage		70	100

Note. Prof = professor; VT = VoiceThread.

Major Theme 1: General perceptions about blended learning discussions.

This theme from Research Question 1 also applied to Research Question 1.2. Major Theme 1 had two subthemes: (a) support from professors and (b) professor-to-student challenge. Student participants' responses are categorized in the two subthemes.

Subtheme 3: Support from professor. Eleven percent of the 70 total occurrences arose for the support from professor subtheme. Student participants' responses about support from professors were related to various forms of supportive patterns of interactions such as argumentative, relationship, affable, inquiry, active or passive-oriented responses. All eight students reported that their professors showed support within the online discussion threads. For example, Carol (1YBFS) said all her professors facilitated students' learning within the courses' discussion threads. Carol (1YBFS) stated, "Oh, very much so. Every professor has been very active in enforcing the school's policy of the interactions. Every professor I've had have been very good at that, answering all students' questions and then you read their responses and other students', and you have a better idea."

Subtheme 4: Professor-to-student challenge. Ross (1YBMP), Carol's professor, confirmed that professors were "good at answering students' questions" and providing support. The positive, challenging pattern of interaction was depicted by all students in this study when they explained that their professors challenged them in the discussions with follow-up questions. For instance, when I asked Byron (1YMBS) to describe challenging interactions that professors might have initiated to students or from students to professors, he explained that positive challenges occurred. Byron related that the

professor would ask where he obtained “some key points” or the professor would reveal where he missed the big picture.

Negative, challenging patterns of interaction was noted by some students when they described professor-to-student interactions within their online discussion threads. Five percent of the 70 total occurrences happened for the professor-to-student negative challenge code. Cynthia (1YTFS) shared that challenging interaction from professor-to-student and vice versa depends on the professor.

Cynthia (1YTFS) also expressed that some professors may view students’ asking questions as putting up a challenge, which was confirmed by what Ross (1YBMP) shared during his interview. Ross (1YBMP) declared that students could not challenge him and related that students might challenge ideas, but they need to show empirical evidence.

Subtheme 5: Gender impact. Majority of the participating students declared immediately that their gender did not have an impact on how they communicated with others in the online discussion threads of their blended learning courses. However, after asking probing questions, some students admitted that gender played a role in how they interacted with others. For example, John (4YBMS) quickly declared that he did not see much of an impact from students’ and professor’s gender occurring within the online forums. However, he added that some people are more constrained than others, but it depends on the topic. John explained that “women are more open to speaking about topics surrounding biology and sexuality.” He added that as far as anonymity is concerned, if all the names were removed from the forum, no one would be able to tell the difference between male or female students. He shared that at the start of a course,

reserved students were generally timid to interact with others, but usually close to the end of the course, they eventually break free from being "nonvocal" and become more outspoken and relax. The student participants who declared in their interviews that gender had no impact on how they communicated, later revealed that it does, bearing various forms of patterns of interactions. For example, when asked if gender might have played a role in how people communicate with each other, Cynthia (1YTFS) stated, "I don't think so, I hear, I think gender does not affect that." She then contradicted herself by speaking about how certain topics impact females. She added, "Sometimes some males think programming or IT is only for them, or math is only for them, girls cannot do it."

Subtheme 6: Discussion thread content and design. Participants expressed in their interviews that blended learning course designs impact students' interaction and learning. Two students made two references related to discussion thread content and design. John (4YBMS) expressed that the discussion thread content of blended learning courses may have an impact on how students communicate with each other and could also facilitate or hinder students' learning. John (4YBMS) related that the discussion content sometimes evolved into topics that he did not "need at the moment."

Carol (1YBFS) was the other student who thought that the design of the discussion area could have an impact on how students interact with each other. Carol (1YBFS) expressed that students are "almost afraid to say somethings" in the discussions and that she would like if students could include emojis to express their feelings. Carol's (1YBFS) response also demonstrated a desire to express affable forms of interactions.

Three percent of the70 total occurrences arose for the discussion thread content subtheme.

Subtheme 7: VoiceThread impact. All eight participating students reported that they had issues with the VoiceThread multimedia tool. Students' first experience using the VoiceThread media tool had an impact on the quality of their posts. The quality of students' VoiceThread posts also affected how they interacted with each other within the discussion area of their blended learning courses. Eleven percent of the 70 total frequencies occurred for the first experience using VoiceThread code. Seven out of the eight student participants shared that their first experience using VoiceThread was unpleasant, except for John (4YBMS). However, although he stated that his first experience was good, he explained that no one was able to see his imported slide show. Karen (4YBFS) shared that she felt afraid the first time she used VoiceThread. The other students shared similar experiences about the VoiceThread media tool. One student explained that after listening and re-recording a couple of times, he decided not to submit his weekly VoiceThread, which caused him to lose significant points in the course. While laughing, he said, "I just take the hit. I just take the hit." He explained that he did not like hearing himself speak.

Carol (1YBFS) stated, "You're able to read tone in the voice as opposed to interpreting it through writing." However, Phillip (4YTMS) shared, "I don't listen to other classmates' VoiceThreads." In addition, John (4YBMS) related, "You do see some people that are a little hampered. I want to say they are a little soft spoken, a little shy still doing the recording." Based on these interview responses, the VoiceThread tool had both

a negative and positive impact on how students communicated with each other within the online discussion area of their blended learning courses.

All students expressed that although the tool allowed them to express tonality in the discussion, they had various types of issues with it. For example, Byron (1YBMS) expressed that what he liked best about VoiceThread was that "you can easily express your thoughts with no issue." He then added that "when using it, I had to go through a number of times because it was hard to actually hear myself through all the static." His female classmate, Carol (1YBFS), stated, "What I like best about it is that it allows you to interpret tone and demeanor as opposed to just losing interpretation through text," but further added, "What I like least about it, is having to do it." Students' criticism of digital media, such as the VoiceThread tool, is a challenging form of interaction.

Three first-year students and one fourth-year student believed that having VoiceThread as the only form of communication within the discussion area of their blended learning classes would not facilitate students' learning. These students believed that if students use only the VoiceThread tool to post to the discussion area, students will not increase their writing and communication skills. For example, Karen (4YBFS) related that she would not be too happy if VoiceThread became the only form of communication "because it would be just too much work, and it's not ideal, because in the real world, there is a mixture of e-mails, texts, as well as making phone calls."

Research Question 1 Discussion Thread Data

For triangulation with interview data, all discussion thread data from the four courses under exploration were used to help answer the research questions for this study.

Based on the overarching Research Question 1 analyzed discussion thread data, six subthemes emerged. The six subthemes were (a) student-to-student support, (b) student-to-student challenge, (c) support from professors, (d) professor-to-student challenge, (e) impact from gender, and (f) discussion threads content and design. My findings for Research Question 1 discussion thread data confirmed that the students' and professors' interview accounts about their interactions within their online discussion threads were consistent. Students and professors stimulated the discussion threads by sharing information, using clarification, and sometimes offered proof or validation. Students communicated with each other mostly by agreeing with each other and disagreements were never out of control. For example, John (4YBMS) noted that he saw his classmates with strong opinions, but no aggression. Also, Curry (1YTFP) noted that one of her military students had strong convictions toward specific topics and whenever other students tried to bring up different examples, "he chilled the conversation, he kind of shut it down" she said. She explained that the aggressor's peers might have been intimidated by his physical appearance and were fearful; thus, they avoided responding to his online discussion posts. Also, Xi (4YBMP) voiced that aggressive behavior affects knowledge construction because "when behavior is aggressive, people naturally hold back a little bit." This subsection is organized based on the six subthemes.

Subtheme 1: Student-to-student support. I analyzed the discussion threads of the four chosen classes based on Fauske and Wade's (2004) five patterns of interaction categories: (a) active participation, (b) affable-oriented responses, (c) inquiry-oriented responses, (d) passive oriented responses, and (e) relationship-oriented responses. Active

participation posts are those intended to prompt responses. Students demonstrated active participation pattern among all four classes under study. Nine percent of the 158 total occurrences arose for the active participation code. In the following example, a student from the first-year business class was seeking a response by use of images and asked a question, which fell under the category of active participation. For example, Byron (1YBMS) sought a reaction from his peers by posting an image. Byron said, “The only symbol I can think of that has double meaning is” and displayed the “okay sign” as shown.

He shared the sign in its original meaning stands for “okay” or “A-ok;” however, he stated, “it is being used as a ‘got you’ moment, with a ‘made you look’ theme.” Byron’s peers were intrigued by his post and one of his classmates responded, “Hi Byron, this is interesting. Placed in an upside-down position, it is also a symbol used by White supremacists. So, it has quite a spread of meanings.” Ross (1YBMP) mentioned the issue of students unknowingly causing tension within the forums. He explained that he considered a post to be aggressive when the author intended to disrupt the discussion negatively. Therefore, when that first-year business student brought up the topic of White supremacy, he or she might have unknowingly caused tension in the online discussion thread of his blended learning class.

The students displayed student-to-student support in the form of affable-oriented responses within the 8-week discussion threads of the four chosen courses. Nine percent of the 158 total occurrences happened for the affable-oriented responses code. The fourth-year technical students displayed an example of student-to-student affable-oriented interaction. For example, the student agreed with his or her peers, where a peer/student responded to Sonia (4YTFS), stating, “Sonia, I agree, as I mentioned before, North Korea’s biggest fear is the takeover of their country by a foreign invader.”

Inquiry-oriented responses are those where students ask supportive, challenging questions. Ten percent of the 158 total occurrences surfaced for the inquiry-oriented responses code. The four chosen courses discussion threads displayed student-to-student support in the form of inquiry-oriented responses. An example of this form of interaction involved Carol (1YBFS) where she asked her classmate inquiry-based questions; however, the tone appeared aggressive. Carol (1YBFS) stated, “What are you even talking about? When does America fund Iranian or Korean regimes? And why would you, as a country, want to seize assets of another country?”

Students displayed student-to-student support in the form of passive-oriented responses within the 8-week discussion threads of the four chosen courses. Eighteen percent of the 158 total incidences occurred for the passive-oriented responses code. The first-year technical students displayed an example of this form of interaction. For example, a student agreed with his or her peers and did not prompt for a response, which falls under passive-oriented replies. A peer/student responded to Cynthia (1YTFS),

stating, “Agreed, Cynthia! Having unnecessary words in your memo/e-mail can make it uninteresting.”

Students expressed student-to-student support in the form of relationship-oriented responses within the 8-week discussion threads of the four chosen courses. Thirty percent of the 158 total occurrences arose for the relationship-oriented responses theme. The first-year business students displayed an example of student-to-student relationship-oriented responses. For example, a student responded using slang terms to his or her peer, which showed that there were strong social connections or relationship between them as classmates. A peer/student responded to Carol (1YBFS), stating, “That’s a good point Carol. Dope in the 70s was a drug that created a big stir, as where nowadays it’s used as something being cool. Crazy how terms have double meanings and can mean two entirely different things.”

Subtheme 2: Student-to-student challenge. I reviewed the discussion threads to see if there were moments when students challenged each other. Ninety-five percent of the 22 total occurrences surfaced for the student-to-student challenge subtheme. An example of a student-to-student positive challenge was displayed in the fourth-year technical group, where one of the students asked a political, national security question, “I will have to disagree with most of my classmates as this event could happen any minute; but are we really secured or is it just false feeling of security since we are a powerful nation?”

Five percent of the 22 total incidences occurred for the student-to-student negative challenge subtheme. The only example of a student-to-student negative

challenge that was captured in the discussion threads across all four classes under study came from the first-year business students. Carol's (1YBFS) response to her classmate seemed disparaging based on tone and word choice. For example, she stated, "What are you even talking about?" Also, she seemed to have scolded her classmate as a parent would, when she stated, "See, it's this attitude toward the world at large that has caused significant problems in international relations."

Subtheme 3: Support from professors. All four professors displayed support for their students within the online discussion threads of their blended learning discussions. One hundred percent of the 299 total occurrences arose for the support from professors subtheme. The professors displayed supportive interactions used in the study, to include affable-oriented responses, relationship-oriented responses, and inquiry-oriented responses. Xi's (4YBMP) number of student posts were moderately low (48), whereas Ross's (1YBMP) number of posts were high (122). Green (4YTFP) infrequently posted to her 17 students and her interview data supported this finding, where she stated that some professors "write way too much in the discussions." Curry's (1YTFP) number of posts were moderately high (112). Curry (1YTFP) explained that she allowed students to interact with each other, but she would occasionally go in to facilitate higher order thinking. In the following example, Ross (1YBMP) showed support to Byron (1YBMS) by acknowledging his post and asking a probing question to facilitate learning. Ross posted, "Hi Byron, this is an interesting view. You seem to situate the problem in what we can call an interactionist perspective. Why do you think we have that view of veterans?"

Subtheme 4: Professor-to-student challenge. One hundred percent of the 21 total occurrences happened for the professor-to-student challenge subtheme. Although Green (4YTFP) infrequently posted to her fourth-year technical students, she positively challenged students more often than the other professors in the study. Green (4YTFP) challenged her students nine times; Xi (4YBMP) challenged his students five times, Ross (1YBMP) challenged his students four times, and Curry (1YTFP) challenged his students three times.

The fourth-year business students displayed an example of the professor-to-student positive challenge. For example, Xi (4YBMP) questioned his students about risks, which was an example of the professor-to-student positive challenge. His questions required personal reflection as well as further research. Xi (4YBMP) posted, "What is an acceptable risk and how would you determine this? How about you personally? What's your risk tendency? Skydiving anyone? For your third post, please respond thoughtfully to another student's post." There was no professor-to-student negative challenge found in the discussion threads across all four classes used in the study.

Subtheme 5: Impact from gender. To triangulate interview data with discussion thread data, I observed the impact from gender subtheme across all four classes. Ninety-four percent of the 16 total occurrences surfaced for the impact from gender subtheme. The first-year business students displayed an example of effects from gender. For example, Carol's (1YBFS) post reflected gender impact in several ways. For instance, Carol openly spoke about herself as not as nurturing as the stereotypical woman. She was also wordy in most of her posts, which Xi (4YBMP) described in his interview a

feminine trait. Carol (1YBFS) posted, “Yes, stereotypically, women are more nurturing than me. At my age, I find that this stereotype does hold true often. Of course, not all women are like this.”

Subtheme 6: Discussion threads content and design. Discussion thread content and design as an emergent subtheme was present during Curry’s (1YTFP) interview where she stated, “I think it’s up to the professor to really get in there and get the students talking. Sometimes you’re successful; sometimes you’re not. It depends on the course and the material.” To triangulate the data, I analyzed the discussion threads of all classes used in the study and found a short interaction which showed two students expressing concern over issues with the course material. Six percent of the 17 total incidences occurred for the discussion thread content and design subtheme. Rudolph (1YTMS) discussed having to deal with “fluff” for required reading for the discussion thread. A student expressed issues with the material and one student stated, “Unfortunately, the grammar is atrocious. It was super distracting for me to have to go back and reread sentences in order to properly process them.” Rudolph (1YTMS) responded and stated, “I agree with you on the grammar, I think it’s because they are using a bit of fluff to lengthen it in certain parts. They did use a good amount of detail; just some parts are kind of being repeated.”

Within-Case and Cross-Case Analysis to Answer Research Question 1

To perform within-case and cross-case analysis, I ran queries of all four courses in NVivo to find notable similarities and differences. Figure 5 depicts within-case and cross-case analysis of Research Question 1, Research Question 1.1, and Research

Question 1.2. This subsection is organized in the following areas: within-case analysis and cross-case analysis.

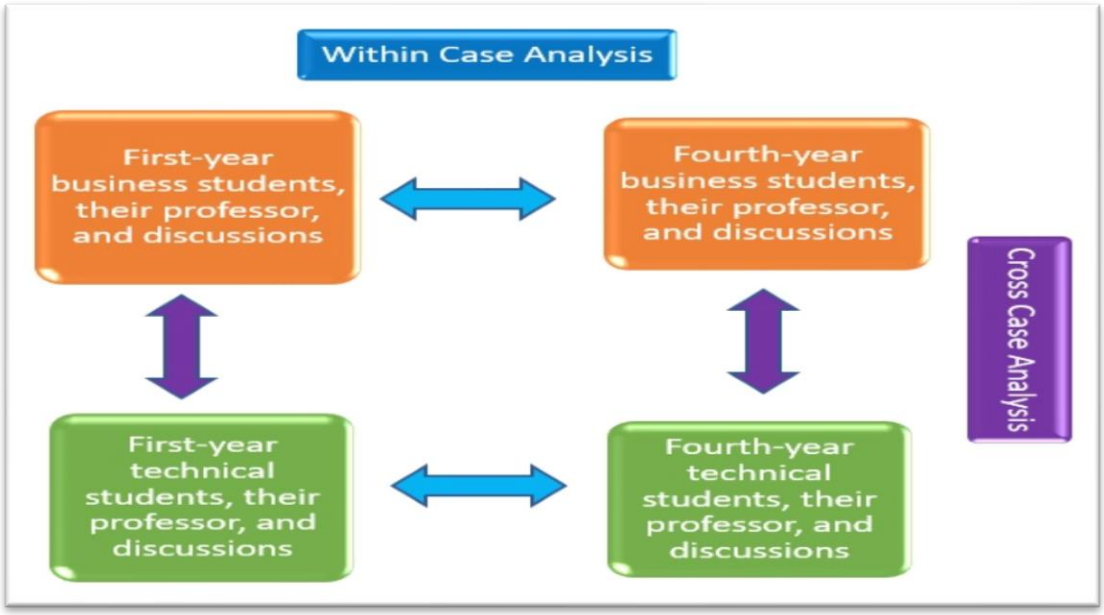

Figure 5. Within-case and cross-case analysis to answer Research Question 1.

Within-case analysis. For the within-case analysis portion of this study, I drew comparisons between the first-year and fourth-year business students' and their professors' interview data as well as their discussion thread data to answer the overarching Research Question 1. I carried out the same process for the technical case to help answer the overarching Research Question 1: What are first- and final-year students' supportive and challenging patterns of interaction that occur in the online portion of blended learning discussions? I organized this subsection into two areas: (a) first and fourth-year business students and professors and (b) first and fourth-year technical students and professors.

First and fourth-year business students and professors. Based on interview data, all business students and their professors reported that they enjoyed participating in the discussions and expressed that they could read each other's tone. The business students said they acquired knowledge from their professors and peers within the discussion threads. I used interview and discussion thread data to run the codes related to the student-to-student support subtheme for the business case in NVivo. The codes were: active, affable, inquiry, passive, and relationship-oriented participation. I also ran the codes related to the student-to-student challenge subtheme. The codes were student-to-student positive challenge and student-to-student negative challenge. Results showed that students and professors from the business case found the online portion of their blended learning discussions to be useful where they were able to interact with each other by asking questions to encourage conversations. The first-year and fourth-year business professors and students expressed that students communicated with each other mostly by agreeing with each other, and whenever they disagreed, they were often civil about it.

First and fourth-year technical students and professors. Based on my interview data, all technical students and their professors described the discussions as a good place where they could express their feelings and learn from each student other and professor through step-by-step instructions. I used interview and discussion thread data to run queries related to student-to-student support for the technical case in NVivo. I also ran queries related to student-to-student challenge. Students and professors from the technical case found their blended learning online discussions to be useful in that they could interact with each other by asking questions to inspire conversations. The first-year and

fourth-year technical professors and students expressed that students interacted with each other mostly by agreeing with each other and whenever they opposed each other, they were respectful about it.

Cross-case analysis. To perform cross-case analysis for this study, I used interview responses from students and professors and the discussion threads across each of the two cases: (a) first-year business and first-year technical students, their professors, and their discussion threads in two courses; and (b) fourth-year business and fourth-year technical students, their professors, and their discussion threads in two courses. See Figure 5 for a visual depiction of cross-case analysis in this study. I organized this subsection into two areas: (a) first-year business and technical students and (b) fourth-year business and technical students.

First-year business and technical students . Based on the results from interview data, the first-year business and technical students often participated in a dynamic manner to elicit responses from their peers. However, discussion thread data showed that technical students displayed more active participation than business students (5 out of 68 occurrences for business students and 9 out of 110 occurrences for technical students). The first-year students' interview data showed that they were equally friendly with each other, but their discussion thread data showed that technical students interacted in a friendlier manner than business students (20 out of 68 occurrences for business students and 30 out of 110 occurrences for technical students). Interview data showed that the first-year technical students often asked more inquiry-oriented questions than the first-year business students (2 out of 19 occurrences for business students and 3 out of 29

occurrences for technical students). On the other hand, the discussion thread data revealed similar findings between first-year technical and business students in relation to inquiry-oriented questions. Based on both interview and discussion thread data, the first-year technical students interacted passively with each other more often than first-year business students. Interview data showed that the Byron (1YBMS) showed the only passive interaction among first-year business students based on the interview data. Byron (1YBMS) stated that he saw his peers agree with each other "a lot." He stated that his peers mostly stated, "I agree with what you're saying." Byron's discussion thread posts also demonstrated passive-oriented interaction, which does not prompt for a reply. Byron posted, "I agree with you both on this. I know a lot of people that are either currently in the military or are veterans. My grandfather and dad were veterans."

Based on the interview and discussion thread data, the first-year technical students posted not only passive replies more often than first-year business students; they also posted more relationship-oriented responses than first-year business students (1 out of 19 responses for business students and 4 out of 29 for technical students). For relationship-oriented responses, business students had 20 out of 68 responses, whereas technical students had 28 out of 110 responses.

Interview and discussion thread data showed that first-year technical students posted positive challenging responses more often than business students. In her interview, one first-year business student spoke of negative challenge occurring in her course, whereas the two first-year technical students spoke of negative challenging occurring. However, based on discussion thread data, the first-year technical students showed no

negative challenging interaction occurring in their course, whereas the first-year business class had one occurrence, which was displayed by the same student who spoke about negative challenge occurring in her class.

Fourth-year business and technical students. Results from interview data revealed that the fourth-year business and technical students frequently participated to elicit responses from their peers, but discussion thread data showed that technical students were more actively involved with each other than business students (5 out of 68 occurrences for business students and 9 out of 110 occurrences for technical students). The fourth-year business and technical students' interview data showed that they were equally friendly with each other. However, discussion thread data showed that technical students were more courteous with each other than business students (20 out of 68 occurrences for business students and 31 out of 110 occurrences for technical students).

Based on interview data, the fourth-year technical students often asked more inquiry-oriented questions than the fourth-year business students (2 out of 19 occurrences for business students and 3 out of 29 occurrences for technical students). However, the discussion thread data showed that the fourth-year business students asked just as many inquiry-oriented questions as technical students. In their interviews, the fourth-year business students did not speak about having passive-oriented replies in their discussions, and the discussion threads did not disclose any such posts. The fourth-year technical students, however, described passive-oriented posts in their interviews. For example, Sonia (4YTFS) spoke about passive posts, stating, "Yeah, I see a lot of people, for the sake of coming up with a post." A peer/student responded passively to Sonia's (4YTFS)

post, stating, "I agree with Sonia. Throwing away your cycle into the trash is a big waste. The sad part about it is that most of the cities and state of [state redacted] don't recycle."

Interview and discussion thread data showed that fourth-year technical students posted more relationship-oriented replies than fourth-year business students (1 out of 19 occurrences for business students and 4 out of 29 occurrences for technical students). Based on interview and discussion thread data, fourth-year technical students often challenged each other positively more often than fourth-year business students. The fourth-year technical and business students did not show any negative, challenging forms of interactions in the discussion threads of their classes.

Research Question 2

What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions? Based on Research Question 2 analyzed interview data, two major themes and six subthemes emerged. The two major themes were (a) knowledge construction and (b) perceptions of impact. The knowledge construction major theme had three subthemes: (a) knowledge construction amid support, (b) knowledge construction amid challenge, and (c) making sense of new information. The perceptions of impact major theme had three subthemes: (a) issues that impede learning, (b) VoiceThread impact, and (c) nonsupportive behavior. This section is organized based on these two major themes and six subthemes.

The knowledge construction major theme and its three subthemes helped me to answer Research Question 2 as I explored from participants' viewpoints patterns and

stages of knowledge construction that occur when first-year and final-year business and technical students are experiencing different classroom interactions within the online discussion threads of their blended learning classes. The perceptions of impact theme and its three subthemes also helped in answering Research Question 2 as I explored from participants' perspectives the impact that various elements have on students' learning.

Students and professors reported in their interviews that no severe aggressive interactions occurred in any of their classes. However, through triangulation of discussion thread data, a nonsupportive or aggressive challenge occurred twice throughout the 8-week discussions by one first-year business female student and one first-year technical female student. All eight students reported that supportive interactions led to an increase in knowledge. Supportive interactions consisted of agreement and occasionally, civil disagreement. Knowledge construction often occurred in a positive, challenging form of communication where students' and professors' replies encouraged learners to conduct additional research. Students and professors also reported that students studied further whenever they encounter unfamiliar information posted by their classmates or their professors. Table 6 depicts the frequencies and percentages for the major theme and subthemes in relation to Research Question 2.

Table 6

All-Participant Interview Data to Answer Research Question 2

Major themes and subthemes	Codes	No. of frequencies (N = 114)	% of frequencies
Knowledge construction			
Knowledge construction amid support		12	10.5
Knowledge construction amid challenge		12	10.5
Make sense of new information			
	Sharing/comparing information	12	10.5
	Discovery and exploration of dissonance	12	10.5
	Negotiation of meaning/coconstruction of knowledge	12	10.5
	Testing and modification of proposed synthesis or coconstruction	0	0
	Phrasing of agreement statements and applications of newly constructed meaning	0	0
Perceptions of impact			
Issues that impede learning		12	10.5
VoiceThread impact		12	10.5
Nonsupportive behavior		13	10.5
	What caused nonsupportive behaviors?	9	8
	Nonsupportive behavior impact?	8	7
Total frequencies and percentage		114	100

Major Theme 3: Knowledge construction. Knowledge construction is the first major theme for Research Question 2. In this study, knowledge construction is based on the principle that as students collaborate in online discussion threads, they construct their knowledge in certain phases. I used Gunawardena et al. (1997) five phases of student knowledge construction to analyze Research Question 2: (a) sharing/comparing information, (b) discovery and exploration of dissonance, (c) negotiation of meaning/coconstruction of knowledge, (d) testing and modification of proposed synthesis or coconstruction, and (e) phrasing of agreement statements and applications of newly constructed meaning. This subsection is organized based on the three subthemes: (a) knowledge construction amid support, (b) knowledge construction amid challenge, and (c) making sense of new information.

Subtheme 8: Knowledge construction amid support. I asked student participants to explain how students increased their knowledge whenever they experienced supportive interactions with other students or with their professors within the online discussions of their blended learning courses. All eight students explained that they learn from other students' viewpoints, which broadened their knowledge. For example, Carol (1YBFS) stated, "It just teaches you more about other people's views and maybe their insight into the subject matter to where you could either expand or narrow your own views." In addition, she stated, "yes," learning takes place.

Subtheme 9: Knowledge construction amid challenge. I asked participants to express how they thought students increase their knowledge while engaged in a nonsupportive or challenging online discussion environment. In general, all participants

believed that students increased their knowledge amid positive, challenging interactions. For example, Byron (1YBMS) noted that challenge forces him to "take another look at the discussion topic." He further related that he would do more research and then try to understand the other person's point of view. He stated, "So, you do learn in the middle of tension."

Ross (1YBMP) explained that increasing students' knowledge was reliant on "how that environment influences the dynamics of learning." Curry (1YTFP) related that first-year students tend to be thoughtful and creative in their answers and are not concerned with losing discussion points. She explained that in her courses, the discussion area is nonthreatening and is not an environment where students believe they are going to get a lower grade. In addition, Curry (1YTFP) that it helps if students believe that they can speak freely about things, which opens the learning experience.

Subtheme 10: Making sense of new information. Results related to how students make sense of new information, which was based on Gunawardena et al. (1997) five phases of knowledge construction. Thus, findings are discussed in relation to these five phases. I asked participating students and professors to share their perspectives about how students make sense of new information and viewpoints they disagree with within the weekly discussion threads of courses. I also asked if there were disagreements, whether students would agree by the end of the week.

Phase 1: Sharing/comparing information. In general, student participants reported that they rarely saw disagreements. For instance, Sonia (4YTFS) response was that making sense of new information is different for every person. She stated, "Some people

are very just set [in their ways].” Similarly, Byron (1YBMS) shared that when students encounter new information, they would go back and forth as they tried to prove that their point of view was valid. He explained that sometimes each side of the argument “has a lot of facts” towards proving their points, but at times they “agree to disagree.”

Green (4YTFP) stated, “Yeah, most likely yeah. I’ve seen them come in, seeing more eye-to-eye than anything else.” She explained that maybe students just wanted to give “positive reinforcement to others because they are required to respond to each other.” She added that she rarely sees students challenge each other, and if ever they disagree, the other person might come back and say, “well, I see your point” or students would “just agree to disagree.”

Phase 2: Discovery and exploration of dissonance. An example of discovery and exploration of dissonance was when Cynthia (1YTFS) stated, “Yeah, it [students agreeing] happens. Even it happens to me.” She then provided an example of how she argued with two of her classmates, and after researching online, she realized that her answer was incorrect. However, her male classroom counterpart, Rudolph (1YTMS), believed otherwise and shared that students “really go too far off of whatever the basic information is.” He explained that students do not disagree, and if anything, “they add on to what others have said to go delve deeper into the topic.”

Phase 3: Negotiation of meaning/coconstruction of knowledge. The students from all four classes negotiated with each other whenever they sought meaning to new information. The first-year male business student, Byron (1YBMS), related that when students come across new information, they would go back and forth as they were trying

to prove that their point of view was valid. He explained that sometimes each side of the argument "has a lot of facts" to prove their points. At first, Cynthia (1YTFS) shared people need to do "research on the topic," but later explained that doing research makes it easy for "the person who is wrong" to "understand what is wrong."

Phase 4: Testing and modification of proposed synthesis or coconstruction of knowledge. I did not capture any interview data from participating students' and professors' responses for Stage 4 of the five phases of knowledge construction. For Phase 4, students would have tested the proposed new knowledge against the existing cognitive schema, personal experience, or other sources (Gunawardena et al., 1997). However, through triangulation with discussion thread data, Phase 4 of knowledge construction was captured for both classes belonging to the technical case of this study.

Phase 5: Phrasing of agreement statements and applications of newly constructed meaning. I did not capture any interview data from participating students' and professors' responses for Phase 5 of the five phases of knowledge construction. For Phase 5, students would have merged and summarized their agreements with an application of new knowledge and statements by showing their understanding that they experienced critical reflection (Gunawardena et al., 1997). However, through triangulation with discussion thread data, Phase 5 of knowledge construction was captured only for the first-year technical students.

Major Theme 4: Perceptions of impact. Perception of impact is the second major theme for Research Question 2. This subsection is organized based on the three

subthemes: (a) issues that impede learning, (b) VoiceThread impact, and (c) nonsupportive behavior.

Subtheme 11: Issues that impede learning. For this section, I considered elements that might hinder blended learning students' learning within the online discussion threads of their courses. All participating students were asked to describe from their perspectives the issues that might distract their attention from learning in the discussion threads. Student participants were also asked to describe the impact VoiceThread might have on their learning as well as interactions from others that might have been nonsupportive or aggressive. An issue that might impede students' learning is their viewpoint of online discussion threads in general. For example, Carol (1YBFS) shared that at first, she "wasn't a fan" of the discussions but now she could see its value.

Similarly, the first-year male tech student believed that the online discussions for some courses were irrelevant. He stated, "Just some stuff like math discussion boards. It's like just give us homework. The discussion board with math, it doesn't really work too well with me." Another issue that may impede learning could be the idea that some students might feel as though they were ignored within the discussion threads of their blended learning class. For example, Byron (1YBMS) related that the only issue that would impede learning was that by default, the system does not alert students if someone responded to them directly. In addition, at times, some posts were hidden. This issue could let students think that they were being ignored by other students within the discussion portion of their blended learning classes. Trolling or cyberbullying from other students or professors may also impede students' learning within the online discussions

of blended learning classes. For example, Cynthia (1YTFS) described a cyberbullying incident that might have impeded her learning. She shared that there was a female student who constantly responded to her, stating, “Cynthia, go and research, you don’t know anything.” The professors spoke about possible barriers to learning that were related to technology, closed-ended discussions, need for academic training, students’ personal issues, and students’ poor reading and writing skills.

Subtheme 12: VoiceThread impact on how people learn. The first-year female technical student and all fourth-year students believed that VoiceThread as a multimedia tool helped students to learn. For example, Cynthia (1YTFS) shared that VoiceThread enabled her to improve her grammar and public speaking skills. However, some student responses were not entirely positive; for example, Phillip (4YTMS) related that once students listen to each other’s VoiceThread posts, they will increase their knowledge. Similarly, Byron (1YBMS) thought that VoiceThread was helpful, but not in the sense that it helps students learn.

The professors also provided varied responses to the question of whether the VoiceThread tool facilitated learning. For example, Curry (1YTFP) stated, “Oh no, I think it helps people to learn.” She explained that VoiceThread allows people to personalize their posts and help people to put a voice to a name. Xi (4YBMP) noted that if students “just do it to get it over with,” then there would be a negative impact on the discussions. Ross (1YBMP) believed that his course would not be diminished if VoiceThread was absent. Ross (1YBMP) added that he was not sure if VoiceThread helped to increase students’ learning. Similarly, Green (4YTFP) stated, “I don’t think it’s

that big of a deal, to be honest with you." She added that she views VoiceThread as just one of the tools the school provided.

Subtheme 13: Nonsupportive or aggressive behavior. The final subtheme emerged based on the notion that the argumentation knowledge building framework to mitigate casual conversations between students, might lead to aggressive behavior between students (Paulus, 2006). The participating students and professors related that students infrequently displayed nonsupportive or aggressive behavior within their blended learning classes. They also believed that whenever these negative behaviors occurred, they were never out of control. For example, John (4YBMS) noted that he saw his classmates with strong opinions, but no aggression. John (4YBMS) spoke of instances where students began straying from the topic and become "very opinionated," then the professor would say, "okay, we're going to bring this over and back on topic."

Phillip (4YTMS) shared that no one wants to come across as "ridiculous," and for this reason, they are careful when posting to the discussion threads. His female class counterpart, Sonia (4YTFS), related that students usually do not display aggressive behaviors but noted that she has exhibited aggression a couple of times. She stated, "I feel maybe I just do that to stand out from other students." Curry (1YTFP) related, "I've experienced students who came across as very strong in their convictions." She added that whenever students replied that way, "that they kind of shut down the conversation on the topic." She said she believes that such behaviors have a negative impact on the discussions.

Regarding what caused the aggressive behavior, students and professors believed that nonsupportive or aggressive behaviors occurred because students in their learning community were frustrated, lacked confidence, took offense readily to other's comments, because of the nature of blended learning, or due to a controversial topic. For example, the first-year and fourth-year male business students believed that aggressive behavior might have occurred because students might be living in stressful environments, students might be frustrated because they are not able to get their points across, or people took things too personal. The first-year and fourth-year female technical students believed that students expressed aggressive behavior in the discussions because of lack of confidence, where they might project past negative experiences onto others and that there might have been "a controversial topic." Sonia (4YTFS) explained that if a student posts "an unpopular opinion" then he or she should be ready to take on the aggressive responses. The professors' responses were more in-depth than those of their students. For example, Ross (1YBMP) noted that what might cause aggressive behaviors has to do with "students being tangential" within the discussion threads and Xi (4YBMP) believed that "people's passions" would be the cause of antagonistic behaviors.

According to Curry (1YTFP), the nature of blended learning might cause aggressive behaviors to occur. Curry (1YTFP) related that the face-to-face portion of her blended learning class affected the online part and amplified tension between students in the discussion threads. She shared how an army officer came across as intimidating in her class, both online and when face-to-face. Curry (1YTFP) noted that he was set in his convictions and whenever other students tried to bring up different examples, "he chilled

the conversation, he kind of shut it down." She explained that his peers might have been intimidated by his physical appearance and were fearful, thus, they avoided responding to his posts.

Regarding how aggressive behavior affects knowledge construction, the students and professors believed that aggressive behavior was a distraction from the topic, driven by emotions, caused students to feel uncomfortable, prompted students to stray away from the subject, and interfered with how students learn from each other. For example, Byron (1YBMS) related that aggressive behavior takes away from the discussion and becomes "fueled by pure emotion." He noted that students no longer behave politely in the forum, "but it's more a personal rant," which takes away from learning from each other. Karen (4YBFS) shared that her professor's cynical remark, "great copy-paste, now explain," would cause students to feel uncomfortable, but it would make "everyone step their game up." Sonia (4YTFS) noted that she felt intimidated by aggressive behavior within the discussion threads. She stated that students learned from other students' mistakes, and added, "maybe I'll be braver or say something like, what he did, or she did, or whatever."

Xi (4YBMP) declared that aggressive behavior affects knowledge construction because "when behavior is aggressive, people naturally hold back a little bit." However, Ross (1YBMP) spoke about the content of a student's post in relation to the student's intention to disrupt the discussion negatively. He explained that the student's discussion post content might be negative, but his or her aim might be pure.

Before ending the interviews, I asked all participating students and professors if there was anything else they would like to share. Some participants expressed they had nothing else to add, whereas others included additional thoughts. Two first-year students and three fourth-year students shared additional information. For example, Byron (1YBMS) spoke highly of the online learning platform. He stated, "It's a very great platform, it's still growing, it's still implementing new ways to work itself." Karen (4YBFS) shared, "As I said, the discussion board is very beneficial. You know, it helps me to learn and it helps me to gain additional knowledge that maybe I didn't think I needed."

All Participants' Discussion Data to Answer Research Question 2

For Research Question 2, I focused on revealing the patterns and stages of knowledge construction that occurred when first-year and final-year students are experiencing different classroom interactions in the online portion of their blended learning discussions. Participants' interview data resulted with students displaying Gunawardena et al. (1997) first three phases of student knowledge construction based on the researcher's five phases of knowledge construction. However, with triangulation of discussion thread data from this study, results showed that unlike the business students, who were developing emotional intelligence (EI; Golemon et al., 2004), some of the technical students were able to transcend beyond the first three phases of knowledge construction, to the fourth and fifth phases.

The conversations between students and professors within the discussion thread of their blended learning courses fell under more than one thematic category for this study.

Based on the Research Question 2 analyzed discussion thread data, two major themes and six subthemes emerged. The two major themes that emerged from Research Question 2 were (a) knowledge construction and (b) perceptions of impact. The subthemes were (a) knowledge construction amid support, (b) knowledge construction amid challenge, (c) making sense of new information, (d) issues that impede learning, (e) VoiceThread impact, and (f) nonsupportive or aggressive behavior. This section is organized based on the six subthemes.

Subtheme 8: Knowledge construction amid support. Fifty percent of the 40 total frequencies occurred for the knowledge construction amid support subtheme. Results for the knowledge construction amid support subtheme showed that students constructed their knowledge by exchanging information, providing clarification, providing supportive evidence, and responding fervently to their professors' follow-up questions within the discussion threads. In the first-year business course discussion threads, students began the process of knowledge construction by exchanging information. The exchange occurred as Byron (1YBMS) posted to his peers about his military experience, where he discussed PSTD. One of Byron's classmates liked his post, which showed support and acknowledgment. Byron posted, "I am a former enlisted soldier having served in the Army and had deployment experience. You never really know how these homeless veterans got to where they are now until you understand their story."

Subtheme 9: Knowledge construction amid challenge. Fifty percent of the 40 occurrences arose for the knowledge construction midst challenge subtheme. Based on

participants' discussion threads from the business case and technical case in the study, in relation to the knowledge construction amid challenge subtheme, student construct their knowledge by engaging with challenging follow-up questions from their professors and engaging in Socratic questioning. Students in the first-year business class displayed knowledge construction midst pedagogical challenge when Ross (1YBMP) challenged one of his students. Ross's (1YBMP) post to Carol (1YBFS) reflected challenge even as he questioned her about the housing crisis in America in the discussion forum. Ross (1YBMP) posted, "Hi Carol, great start to the problem. The funny thing is that having more affordable housing is a simple solution to the housing crisis. Why do you think we are not doing that as a country?"

Subtheme 10: Making sense of new information. I captured how students made sense of new information in the online threaded discussion area of the courses under study. I used Gunawardena et al.'s (1997) five phases of knowledge construction to help clarify how blended learning students in both business and technical classes make sense of new information within the online portion of their blended learning discussion threads. I organize this section based on Gunawardena et al. (1997) five phases of knowledge construction.

Phase 1: Sharing/comparing information. Thirty-four percent of the 77 total occurrences happened for the sharing-comparing information code. Instances of sharing and comparing information subtheme were displayed in the discussion threads of all four classes that were studied. The fourth-year students in this study often agreed with each other's statements as they shared and compared information. According to Sonia

(4YTFS), many students in her class agreed with other students' comments "for the sake of coming up with a post." She pointed out that she rarely sees other students disagreeing with each other. She stated, "I feel like if they're going to disagree, they wouldn't respond to that person. They'll only pick the person they agree with and go off that." She explained that agreeing with another student's post is easier than disagreeing because students would have to conduct further research to back up their point of view on the issue. A sharing/comparing information example was displayed as a student from the fourth-year technical class completely agreed with another student's post, and then pointed the student to other online resources about the subject.

Phase 2: Discovery and exploration of dissonance. Thirty-two percent of the 77 total occurrences surfaced for the discovery and exploration of dissonance code. All four classes included in the study showed examples of discovery and exploration of dissonance. Rudolph (1YTMS) agreed with another student's post but offered counterevidence. Rudolph (1YTMS) posted, "I agree with you on the grammar, I think it is because they are using a bit of fluff to lengthen it in certain parts. They did use a good amount of detail; just some parts are kind of being repeated." Rudolph's (1YTMS) agreement with is peer on one point, and then shifting to another point, showed that he was cordial even as he opposed his peer, mitigating the impact his post could have on the conversation.

Phase 3: Negotiation of meaning/coconstruction of knowledge. Twenty-nine percent of the 77 total occurrences happened for the negotiation of meaning/coconstruction of knowledge code. Having academic support, students from all

four courses in the study experienced negotiation of meaning/coconstruction of knowledge. The students from the fourth-year business class displayed negotiation of meaning/coconstruction of knowledge. This phase was evident as a fourth-year business student critiqued John's (4YBMS) VoiceThread. The student seemed to sift through the recording carefully for meaning and added more information, stating, "Hello John, I agree that effective communication requires clarity, time managed, elaborately detailed, accurate, and continuous. I also think these types of project 'leaders' work best within an agile environment."

Phase 4: Testing and modification of proposed synthesis or coconstruction of knowledge. Four percent of the 77 total occurrences arose for the testing and modification of proposed synthesis or coconstruction of knowledge code. Students at this phase of knowledge construction would test the proposed new knowledge against existing cognitive schema, personal experience, or other sources (Gunawardena et al., 1997). Unlike the business students, the technical students in the study displayed testing and modification of proposed synthesis or coconstruction of knowledge. Professor guidance and technical students' openness to supportive media artifacts might have played a role with technical students displaying testing and modification of proposed synthesis or coconstruction of knowledge. The students from the first-year technical class appeared to be open-minded and enthusiastic about the topics. Even though the first-year technical students appeared to be eager and enthusiastic in their responses, in general, they appeared to be courteous and respectful of each other's beliefs. An example of testing and modification of proposed synthesis or coconstruction of knowledge was

displayed as a first-year technical student responded to another students' post, stating, "Providing facts and detail is crucial to any proposition or persuasive document. I honestly think at times; it can be hard to avoid what you are calling fluff, within a document. Chances are, without guidelines of acceptable criteria, this would be eliminated."

Testing and modification of proposed synthesis or coconstruction of knowledge was displayed in the fourth-year classes. In one instance, a student respectfully probed another student's post, suggested other material related to the topic, and then proposed new ideas, stating, "I guess it really depends on the accuracy of that technology. Have you ever seen the movie Gattaca? It took place in a world where we could manipulate genetics. We may run into a similar scenario in the future as technology moves forward."

Phase 5: Phrasing of agreement statements and applications of newly constructed meaning. One percent of the 77 total occurrences happened for the phrasing of agreement statements and applications of newly constructed meaning code. This final phase includes convergence and summarization of participants' agreements, application of new knowledge, and statements by participants showing their understanding that they experienced critical reflection (Gunawardena et al., 1997). Using discussion thread data, I ran a query in NVivo across both business and technical cases in the study using the phrasing of agreement statements and applications of newly constructed meaning theme. The only blended learning course under study that arrived at the final stage of knowledge construction was the first-year technical group. The first-year technical students conversed with each other over how to handle fluff. At the end of the conversation, their

professor confirmed that their ideas were sound. There were convergence and summarization of the students' agreements, application of new knowledge, and student statements showing their understanding that they experienced critical reflection.

The following example shows small portions of the asynchronous conversation between the students and their professor that demonstrated phrasing of agreement statements and applications of newly constructed meaning, "Unfortunately, the grammar is atrocious. It was super distracting for me to have to go back and reread sentences to properly process them." Rudolph (1YTMS) responded, stating, "I agree with you on the grammar, I think it is because they are using a bit of fluff to lengthen it in certain parts. They did use a good amount of detail; just some parts are kind of being repeated." Curry (1YTFP) showed approval of the students' dialog suggesting that she believed that through the process, they increased their knowledge. She also repeated some of what the students shared, which demonstrated that she saw value in their conversations. Curry (1YTFP) posted, "Great ideas here. It is extremely difficult to avoid fluff. It is hard to fill a document with new and interesting ideas in spots. Yet, you also make an interesting insight here, don't repeat. Instead, reinforce."

Subtheme 11: Issues that impede learning. In triangulation with interview data, I used the discussion thread data for all four classes to identify issues that might obstruct students' learning. The first-year business class had two potential issues that may impede students' learning. Ross (1YBMP) requested that students review his announcement about netiquette or online etiquette. Ross's (1YBMP) announcement suggested that his students' posts might have been shifting from formal to informal and perhaps moving

towards aggressive patterns of interactions, which could impede learning. Ross (1YBMP) posted, “Hi Everyone, as we continue the learning experience, remember to support your response with an appropriate citation and review the announcement of netiquette.”

The second potential issue that the first-year business students faced were technical issues with not being able to watch a video or gain access to a specific resource. One student stated, “It would be great if we can see the videos or read. I feel like if it supposed to be part of the textbook, then we should be able to access it. It is like they are cutting our learning short in a way.”

Subtheme 12: VoiceThread impact on how people learn. The fourth-year business students had technical issues with the VoiceThread application that may impede students’ learning. Technical glitches in an online discussion thread could infuriate students, which could create barriers to learning. John (4YBMS) posted, “I attempted to view your VT, but you did [not] elect the permissions for everyone to view it.”

Subtheme 13: Nonsupportive behavior. Twenty-three percent of the 13 total occurrences arose for the nonsupportive or aggressive behavior subtheme. I analyzed the 8-week discussion threads for all four classes used in the study and found that the first-year business and technical classes each had an occurrence of aggressive behavior with three references. The nature of aggression from the first-year business class was one where Carol (1YBFS) badgered her classmate with disparaging questions. Carol posted, “What are you even talking about? When does America fund Iranian or Korean regimes? And why would you, as a country, want to seize assets of another country?” Carol’s

(1YBFS) response might have "shut down the conversation" based on Curry's (1YTFP) description of nonsupportive or aggressive student behavior.

Cynthia (1YTFS) displayed aggressive behavior when she posted a series of technical terms and her professor requested that she define keywords that the general audience may not know. Based on Fauske and Wade's (2004) research, Cynthia's (1YTFS) vast usage of technical terms may have reflected posturing behavior where an individual displays arrogance by lecturing or using unfamiliar or technical language. The following is an excerpt of an exchange between Cynthia (1YTFS) and her professor, Curry (1YTFP). In the exchange, Cynthia (1YTFS) attempted to modify her posturing post as requested by Curry (1YTFP). After, Curry (1YTFP) showed approval for the changes Cynthia (1YTFS) made. Cynthia (1YTFS) posted, "CIS stands for Computer Information System. It includes programming languages such as C++, java C#. C++ are programming languages is a formal way to communicate with machine to produce different kinds of outputs, for example, we can create calculator from the programming language." Curry (1YTFP) replied, "Hi Cynthia, thanks for your clear and concise post. One of the most important things to remember to do is to define key terms the general audience may not know and provide examples which you do here."

Regarding what caused the aggressive behavior among students, based on interview data, the aggressive behavior Carol (1YBFS) displayed against her peer in the discussion forum might be due to frustration, lack of confidence, taking offense readily to other's comments, the nature of blended learning, or a controversial topic. Cynthia (1YBFS) might have displayed a posturing form of interaction in her class because she

perceived the need to prove her worth as a programmer because Cynthia (1YBFS) noted during the interview that a female student who regularly respond to her, stating, “Cynthia go and research, you don't know anything.”

Regarding how the aggressive behavior affected knowledge construction, researchers (de Laat et al., 2007; Fauske & Wade, 2004; Lee, 2012) have noted that as students display various patterns of interaction in online discussions, the presence of challenging and posturing behaviors may have adverse effects on students’ learning. In her interview, Curry (1YTFP) explained that whenever students write with an aggressive tone in the discussion threads, “they kind of shut down the conversation on the topic.” Thus, shutting down the topic is the same as obstructing learning in the course discussion area.

Within-Case and Cross-Case Analysis to Answer Research Question 2

What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions? Based on Research Question 2 analyzed interview data, two major themes and six subthemes emerged. The two major themes were (a) knowledge construction and (b) perceptions of impact. The subthemes were (a) knowledge construction amid support, (b) knowledge construction amid challenge, (c) making sense of new information, (d) issues that impede learning, (e)VoiceThread impact, and (f) nonsupportive behavior. To perform within-case and cross-case analysis, I ran queries of all four courses in NVivo to find notable similarities and differences. Figure 6 depicts within-case and cross-case analysis of Research

Question 2. This subsection is organized in the following areas: within-case analysis and cross-case analysis.

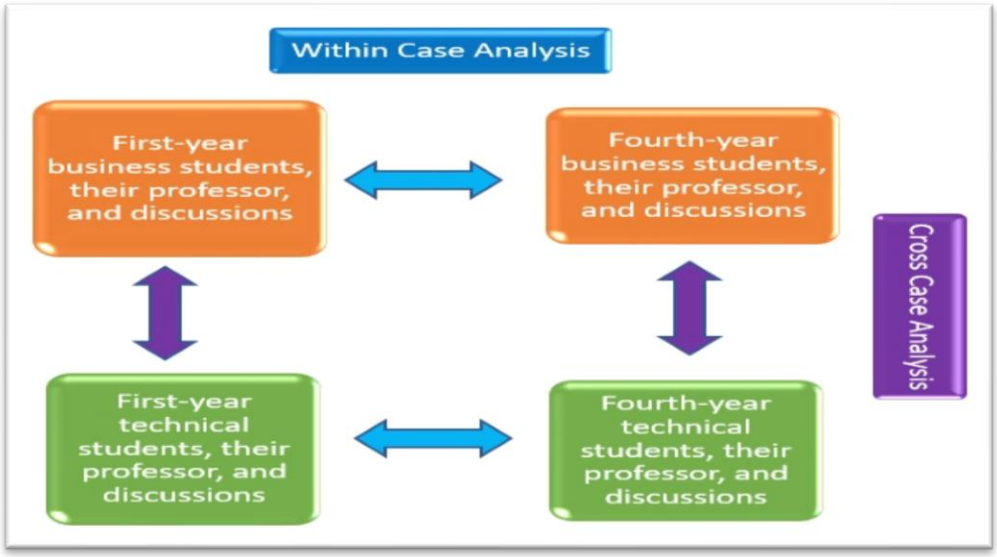

Figure 6. Within-case and cross-case analysis aimed to answer Research Question 2.

Within-case analysis. Results from interview data showed that the first and fourth-year business students equally build knowledge together as supportive interactions occurred within the online discussions of their blended learning classes. Results also revealed that the first and fourth-year business students equally increased knowledge together proportionately amid positive, challenging interactions within the online discussions of their courses. These findings do not show evidence of growth for business students' knowledge construction skills over time.

The first and fourth-year technical students also equally build knowledge together as supportive interactions occurred within the online discussions of their blended learning classes. The first and fourth-year technical students also developed knowledge together as challenging interactions happened within their blended learning online discussions.

However, fourth-year students challenged each other positively more often than first-year business students (two occurrences for first-year technical students and five occurrences for fourth-year technical students). The findings suggested that technical students' knowledge construction skills may have grown over time.

Cross-case analysis. For the cross-case analysis, I used my interview data to compared first-year business students' perspectives against first-year technical students' perspectives. I also compared fourth-year business students' perspectives with fourth-year technical students' perspectives. In addition, I sifted through students' 8-week discussion threads to identify patterns of interactions related to the emergent themes that would help in answering Research Question 2. Interview data showed that students only displayed the first three phases of Gunawardena et al.'s (1997) five phases of student knowledge construction. However, discussion thread data showed that the technical students were able to transcend beyond the first three phases of knowledge construction.

First-year business and technical students. Based on interview data, the first and final-year business and technical students displayed the first three phases of knowledge construction. The business case and technical case interview data showed that same query results in NVivo. Zero percent of the 12 total incidences occurred for Phase 4: Testing and modification of proposed synthesis or coconstruction of knowledge interview code. However, through triangulation with discussion thread data, testing and modification of proposed synthesis or coconstruction of knowledge was captured for the first-year technical students, but not for the first-year business students. Eleven percent of the 27 total occurrences arose for the Phase 4 discussion code, whereas business students had

zero occurrences. The findings suggested that first-year technical students tested and modified each other's proposed ideas within the discussion threads of their blended learning class.

In addition, based on discussion thread data, the first-year technical students displayed the fifth phase of knowledge construction, phrasing of agreement statements and applications of newly constructed meaning. However, the first-year business students did not display the fifth phase of knowledge construction. The first-year business students had zero occurrences in the discussion threads whereas the first-year technical students had one occurrence in their forum. First-year technical students tested and modified each other's proposed ideas within the discussion threads of their blended learning class.

Fourth-year business and technical students. Based on interview data, fourth-year business and technical students were able to move through the first three phases of knowledge construction. I also uncovered through interview data that fourth-year business and technical students did not display Phases 4 and 5 of knowledge construction. However, through triangulation with discussion thread data, Phase 4 of knowledge construction was captured for the fourth-year technical students, but not for the fourth-year business students. I found 11% of the 27 total occurrences for Phase 4 discussion thread code for fourth-year technical students. Discussion thread data also showed that no fourth-year student displayed the fifth and final phase of knowledge construction. The first-year technical students were the only group that displayed the final stage of knowledge construction.

Summary

The purpose of this multiple case study was to compare first-year and fourth-year business and technology students' and professors' perceptions about supportive and challenging patterns of interactions. I also explored how the patterns and stages of knowledge construction occurred for students who were experiencing different classroom interactions in the online portion of their blended learning discussions at a university in a northeastern state in the United States. I collected data through face-to-face interviews with eight business and technical student participants and their four professors from four blended learning courses. There were two cases: one business and one technical. The technical case comprised of one male and one female first-year technical student, a male and a female fourth-year technical student, along with their professors. The business case consisted of one male and one female first-year business student, a male and female fourth-year business student, along with their professors. I also explored the online discussion threads related to the eight student participants and four professor participants.

I used two research questions and two subquestions to guide the study. Research Question 1 was an overarching question encompassing two subquestions. Research Question 1 was as follows: What are first- and final-year students' supportive and challenging patterns of interactions that occur in the online portion of blended learning discussions? There were two subquestions for Research Question 1. The first subquestion for Research Question 1 was as follows: What are professors' perceptions of first and final-year students' interactions with other students and with their instructors in the online portion of technical and business blended learning discussions? Results showed

that students and professors interacted with each other by asking questions to encourage conversations. Students and professors stimulated the discussion threads by sharing information, using clarification, and offered proof or validation. In general, the four professors and students in this study revealed that students communicated with each other mostly by agreeing with each other and whenever they disagreed, they were often civil about it. The disagreements came in the form of supportive challenges within the discussion forums. In their interviews, students and professors shared that nonsupportive or aggressive challenges occurred infrequently and that they were never out of control where there were severe conflicts.

The second subquestion for Research Question 1 was as follows: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions? Findings indicated that students believed that the exchanges within their blended learning online discussions fluctuated between supportive and challenging interactions. Supportive interactions are those that are active, affable, inquiry, passive, and relationship-oriented responses, whereas challenging interactions are those where an individual would disagree openly with another person's statements or continually offer counterevidence.

Results showed that students and professors perceived the various forms of supportive interactions as those that increased learning, whereas nonsupportive aggressive interactions were almost absent from all four classes. The students from all four courses viewed the interactions with their professors as supportive where the

professor would propel the discussions positively by asking questions or steering students in the right direction. Through triangulation, the 8-week discussion thread data helped to support the participating students' and professors' accounts of the patterns of interaction in the online discussion threads of their blended learning courses.

Research Question 2 was as follows: What patterns, and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions? In general, students and professors reported in their interviews that no severe aggressive interactions occurred in any of the four courses used in the study. However, there were a few exceptions, for example, Sonia (4YTFS) admitted that she deliberately made aggressive posts just before the discussion expired to avoid getting a response from her peers. Furthermore, through triangulation of discussion thread data, a nonsupportive or aggressive challenge occurred twice throughout the 8-week discussions. One business and one technical first-year female students posted aggressive responses.

All eight students reported that supportive interactions led to an increase in knowledge. Supportive interactions sometimes consisted of agreement or civil disagreement. Knowledge construction often occurred in a positive challenging form of interaction. A positive challenge happened when students' and professors' replies encouraged learners to conduct additional research. Students also researched further whenever they encounter unfamiliar information posted by their classmates or their professors.

I explored the eight students' and four professors' perspectives in relation to Gunawardena et al. (1997) five phases of knowledge construction. These phases are included (a) sharing and comparing information, (b) discovery and exploration of dissonance, (c) negotiation of meaning and coconstruction of knowledge, (d) testing and modification of proposed synthesis or coconstruction, and (e) agreement and applications of newly constructed meaning. Professors' and students' interview data resulted with students displaying the first three phases of knowledge construction. However, with triangulation of discussion thread data, results showed that the technical students were able to transcend beyond the first three phases of knowledge construction as some students displayed the fourth and fifth phases of knowledge construction as well. The fourth-year technical students were able to transcend to Phase 4: Testing and modification of proposed synthesis, whereas first-year technical students were able to transcend to Phase 5: Phrasing of agreement statements and applications of newly constructed knowledge.

Green's (4YTFP) instructional method of not interfering too often with her fourth-year technical students' interactions might have contributed to her students displaying the fourth phase of knowledge construction. Curry (1YTFP) was moderately engaged with her students in that she occasionally responded directly to her first-year technical students' posts with a few overall posts to everyone. Curry's (1YTFP) idea of allowing students to interact with each other, but to go in to sporadically facilitate higher order thinking, might have contributed to her first-year technical students displaying the fifth phase of knowledge construction.

Based on interview and discussion thread data, the business students might not have constructed knowledge together as excellently as the technical students. Interview data showed that the business and technical students often participated equally in an active manner to elicit responses from their peers. However, discussion thread data showed that technical students displayed more active participation than business students (5 out of 68 occurrences for business students and 9 out of 110 occurrences for technical students). Based on interview data, business and technical students were often equally friendly with each other within the discussion threads of their courses. Using interview data, I also found that technical students often asked more inquiry-oriented questions than business students (2 out of 19 interview occurrences for business students and 3 out of 29 interview occurrences for technical students).

However, based on interview and discussion thread data, technical students may have shown more passive responses (not eliciting replies) and showed more relationship-oriented responses than business students. Business students showed 1 out of 19 passive interview responses, whereas technical students showed 3 out of 29 passive interview responses. The business students showed 5 out of 68 passive discussion thread responses, whereas technical students showed 24 out of 110 passive responses. Inquiry-oriented participation showed 2 out of 19 interview occurrences for business students, whereas technical students showed 3 out of 29 interview occurrences. The results indicated that the technical students asked more inquiry-based questions than business students in the online discussions of their blended learning courses. The finding might help to shed light

on how technical students were able to transcend to the final phases of knowledge construction unlike the business students.

In Chapter 4, I included the setting, demographics, data collection, data analysis, evidence of trustworthiness, results, and a summary. In Chapter 5, I include the interpretation of the findings, limitations of the study, recommendations, implications, and a conclusion.

Chapter 5: Discussion, Conclusions, and Recommendations

In this multiple case study, I explored first-year and final-year business and technology students' and professors' perceptions about supportive and challenging patterns of interactions. I also explored how patterns and stages of knowledge construction occurred for students who were experiencing different classroom interactions in the online portion of their blended learning discussions at a university in a northeastern state in the United States. I collected data through face-to-face interviews with four business and four technical students and their four professors as well as the 8-week discussion threads of the eight students who took part in the interviews. I conducted interviews in a private room at the university, most of which took approximately 45 minutes. I interviewed each participant using semistructured interview questions, which were audio-recorded using my high-quality digital recorder. I collected online discussion threads for the four blended learning courses used in the study. The online discussions threads were significant because they were worth over 20% of students overall grades. The university hosted the discussion threads and the four professors were the moderators.

I used two research questions and two subquestions to guide the study. Research Question 1 addressed first and final-year students' supportive and challenging patterns of interactions that occur in the online portion of blended learning discussions. In addition, I explored two subquestions for Research Question 1: (a) What are professors' perceptions of first and final-year students' interactions with other students and with their instructors in the online portion of technical and business blended learning discussions and (b) What are first- and final-year students' perceptions of interactions with other students and with

their instructors in the online portion of technical and business blended learning discussions? Research Question 2 addressed patterns and stages of knowledge construction that occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions. I conducted data analysis for this multiple case study was at two levels: (a) single-case or within-case analysis and (b) cross-case analysis.

The 12 participants' interview data and student course discussion thread data analysis indicated that students and professors interacted with each other by asking questions to inspire conversations. Students and professors stimulated the discussion threads by sharing information, using clarification, and sometimes offered proof or validation. Students' and professors' interactions fluctuated between supportive and challenging exchanges. In their interviews, students and professors shared that nonsupportive or aggressive challenges occurred infrequently and that they were never out of control where there were severe confrontations. However, through triangulation of discussion thread data, nonsupportive or aggressive challenges occurred twice throughout the 8-week discussions, where one first-year business female student and one first-year technical female student posted aggressive responses. Students and professors criticized the school's newly added multimedia tool, VoiceThread.

The results also indicated that knowledge construction often occurred in a positive, challenging form of interaction. Based on professors' and students' interview data, results showed that the business students displayed the first three phases of knowledge construction. Through triangulation of discussion thread data, results showed

that the technical students were able to transcend beyond the first three phases of knowledge construction. In Chapter 5, I present the interpretation of the findings, limitations of the study, recommendations, implications, and a conclusion.

Interpretation of Findings

To investigate eight first and fourth-year business and technology students' and their four professors' perspectives about supportive and challenging patterns of interactions, I designed this multiple case study to answer two research questions and two subquestions. I interpreted the study's results in the context of Piaget's (1953) cognitive constructivism, Vygotsky's (1978) social constructivism, and Knowles's (1980) adult learning theory of andragogy as well as the review of the literature. This section is organized based on the research questions and subquestions: Research Question 1, Research Question 1.1, Research Question 1.2, within-case and cross-case analysis to answer Research Question 1, Research Question 2, and within-case and cross-case analysis to answer Research Question 2.

Research Question 1

What are first- and final-year students' supportive and challenging patterns of interactions that occur in the online portion of blended learning discussions? To answer Research Question 1, I asked participants to describe how supportive and challenging interactions impacted the interactions that occurred in the online portion of their blended learning discussions. Results showed that students and professors interacted with each other by asking questions to encourage conversations. Students and professors stimulated the discussion threads by sharing information, using clarification, and sometimes offered

proof or validation. In general, the four professors and students in this study revealed that students communicated with each other mostly by agreeing with one another, and whenever they disagreed, they were often civil about it. These findings are consistent with Paulus's (2006) claim that online learners often engaged in relationship-oriented online discussions rather than an argumentation model (Barros & Verdejo, 2000; Duffy et al., 1998; Gunawardena et al., 1997; Park, & Park, 2016; Tan et al., 2001). In this study, findings indicated that the disagreements occurred in the form of supportive challenges within the discussion forums. In their interviews, students and professors shared that nonsupportive or aggressive challenges occurred infrequently and were never out of control where there were severe conflicts. These finding may also be attributed to Knowles's (1980) adult learning theory of andragogy as Birzer (2004) noted that good physical and psychological climates help the instructor create mutual respect and a collaborative environment to ensure learning effectiveness in the classroom.

Findings in this study indicated that participating students would lessen the level of disagreement. For example, Green (4YTFP) related that students rarely challenge each other, and if they ever disagree, the other student might respond, saying, "well, I see your point" or students would "just agree to disagree." In addition, Sonia (4YTFS) pointed out that other students rarely disagree with each other, stating, "I feel like if they're going to disagree, they wouldn't respond to that person. They'll only pick the person they agree with and go off that." This finding is in line with the literature as Duffy et al. (1998) explained that students engaged in online discussions tend to "talk past each other" (p.8). Therefore, to lessen these casual exploratory conversations between students, the

supporters of the challenge model encouraged students to be engaged in issue-based discussions with counterarguments (Duffy et al., 1998). However, although researchers declared argumentation as an important factor to problem-solving, it was believed that students often found it challenging to form sound reasoning and arguments (Tan et al., 2001). With the growing interest to improve learning outcomes in higher education, Paulus (2006) explored Gunawardena et al. (1997) model with modifications to see whether such changes may better capture students' knowledge building process in online discussions. Findings showed that participants often engaged in relationship-oriented discussions. For example, participants mitigated their level of disagreement by responding using phrases such as "I don't quite understand" and "a little unsure" (p.15).

Some students and professors openly criticized the school's newly added multimedia tool. For example, Carol (1YBFS) stated, "I hate VoiceThread." Later, during the interview, Carol explained that she was frustrated the first time she attempted to use VoiceThread because she had compatibility issues with her MAC computer. The students' and professors' shared criticism of the VoiceThread multimedia tool reflected a challenging or nonsupportive pattern of interaction, which is consistent with the literature, where Burbules (1993) noted that students would criticize their course texts, digital media, course activities, The VoiceThread finding can also be attributed to Piaget's (1953) cognitive constructivism pertaining to assimilation, where McLeod (2009) reported that disequilibrium occurs when children cannot fit new information into existing schemas, which may be related to student's and professors' criticism of the multimedia tool. In addition, Powell and Kalina (2009) related that based on Piaget's

theory of cognitive development, students must create their own knowledge as they will not immediately understand and use the information given to them.

Carol (1YBFS) shared that she felt intimidated by what other people were posting. She also explained that she had personal critique issues when it came to audio recording her VoiceThread messages for her class. She would say, “Oh wait, maybe I should brush my hair.” Displaying self-doubt or challenging oneself are also considered to be nonsupportive attitudes (Burbules, 1993; Herring, 1994; Kendall & Tannen, 2001). In addition, nonsupportive attitudes go beyond self-doubt and disagreeing with others as this behavior includes posturing that shows an official role (Fauske & Wade, 2004). Cynthia (1YTFS) displayed posturing behavior as she posted a series of technical terms and her professor requested that she defined keywords that the general audience may not know.

Students and professors perceived the various forms of supportive interactions as those that increased learning, whereas nonsupportive aggressive interactions were those that hindered learning. This finding is consistent with the literature as Lee (2012) noted that aggressive behavior within discussion threads may hinder the development of language skills and prevent internalized thoughts from becoming inner speech. In addition, findings in this study indicated that the student participants viewed the interactions with their professors as supportive where the professors would propel the discussions positively by asking questions or steering students in the right direction. This finding is in line with Vygotsky’s (1978) social constructivism as Powell and Kalina (2009) reported that cooperative learning is an important aspect in creating a social

constructivist classroom and creating a deeper understanding. Powell and Kalina related that students should individually work with teachers, as well as work with each other as they have a lot to offer one another. The researchers noted that when students complete group projects or activities, the knowledge gained by each student occurs at a different rate due to their own experience. Thus, social interaction is important for the internalization of knowledge (Park & Park, 2016; Powell & Kalina, 2009).

Research Question 1.1

What are professors' perceptions of first and final-year students' interactions with other students and with their instructors in the online portion of technical and business blended learning discussions? Ross (1YBMP) stated in his interview that it is best to let the interaction "plays itself out," which is consistent with Knowles's (1984) adult learning theory of andragogy. Knowles believed that adult learners have a deep psychological need to be self-directed and incline to be ready to learn what they think they need to know. In addition, the four professors' instructional strategies reflected Piaget's (1953) cognitive constructivism and Vygotsky's (1978) social constructivism methods to encourage learning through students' experiences in which ideas were created to have personal meaning to such learners (Powell & Kalina, 2009).

All four professors disclosed that as students interacted with each other within the discussion threads, the students were not fully engaged because they mostly replied by agreeing with each other's previous posts. In my study, most students avoided conflict by ignoring unfriendly posts and focusing on replies that they could easily respond to positively. Sonia (4YTFS) discussed that students talked past each other within the

discussion forums. She shared that if students disagreed with another student's post, they would not respond to that person. Instead, her peers would only post to students they agreed with to avoid conflict and to avoid conducting further research. "Agreeing is the easier thing to do," she said. This finding aligns with the literature as Duffy et al. (1998) explained that as students interact in online discussions, they mostly "talk past each other" (p.8).

The finding that most students avoided conflicts within the discussion threads might explain why nonsupportive or aggressive challenges rarely occurred (only twice) in the online discussions of the four courses. This finding is consistent with Paulus (2006) idea that Gunawardena et al. (1997) argumentation-oriented model will not fully capture how students communicate while constructing their knowledge. Instead, a relationship-oriented model would completely capture how students connect while building knowledge together (Park & Park, 2016; Paulus, 2006). However, based on interview data from my study, the relationship-oriented model alone does not lay the proper foundation for students to display the five stages of knowledge construction. This is based on the finding that business and technical students were equally friendly with each other. The technical students were able to display the fifth phase of knowledge construction whereas the business students did not transcend to this stage. It may be that technical students were more inclined to ask inquiry-oriented questions than the business students. Ross (1YBMP) related that he encouraged business students to ask more questions but pointed out "it doesn't always work." In addition, the technical students were actively engaged with each other more often than the business students. For

example, Phillip (4YTMS) shared that some students go beyond simply answering the question and “actually agree and put in their thoughts.” Inquiry-oriented questions and active participation fall under the argumentative category. Therefore, for blended learning students to construct knowledge effectively together, educators should use a combination of argumentation and relationship-oriented strategies.

Research Question 1.2

What are first- and final-year students’ perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions? Findings indicated that students believed that the exchanges within their blended learning online discussions fluctuated between supportive and challenging interactions. Supportive interactions are those that are active, affable, inquiry, passive, and relationship-oriented responses, whereas challenging interactions are those where a person would disagree openly with another person’s statements or constantly offering counterevidence (Burbules, 1993; Fauske & Wade, 2004; Herring, 1994; Kendall & Tannen, 2001). This finding is consistent with Lee’s (2012) study result, where the researcher found that students read many peer’s postings but selectively responded according to their interest.

Students described supportive interactions similarly to those that enhance learning, but aggressive interactions as those that disrupt education, however, antagonistic posts were mostly absent from all four courses. The students believed that their interactions with professors were consistently supportive, with professors stimulating discussion by asking questions or giving information and validation. All eight

students reported that their professors showed support within the online discussion threads. For example, Carol (1YBFS) related that her professors facilitated students' learning within the discussion threads of her courses. Carol stated, "Every professor I've had have been very good at answering all students' questions, and then you read their responses and other students', and you have a better idea." Similarly, her professor, Merrick (1YBMP), confirmed that professors were "good at answering students' questions" and providing support. Likewise, Cynthia (1YTFS) said, if she were confused about anything, she would call her professors or SMS [short message service] them. The finding that students were heavily reliant on their professors' expertise may be attributed to Vygotsky (1978) MKO principle. Vygotsky (1978) suggested that a MKO needs to be present for learning to take place. The MKO is an individual other than the learner who has a better understanding of a specific idea, process, or task (Galloway, 2015; Vygotsky, 1978). Carol (1YBFS) mentioned that whenever she read not only her professors' responses, but her peers' responses, she would obtain clarity on subject areas where she was previously unsure. In addition, Cynthia (1YTFS) shared that at times students would explain to her where she has gone wrong. The idea that Carol's and Cynthia's classmates helped with facilitating their learning suggested that at times students may be the MKO in the discussion threads. Triangulation of the discussion thread data allowed me to identify the related supportive and challenging patterns in the forums of the four courses and then determine that students' and professors' interview descriptions were mostly consistent.

Interview and discussion thread data analysis resulted in the gender impact subtheme for all four classes. The gender impact subtheme was present in the first-year

business class as Carol's (1YBFS) shared, "Yes, stereotypically, women are more nurturing than me." Her possible self-doubt and negative portrayal of herself was a display of passive-aggressive behavior (Burbules, 1993; Herring, 1994; Kendall & Tannen, 2001). Carol's passive-aggressive conduct is in line with the idea that males are more likely to take part in direct bullying whereas females tend to engage in indirect bullying (Chibbaro, 2007; Crawford, 2002; Quiroz et al., 2006; Wong et al., 2014). Direct bullying tends to be more physical than indirect bullying behavior and includes behaviors such as hitting, tripping, shoving, threatening verbally, or stabbing (Chibbaro, 2007). Indirect and direct bullying includes actions such as excluding, spreading rumors, or blackmailing (Chibbaro, 2007; Dedousis-Wallace et al., 2013; Willard, 2006). Carol (1YBFS) was also wordy in most of her posts, which Xi (4YBMP) and Ross (1YBMP) described as a feminine trait. Ross (1YBMP) had rich information to share about how gender influenced linguistic approaches (word choices), assertiveness (females less assertive than males), length of what is being said (women are more wordy than men), how what is said, how people respond, what comes first, and the kinds of examples used to show support.

Carol (1YBFS) was one of the female students who displayed nonsupportive or aggressive behavior in the discussion thread data. Cynthia (1YTFS) was another female student who exhibited nonsupportive or aggressive behavior as she displayed posturing behavior in the online discussion threads of her class to the extent that her professor asked her to define all the technical terminologies she used. In her interview, Cynthia (1YTFS) spoke at length about being bullied by her professor and a classmate from her

previous course. In addition, Sonia (4YTFS) admitted in her interview that she deliberately made aggressive posts close to the moment when the discussion was about to expire to avoid getting a response from her peers. These findings are consistent with Snell and Englander's (2010) research results where the researchers found that females played the role of both victims and perpetrators in cyberbullying activities. Furthermore, the concept that three women in the study tended to engage in behavior that disparages and excludes others aligns with the belief that women are more likely than men to engage in indirect bullying (Chibbaro, 2007; Willard, 2006).

Results in this study showed that shy students evolve over the course of a blended learning class and may feel less reserved within online forums. For example, John (4YBMS) shared that at the start of a class, reserved people are generally timid to interact with others, but usually close to the end of the course, they eventually choose to break free from being "nonvocal and more outspoken." Green (4YTFP) related that shy students tend to be more expressive online than in the classroom of her blended learning courses. These findings are in line with the literature as Bello-Haas et al. (2013) found that online, quieter individuals may be less concerned about embarrassment, being judged negatively by their peers, and may feel less inhibited (Bello-Haas et al., 2013; Kim, 2014).

Results om this study also showed that some students might feel intimidated or fear coming across as "ridiculous" while interacting in the online discussions of their blended learning classes. For example, Carol (1YBFS) stated, "I felt intimidated somewhat by what other people were posting." Similarly, Phillip (4YTMS) related that

no one wants to come across as “ridiculous,” and for this reason, students are careful when posting to the discussion threads. These results are consistent with Cassidy et al. (2009) findings that students in blended learning courses often become reserved in online discussions because they worry that their posts might fail to meet the required quality or standard and that their peers will ridicule them.

Findings in this study also suggested that the nature of blended in-person and online discussions at times obstruct learning. For example, Curry (1YTFP) shared how an army officer came across as intimidating both online and face-to-face in her blended learning class. Curry stated that “he chilled the conversations” whenever students included their thoughts and ideas. She explained that his peers might have felt intimidated by his physical appearance onsite, and through fear, they avoided responding to his posts. This finding shed light on what happens when students in a blended learning course experience negative interaction in their online discussion and then face their aggressor in the classroom. This finding is also in line with Barton’s (1995) research results that a mere combination of face-to-face and online discussion rules to promote learning will not work for blended learning classes. Barton conveyed that in face-to-face classroom discussions, teachers work to create supportive environments by training themselves and their students to apply active listening methods. However, Barton noted that face-to-face discussion rules would not work within the online portion of a blended learning course because the discussion will be textual. Likewise, the discussion rules for an online course will not be the ideal substitute for a blended learning course because students and teacher also meet face-to-face. Essentially, online and onsite discussion rules do not integrate

well into blended learning environments where students and professors participate in face-to-face conversations that tend to be informal and not often remembered, to online communications that are often formal and presented permanently for all to see (Chen et al., 2009).

In contrast to the findings in this study that indicated that the business and technical students tended to participate equally in an active manner to elicit responses from their peers, researchers reported that based on past research, engineering students were often found to have creative problem-solving skills but lack teamwork and interpersonal thinking skills (Herpertz, Schütz, & Nezlek, 2016; Lumsdaine & Lumsdaine, 1995), while through training, business students develop EI (Golemon et al., 2004).

However, discussion thread data in this study showed that technical students displayed more active participation and group work than business students, which is not consistent with Lumsdaine and Lumsdaine (1995) research that engineering students were often found to have creative problem-solving skills but lack teamwork and interpersonal thinking skills. The authors explained that the collaboration and interpersonal skill that technical students lacked are required in the industry whereas business students acquire EI through training programs. EI consists of five components: (a) self-awareness, (b) self-regulation, (c) motivation, (d) empathy, and (e) social skills (Golemon et al., 2004).

In contrast to Lumsdaine and Lumsdaine's (1995) theory that business students are more skilled in EI than technical students, findings in the study indicated that

business and technical students displayed the same level of social skills. based on interview data in this study, business and technical students tended to be equally friendly with each other within the discussion threads of their courses. For example, Karen (4YBFS) shared that most students seemed to be on board with giving positive feedback. Similarly, Sonia (4YTFS) pointed out that she rarely saw other students disagreeing with each other. She stated, "I feel like if they're going to disagree, they wouldn't respond to that person." Findings indicated that technical students often asked more inquiry-oriented questions than business students. Technical students scored higher than business students in active participation and Socratic questioning in the online discussion of their courses. Such findings suggested that technical students demonstrated a higher level of motivation and self-awareness than business students.

Within-Case and Cross-Case Analysis to Answer Research Question 1

I conducted within-case analysis, where I compared first-year business students to fourth-year business students and first-year technical students to fourth-year technical students. I also conducted cross-case analysis, where I compared first-year business students to first-year technical students and fourth-year business students to fourth-year technical students. I used the results from the within-case analysis and cross-case analysis to help answer Research Question 1, Research Question 1.1, and Research Question 1.2. To perform within-case and cross-case analysis, I ran queries of codes associated with the two major themes and seven subthemes of all four courses in NVivo to uncover notable similarities and differences. This subsection is organized in the following areas: within-case analysis and cross-case analysis.

Within-case analysis. To help answer Research Question 1 and the two subquestions, I asked all four business students and all four technical students to share their perceptions about blended learning discussions. I also used interview and discussion thread data to run queries of codes in NVivo that were related to student-to-student support. The codes were (a) active, (b) affable, (c) inquiry, (d) passive, and (e) relationship-oriented participation for the business case and the technical case. In addition, I ran queries of codes related to the student-to-student challenge. The codes were (a) student-to-student positive challenge and (b) student-to-student negative challenge. I organized this subsection into two areas: (a) first and fourth-year business students and professors and (b) first and fourth-year technical students and professors.

First and fourth-year business students and professors. Based on interview data, all business students and their professors conveyed that they enjoyed taking part in the discussions and shared that they can read each other's tone. The business students related that they acquired knowledge from their professors and peers within the discussion threads. Results also showed that students and professors from the business case found the online portion of their blended learning discussions to be useful where they were able to interact with each other by asking questions to encourage conversations. The first-year and fourth year business professors and students expressed that students communicated with each other mostly by agreeing with each other; and whenever they disagreed, they were often civil about it.

These findings can be interpreted in the context of Vygotsky's (1978) social constructivism as Powell and Kalina (2009) noted that cooperative learning is an

important aspect in creating a social constructivist classroom and creating a deeper understanding. Powell and Kalina related that students should individually work with teachers, as well as work with each other as they have a lot to offer one another. The researchers noted that when students complete group projects or activities, the knowledge gained by each student occurs at a different rate due to their own experience. Thus, social interaction is important for the internalization of knowledge (Park, & Park, 2016; Powell & Kalina, 2009). In addition, the findings are also in consistent with Paulus's (2006) claim that online learners often engaged in relationship-oriented online discussions rather than an argumentation model.

First and fourth-year technical students and professors. Based on my interview data, all technical students and their professors described the discussions as a good place where they could express their thoughts and learn from each other and instructor through step by step instructions. Students and professors from the technical case found their blended learning online discussions to be useful in that they could interact with each other by asking questions to stimulate conversations. The first-year and fourth-year technical professors and students expressed that students interacted with each other mostly by agreeing with each other, and whenever they opposed each other, they were respectful about it.

These findings are consistent with results from Paulus (2006) study, which indicated that online learners often engaged in relationship-oriented online discussions rather than an argumentation model. Paulus explained that supporters of the challenge model believed that whenever students are left on their own in online discussions, they

tend to speak in a simple exploratory manner. For instance, Duffy et al. (1998) explained that students engaged in online discussions tend to "talk past each other" (p.8). To mitigate these drifting conversations between students, they were encouraged by their instructors to be engaged in issue-based discussions with counterarguments (Duffy et al., 1998). Although argumentation was declared as an important factor to problem solving, it was believed that students often found it challenging to form sound reasoning and arguments (Tan et al., 2001). The findings in this study can also be attributed to Knowles's (1980) adult learning theory of andragogy as Birzer (2004) proposed the application of six principles of the andragogical practice, which included good physical and psychological climates that help the instructor create mutual respect and a collaborative environment to ensure learning effectiveness in the classroom.

Cross-case analysis. I compared interview responses from students and professors and the discussion threads across each of the two cases (business and technical). First, I compared the first-year business and first-year technical students, their professors, and their discussion threads in two courses. Second, I compared fourth-year business and fourth year technical students, their professors, and their discussion threads. The results helped me to answer Research Question 1 and the two subquestions for the study. I organized this subsection into two areas: (a) first-year business and technical students and (b) fourth-year business and technical students.

First-year business and technical students. Based on the results from interview data, the first-year business and technical students often participated in a dynamic manner to prompt responses from their peers. However, discussion thread data showed that

technical students displayed more active participation than business students. The first-year students' interview data showed that they were equally friendly with each other, but their discussion thread data showed that technical students interacted in a friendlier manner than business students. These findings contrast with the literature as Lumsdaine and Lumsdaine (1995) reported that technical students were often found to have creative problem-solving skills but lack teamwork and interpersonal thinking skills. The notion that technical students in my study might have displayed more sociability than business students align with Herpertz, Schütz, and Nezlek's (2016) investigation where the authors concluded that the ability to perceive other people's emotions can be improved through training.

Interview data showed that the first-year technical students often asked more inquiry-oriented questions than the first-year business students; however, discussion thread data revealed similar findings between first-year technical and business students in relation to inquiry-oriented questions. Based on both interview and discussion thread data, the first-year technical students interacted passively with each other more often than first-year business students. Byron (1YBMS), a first-year business studdent, discussed passive interaction in his interview, where he shared that he saw his peers agree with each other "a lot." He noted that his peers mostly stated, "I agree with what you're saying." Byron's (1YBMS) discussion thread posts also showed passive-oriented interaction, which does not prompt for a reply from his classmates. Byron posted, "I agree with you both on this. I know a lot of people that are either currently in the military or are veterans. My grandfather and dad were veterans." These findings are consistent with the literature

as Lee (2012) found that students read many peer's postings but selectively responded according to their interest.

The first-year technical students posted not only passive replies more often than first-year business students; they also posted more relationship-oriented responses than first-year business students. This finding can be interpreted in the context of the literature as Paulus (2006) explained that online learners often engaged in relationship-oriented online discussions rather than an argumentation model. In addition, the first-year technical students posted positively challenging responses more often than business students. During the interviews, a first-year business student spoke of negative challenge occurring in her course, whereas the two first-year technical students spoke of negative challenges occurring. However, based on discussion thread data, the first-year technical students showed no negative challenging interaction occurring in their course, whereas the first-year business class had one occurrence. These findings can also be interpreted in in the context of the literature as some students may feel comfortable with conveying antagonism in the online portion of the course because they are not in a traditional classroom setting (Ellis, 2001; Lewis et al., 1997; Sathyanarayana Rao, Bansal, & Chandran, 2018).

Fourth -year business and technical students. Results from interview data revealed that the fourth-year business and technical students frequently participated to elicit responses from their peers, but discussion thread data showed that technical students were more actively involved with each other than business students. The fourth-year business and technical students' interview data showed that they were equally

friendly with each other. However, discussion thread data showed that technical students were more courteous with each other than business students. These findings can be interpreted in the context of the literature as Lee (2012) found that students selectively responded to their classmates' post based to their interest, and Paulus (2006) explained that online learners often engaged in relationship-oriented online discussions.

Based on interview data, the fourth-year technical students often asked more inquiry-oriented questions than the fourth-year business students. However, the discussion thread data showed that the fourth-year business students asked just as many inquiry-oriented questions as do the technical students. Findings indicated that technical students participated more actively and asked more inquiry-oriented questions than business students, which suggested that technical students demonstrated a higher level of motivation and self-awareness than business students. In addition, findings suggested that business and technical students displayed the same level of social skills, which contrasts with the literature as Lumsdaine and Lumsdaine (1995) noted that business students are more skilled in EI than technical students.

Research Question 2

What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions? Findings indicated that business students enjoyed participating in the discussions and expressed that they could read each other's tone and acquired knowledge from their professors and peers. Other findings from the business case showed that students and professors found the online portion of their

blended learning discussions to be useful where they were able to interact with each other by asking questions to encourage conversations. For example, Karen (4YBFS) stated, “I enjoy it because in addition to the lessons that are learned, the discussion boards allow me to get a clearer understanding from what the professor is providing as well as the classmates’ interactions.” These finding are in line with the literature as Dooley and Wickersham (2007) reported that online courses have become popular at colleges and universities, with the discussion forum being the main tool for demonstrating critical thinking and interaction. However, few students had reservations about posting in the discussion thread, for example, Carol (1YBFS) stated, “I felt intimidated somewhat by what other people were posting.” This finding can be interpreted in the context of the literature as Carol’s feelings of intimidation might have resulted from first impression bias, where students often meet face-to-face before interacting online and may form first impression biases about each other (Lim et al., 2000).

The first-year and fourth-year business professors and students expressed that students communicated with each other mostly by agreeing with each other and whenever they disagreed, they were often civil about it. For example, Karen (4YBFS) shared that she did not see many people disagreeing, stating, “Everyone is respectful when critiquing another person’s post.” Merrick (1YBMP) explained that he encouraged students to ask more questions but pointed out “it doesn't always work.” These finding may also be attributed to Knowles’s (1980) adult learning theory of andragogy as Birzer (2004) noted that good physical and psychological climates help the instructor create mutual respect and a collaborative environment to ensure learning effectiveness in the classroom.

Moreover, Birzer explained that a psychologically conducive atmosphere helps promote trust during the first meeting. However, through triangulation of the discussion thread data, Carol (1YBFS) displayed a nonsupportive or aggressive form of interaction with her peers. This finding can be interpreted in the context of the literature as Lee (2012) noted that aggressive behavior within discussion threads may hinder the development of language skills and prevent internalized thoughts from becoming inner speech.

Results from interview data showed that the first and fourth-year business students build knowledge together equally while supportive interactions occurred within the online discussions of their blended learning classes. Results also revealed that the first and fourth-year business students equally constructed knowledge together amid positive, challenging interactions within the online discussions of their courses. This finding can be attributed to Vygotsky's (1978) social constructivism as Powell and Kalina (2009) reported that cooperative learning is an important aspect in creating a social constructivist classroom and creating a deeper understanding. In addition, Powell and Kalina emphasized that social interaction is important for the internalization of knowledge.

The technical students described the discussions as a safe place where they could express their thoughts and learn from each other and their professor through step by step instructions. For example, Cynthia (1YTFS) stated, "I think discussions is a very good place. You can express your feelings; you can express your thoughts, and a person like me who has just come from another country, so that I can improve my English." The first-year and fourth-year technical professors and students expressed that students interacted with each other mostly by agreeing with each other and whenever they

opposed each other, they were respectful about it. For example, Cynthia (1YTFS) found the discussion to be supportive in that her peers would explain to her what she was doing incorrectly. Her professor, Curry (1YTFP), stated, “So, if a student is sharing an interesting idea, other students would kind of jump in and add to that.” These findings can be interpreted in the context of the literature as social interaction is key in blended learning discussions, which helps to facilitate students’ knowledge construction in the online portion of their courses (Oseguera et al., 2012). This is because collaboration is often an essential component of any course, which ties in with the constructivism premise of peer interaction (Ali, 2013; Bakhsh, 2015; Lam, 2015; Oseguera et al., 2012; Palloff & Pratt, 2005).

On the other hand, Phillip (4YTMS) had a different perspective about the discussion threads. He shared that some of his peers would say, “I agree and just put in the information versus the ones who actually agree and put in their thoughts.” Sonia (4YTFS) pointed out that she rarely sees other students disagreeing with each other. She explained that her peers would pick the person they agree and ignore everyone else to avoid conducting further research. She said agreeing with another student’s post is easier than disagreeing because students would have to do new research to show evidence to their claims. These findings are consistent with the literature as Lee (2012) found that students read many peer’s postings but selectively responded according to their interest.

The technical students successfully constructed knowledge together by interacting with each other in a manner that reflected Gunawardena et al. (1997) five phases of knowledge construction. The first-year and fourth-year technical students displayed the

first four phases of knowledge construction. For example, in relation to Phase 1: Sharing/comparing information, a student from the fourth-year technical class completely agreed with another student's post, and then pointed the student to other online resources about the subject. This finding is consistent with Knowles's (1980) adult learning theory of andragogy as Birzer (2004) discussed creating learning environments that are student-centered and supported by teachers will inspire meaningful interactions among peers. This positive environment in turn will result in students sharing their experience, negotiating the meaning, and exchanging resources and perspectives that contribute to facilitating collective knowledge construction (Gunawardena et al., 1997; Kanuka & Anderson, 1998; Lee, 2012; Moore & Marra, 2005). In addition, Amry (2014) reported that students' ability to access learning resources anywhere, anytime, and in different formats has the potential to increase students' learning capabilities and to allow students to construct their own knowledge.

In relation to Phase 2: Discovery and exploration of dissonance, Rudolph (1YTMS) agreed with another student's post but offered counterevidence, stating, "I agree with you on the grammar, I think it is because they are using a bit of fluff to lengthen it in certain parts. They did use a good amount of detail; just some parts are kind of being repeated." Thus, Rudolph (1YTMS) agreed with is peer on one point and then shifting to another aspect, which showed that he was cordial even as he opposed his peer, thus, mitigating the negative impact his post could have had on the conversation. This finding can be interpreted in the context of the literature as understanding students' online interactions with other students and their instructors is significant because

interaction influences the quality of online learning (Hewett et al., 2019; Trentin, 2000). According to Flottemesch (2000), students tend to judge the quality of online learning based on their perceived interaction in the online course. In addition, interactions among students in online classes can help motivate them to commit to learning (Gabriel, 2004; Rovai & Barnum, 2003). Students are motivated to be a part of the interaction and to contribute to the online interaction or discussion because it helps them to work collaboratively online with their peers (Gabriel, 2004; Song & Hill, 2009).

In relation to Phase 3: Negotiation of meaning/coconstruction of knowledge, Cynthia's (1YTFS) described how students handled new information, sharing that people need to do "research on the topic," but later explained that doing research made it easy for "the person who is wrong" to "understand what is wrong." This finding can be interpreted in the context of Knowles's (1980) adult learning theory of andragogy as Birzer (2004) discussed learners being encouraged to identify resources to accomplish the learning objectives and students being self-directed and motivated to achieve the objectives.

In relation to Phase 4: Testing and modification of proposed synthesis or coconstruction of knowledge, fourth-year technical students displayed the fourth phase of knowledge construction but did not display the fifth phase. These findings suggested that over time, the technical students might become worn-out and begin seeking the easier way out while posting to their discussion threads, which might obstruct learning. In addition, results showed that a first-year technical student responded to another students' post by pulling apart the topic and then proposed his or her own ideas. In addition, in a

fourth-year technical class, student respectfully probed another student's post, suggested other material related to the topic, and then proposed new ideas. These findings may be attributed to Vygotsky's (1978) social constructivism as Powell and Kalina (2009) discussed cooperative learning, where students work individually with teachers, as well as work with each other as they have a lot to offer one another.

In relation to Phase 5: Phrasing of agreement statements and applications of newly constructed knowledge, findings for first-year technical students stood out from the other student findings. The first-year technical students were the only learners who displayed the fifth phase of knowledge construction, thus, displaying all five phases. This final phase includes convergence and summarization of participants' agreements, application of new knowledge, and statements by participants showing their understanding that they experienced critical reflection (Gunawardena et al., 1997). At Phase 5, the first-year technical students conversed with each other about how to handle "fluff." At the end of the conversation, Curry (1YTFP) confirmed that their ideas were sound and showed approval of the students' dialog, suggesting that she believed that through the process, they increased their knowledge. She also repeated some of what the students shared, which demonstrated that she saw value in their conversation. There were convergence and summarization of the students' agreements, application of new knowledge, and statements by students showing their understanding that they experienced critical reflection.

These finding can be interpreted in the context of Knowles's (1980) adult learning theory of andragogy six main assumptions, where Forrest and Peterson (2006) discussed

each assumption as follows. First is self-concept, where adult learners are self-directed, autonomous, and independent. Second is role of experience, which is a **r**epository of an adult's experience and is a rich resource for learning. Adults tend to learn by drawing from their previous experiences. Third is readiness to learn, where adults tend to be ready to learn what they believe they need to know. Forth is orientation to learning, where adults learn for immediate applications rather than for future uses. Their learning orientation is problem-centered, task-oriented, and life-focused. Fifth is internal motivation, where adults are more internally motivated than externally motivated. Sixth is need to know, where adults need to know the value of learning and why they need to learn (Chan, 2010).

Within-Case and Cross-Case Analysis to Answer Research Question 2

To perform cross-case analysis for this study, I used interview responses from students and professors and the discussion threads across each of the two cases: (a) first-year business and first-year technical students, their professors, and their discussion threads in two courses; and (b) fourth-year business and fourth-year technical students, their professors, and their discussion threads in two classes. This subsection is organized in the following areas: within-case analysis and cross-case analysis.

Within-case analysis. Based on interview data, first-year business students and fourth-year business students displayed Gunawardena et al.'s (1997) first three phases of knowledge construction. Triangulation with discussion thread data confirmed that first-year and fourth-year business students advanced through the first three phases of

knowledge construction. These results contrast with the literature where Sharif et al. (2007) reported that first-year and fourth-year students possess different levels of skills.

Based on interview data, fourth-year technical students displayed Gunawardena et al.'s (1997) first three phases of knowledge construction. However, after conducting triangulation with discussion thread data, fourth-year technical students also displayed the fourth phase of knowledge construction. Based on interview data, first-year technical students displayed the first three phases of knowledge construction. However, unlike fourth-year technical students, first-year technical students displayed all five phases of knowledge construction. These findings are consistent with Sharif et al.'s (2007) findings that who related that first-year and final-year students possess different levels of self-evaluation skills (Sharif et al., 2007). Therefore, first and final-year technical and business students' learning progression over time might affect how they communicate with each other.

Cross-case analysis. Findings indicated that business students' antagonistic behaviors decreased over time, but this behavior did not decrease for technical students. For example, Karen (4YBFS), a fourth-year business student, reported that students in her class were "respectful when critiquing another person's post." However, Carol (1YBF), a first-year business student, antagonized her peer in the discussion thread, stating, "What are you even talking about? When does America fund Iranian or Korean regimes? And why would you, as a country, want to seize assets of another country?"

These findings are consistent with the literature as Kwon and Gruzd (2017) discussed the spillover effects of offensive commenting on social media, which might

influence how students and instructors interact with each other within the online discussions such as Carol's (1YBFS) belittling her peer in the discussion threads about current political issues. In addition, findings are in line with de Laat et al. (2007) reporting, where the researchers noted that online students often developed different roles or interests over time during their collaborative assignments; thus, students' roles and interests may change over time.

In addition, findings indicated that Cynthia (1YTFS), first-year technical student, displayed posturing behaviors in the online discussions threads of her class, whereas Sonia (4YTFS), as a fourth-year technical student, admitted in her interview that she deliberately made aggressive posts close to when the discussion was about to expire. Educators should be mindful that business students' communication skills appear to improve over time, whereas technical students' communication skills might not increase as well over time. Findings may be interpreted in the context of the literature as Lumsdaine and Lumsdaine (1995) reported that students in the engineering (technical) field often lack teamwork and interpersonal thinking skills that are required in the industry. On the other hand, business students' training programs teaches components of EI: self-awareness, self-regulation, motivation, empathy, and social skills (Golemon et al., 2004). Yet, according to Herpertz et al. (2016) the skill to perceive other people's emotions can be improved through training.

Results showed that technical students showed more knowledge construction team-building skills than business students. For example, the fourth-year technical students collaborated in the discussion threads and displayed the fourth phase of

knowledge construction, whereas the fourth-year business students displayed the first three phases of knowledge construction. The first-year technical students worked intensely with each other and displayed the fifth phase of knowledge construction, whereas the first-year business students the first three phases of knowledge construction. These findings are inconsistent with the literature as Lumsdaine and Lumsdaine (1995) reported that engineering students are often found to have creative problem-solving skills, but lack teamwork and interpersonal thinking skills.

Limitations of the Study

There are a few limitations related to trustworthiness that arose from this study. The first limitation concerns the notion that the results of this study will not be easily generalized because I used a multiple case study of 12 participants (eight students and four professors). The findings from this research could be generalized to similar populations of blended learning business and technology students and their professors, who have experienced supportive and challenging patterns of interactions in the online portion of their blended learning discussion threads. However, findings may not be generalized to other populations or other states. In future studies, researchers may extend the sample size across other regions to attain a broader understanding of business and technical professors' and students' perspectives about the patterns of interaction that occur in blended learning discussions. In addition, I used the maximum variation sampling strategy, which is a subset of purposive sampling; however, researchers conducting future studies may use a different form of sampling, such as purposeful random sampling.

The second limitation concerns social desirability bias. In my dual role as researcher and visiting professor, I was mindful of potential biases and employed various measures to minimize the chance of such preconceptions occurring. Nonetheless, I considered social desirability bias where participants might have answered the interview questions in a manner that they believed would be more socially acceptable than if they were to answer truthfully. However, I have assumed that all 12 participants responded to the interview questions honestly and openly, sharing their perspectives about how they interacted with each other in the online portion of their blended learning courses.

A third limitation of this multiple case study design was the possibility of researcher bias because I am the only person responsible for all data collection and data analysis for this study. Merriam (2009) cautioned that researcher bias may occur when data appear to be contradictory to the researcher's preconceived theories that can result in a determination to exclude data. Merriam added that a single researcher may not realize that personal bias may cloud the data collection and analysis process. Therefore, I addressed the issue of potential researcher bias by describing specific strategies that I used to improve the credibility, transferability, dependability, confirmability, and intracoder reliability of this study.

I informed my participants that I would be analyzing their 8-week discussion threads. Therefore, the fourth limitation was the possibility that there were observer effects, otherwise called the Hawthorne effect (Paradis & Sutkin, 2016). Paradis and Sutkin (2016) found that the Hawthorne effect had a limited impact on their study. In addition, Goodwin et al. (2017) revealed that 74% of their participating patients and 55%

of their participating physicians reported that there was no observer effect on the interaction during their study. The researchers explained that most of the participants who noted that there was an observer effect, related that it was insignificant. Thus, I assumed that participants behaved as they usually would during 8-week sessions that had no observations.

Recommendations

Five recommendations for future research are discussed based on the results of this multiple case study. First, as noted in the limitations section, it is recommended that future researchers expand the sample population across other states to gain a clearer understanding of business and technical professors' and students' perspectives about the patterns of interaction that occur in blended learning discussions. Upon doing this, researchers will be able to use various sampling strategies such as purposeful random sampling or other forms of sampling strategies.

Second, future studies pertaining to technology students' and professors' supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions in the online portion of their blended learning discussions, could be done quantitatively or a mixed methods design could be used. This would allow the findings to be generalized to a larger population or other similar situations (Frankfort-Nachmias & Nachmias, 2008).

Third, based on the results from this study, the nature of blended in-person and online discussions at times obstruct learning. This issue arose as some students' physical

appearance and demeanor onsite came across as intimidating to their peers. Thus, through fear, the students who felt intimidated avoided responding to the intimidator's posts. Barton's (1995) found that a combination of face-to-face and online discussion rules to promote learning will not work for blended learning classes. Therefore, it is recommended that researchers explore blended learning students' and professors' perspectives on the development and use of a distinct set of discussion rules that would facilitate learning in their blended learning courses.

Fourth, currently in the education field, educational technology designers are continually creating innovative multimedia applications to support collaboration and facilitate learning (Lim et al., 2000). Lim et al. (2000) spoke of the richness of multimedia. Lim et al. found that multimedia systems presented information in vivid ways with a potential for committing information to long-term memory. However, results from my study revealed that students and professors criticized the school's newly added multimedia tool, VoiceThread. A concern that two professors raised was the notion that blended learning students already meet face-to-face, thus, the integration of a rich multimedia tool such as VoiceThread to their blended learning courses, might be an unnecessary addition. Thus, the professors believed that the use of such instruments should be optional and not mandatory. Therefore, it is recommended that researchers further explore students' and professors' perspectives about the use of multimedia tools such as VoiceThread in their blended learning courses.

Fifth, according to Herpertz et al. (2016) the skill to perceive other people's emotions can be improved through training. The ability to perceive other people's

emotion is a significant aspect of emotional intelligence (Herpertz et al., 2016). Through emotional intelligence training, individuals will become self-aware and can motivate themselves to achieve their goals. Through these training exercises, individuals can become staunch team players and effectively perform conflict resolution. Therefore, it is recommended that researchers explore training programs geared toward blended learning students' and professors' emotional intelligence improvement.

Implications

Although there is an abundance of literature on online learning, this multiple case study adds to the literature and advance knowledge by filling a gap in the education literature with respect to business and technology students' and professors' perspectives about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions. Findings from this study are beneficial not only to the education field, but to a wide array of other fields, including the fields of public policy and administration and psychology. The findings from the study are also applicable to many agencies and organizations, to include the U.S. Department of Education, the American Educational Research Association, Online Learning Consortium, and Distance Learning Associations.

At the individual level, to increase the chance that knowledge construction will take place within the online discussions of blended learning courses, professors recommended that curriculum course designers create discussion topics that are interesting and stimulating to students. Student participants shared that the nature of the discussion thread topics was a problem in that the subjects were not relevant to today's

world. In addition, one student pointed out that discussions were irrelevant for specific courses such as mathematics. Another student related that the learning platform itself might cause some students to feel as if their peers were ignoring them because the system did not send an alert to let students know whenever someone replied to their posts. In addition, at times, some posts were hidden, and most students were not aware of the "view more posts" link, which can also cause students to feel ignored and isolated from their peers.

Nash (2012) found that both students and teachers displayed bullying behaviors. At the individual level, findings showed that students discussed trolling or cyberbullying from other students or professors that might impede students' learning within the online discussions of blended learning classes. The professors suggested a need for instructor training; for example, Green (4YTFP) related that if a professor sees the need to constantly correct a student's grammar on every post, then the student will no longer post to the discussion thread. Green (4YTFP) also shared that some professors would write long-winded intellectual posts that would discourage students from posting to the discussion threads. Professors also pointed out that there is a need to address students' personal issues as well as their poor reading and writing skills.

At the organizational level, the focus on education could include curriculum designs that improve discussion thread topics that are relevant to students' majors in a concrete way. Professor training would also help mitigate the occurrence of negative, challenging forms of interactions such as trolling and cyberbullying in blended learning discussions. For example, Lee (2012) recommended that instructors encourage positive

ways of communicating to prevent lurking within the forums, where students do not make any posting. Lee also suggested that instructors should engage their students by assigning various roles such as summarizer, initiator, or opponent.

At the public policy and societal levels, it is imperative that cyberbullying problem is understood and addressed because online education is growing exponentially and student interaction within discussion threads will continue to be a requirement. In Senate Bill 600 (2012), online course is defined as a correspondence course and would not meet the criteria for funding from the federal government if online discussions are absent. Blended learning is also growing with 30% to 79% of the course content delivered online (Allen et al., 2007, p. 5) and involves online discussions. While the Supreme Court works to find a solution to the national issue of bullying, Nash (2012) recommended that each state should take a proactive approach and focus on education because at the local level, the occurrence of bullying behaviors is displayed by both students and teachers.

At the organization level, the issues and recommendations that students and professors shared have several implications for leaders in higher education such as policymakers and school administrators. School administrators and course designers should consider that separated and irrelevant discussions can occur if the link between the face-to-face and online portion of a blended learning course does not take place (Gerbic, 2010). Gerbic (2010) research showed that if learners construct their knowledge collaboratively within a blended learning discussion that is not adequately linked and integrated with the face-to-face portion of the course, then such an environment could

have significant implications of poor instructional and educational design. If administrators and course designers create a link between the face-to-face and online portion of blended learning classes, then students will see the relevance of the discussions as well as collaborate and increase their knowledge.

In relation to Gunawardena et al.'s (1997) five phases of knowledge construction, findings in this study showed that the fourth-year students' posts did not go beyond the first three phases of knowledge construction and according to one fourth-year student, her peers avoided doing additional research for their discussions and always chose the easier path. This finding may suggest that fourth-year students became burned out after years of rigorous studies in college. In general, students avoided conflicts, which is consistent with Paulus' (2006) research that online learners often engaged in relationship-oriented online discussions rather than an argumentation model. However, Tan et al. (2001) found that the argumentation discourse model was an essential factor to problem-solving and that researchers believed that students often found it challenging to form sound reasoning and arguments. Therefore, at the organizational level, curriculum development leaders at colleges should consider combining an argumentation model (Tan et al., 2001) with a relationship model (Paulus, 2006), to create discussion topics that facilitate learning and encourage students to advance through the five stages of knowledge construction.

The first-year technical students in this study displayed the fifth phase of knowledge construction, phrasing of agreement statements and applications of newly constructed meaning (Gunawardena et al., 1997). Although some blended learning students were comfortable with a relationship-oriented mode of communication, possibly

stepping out of their comfort zone by engaging in an argumentation method of communication may have allowed them to reach the fourth and fifth phases of knowledge construction. Cassidy et al. (2009) noted that students in blended learning courses often become reserved in online discussions because they worry that their posts might fail to meet the required quality or standard and that their peers will ridicule them. In line with this Cassidy et al.'s report, Phillip (4YTMS) shared that students are careful when posting to the discussions because they do not want to come across as ridiculous to their peer. Thus, at the individual level, professors should strive to create good physical and psychological climates, where they create mutual respect and a collaborative environment to ensure learning effectiveness in the classroom because a psychologically conducive atmosphere helps promote trust (Birzer, 2004). Researchers have found that a blending of both face-to-face and online environments have numerous benefits as the combination of hands-on and student-centered learning help students to actively create knowledge online and in the classroom (Bello-Haas et al., 2013; Botsford et al., 2014; McDonald et al., 2014; Poutanen et al., 2011; Rose, 2014; Veneri & Gannotti, 2014).

Findings in the study also indicated that professors believed that students lacked reading and writing skills and that some professors embarrassed students by correcting them within the discussion threads. Thus, at the organizational level, instructor training should include strategies for how to encourage conversations, community building, and how to promote higher order thinking within the online discussion threads of blended learning courses. Although this multiple case study adds to the literature and advance knowledge by filling a gap in the education literature, there are methodological

implications for this study, where researchers could use different research methods, designs, and sampling strategies to further explore how students and professors interact with each other in blended learning classes and online courses as blended learning has grown in popularity and will continue to be an integral part of education (Allen et al., 2007).

Conclusion

To better understand the various types of interactions that occur within business and technical students' online portion of their blended learning classes, it was important to obtain students' and professors' perspectives. In addition, I also obtained students' and professors' perspectives to understand how students construct their knowledge while different kinds of interactions were taking place. A specific discussion model needs to be developed for blended learning discussions to ensure that students achieve the five stages of knowledge construction within the online discussion threads. This is plausible because in higher education, there are distinct rules for face-to-face classroom discussions and rules for how students are to behave in online threaded discussions. Based on Barton's (1995) research, a mere combination of face-to-face and online discussion rules to promote learning will not work for blended learning classes. Therefore, it is imperative that researchers explore blended learning students' and professors' perspectives on the development and use of a distinct set of discussion rules that would facilitate learning in their blended learning courses.

Policymakers have made much progress over the last 8 years on antibullying and anticyberbullying efforts as White House officials, Office of Civil Rights members, U. S.

Department of Education officials, and most recently, First Lady Melania Trump, have made it a priority to tackle cyberbullying (Cyberbullying Research Center, 2017). U.S. lawmakers have responded to school bullying by creating antibullying legislation, and since 2011, these laws were enacted by 47 states, but vary widely in scope and content (Weaver et al., 2013). Results from Weaver et al.'s (2013) research showed that although officials mentioned protective factors often, overall states' antibullying language was ambiguous, thus, explicit guidelines for school officials were frequently lacking.

Students' and professors' perceptions are important as lawmakers seek to find a balance between the Supreme Court's First Amendment case law and the prevailing antibullying statutes where learners' free speech rights and controlling bullying in and out of schools is addressed (Nash, 2012). Nash (2012) suggested that while the Supreme Court works to resolve this issue, each state should take a proactive approach by focusing on education. In line with Nash's suggestion, it is recommended that educators use the results from this multiple case study to assist in proactively addressing issues surrounding supportive and challenging patterns of interactions that occur in blended learning discussions, with the goal of improving and creating positive learning environments.

Findings are directed at university school officials and administrators who can support teachers through professional development activities and policies that offer appropriate intervention skills and strategies to facilitate online class environments that serve the academic, social, and emotional needs of students. The spillover effects of offensive commenting on social media (Kwon & Gruzd, 2017) might be influencing how students and professors interact with each other within the online discussions and school

officials should seek ways to mitigate the impact. Thus, by creating good physical and psychological climates, instructors will be able to create mutual respect and a collaborative environment to ensure learning effectiveness in the classroom (Birzer, 2004). Positive environments result in students sharing their experience, negotiating the meaning, and exchanging resources and perspectives that contribute to facilitating collective knowledge construction (Gunawardena et al., 1997; Kanuka & Anderson, 1998; Lee, 2012; Moore & Marra, 2005; Park & Park, 2016).

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Appendix A: Criteria for Choosing Participants and Wait List Protocol

Participants will be chosen on a first-come first-served basis. If I receive more interest than needed for this study, I will create a "Wait List" related to templates of how I will reply to students or professors who I will not (tentatively) include in my research.

The criteria for selecting professors are: Professors who are teaching a first-year or final-year chosen technical or business blended learning course during an 8-week session at the [name of university redacted] campus. The technical courses will derive from four technical programs – Computer Information Systems, Network and Communications Management, Electronics Engineering Technology and Biomedical Engineering. The business courses will derive from four business programs: Bachelor's in Accounting, Business in Administration, Management program, and Technical Management.

The criteria for selecting students are: Students who have met the minimum discussion posts requirement in the first 2 weeks of the chosen business and technical courses. For this study, the minimum requirement is to post at least two times to the graded topics.

Wait List E-mail Templates

If I receive more interest than needed, the e-mail that I will send to volunteers that I will not include in my study will be:

Dear Volunteer,

Thank you for your interest in my study. You were not selected at this time due to high interest in my study. If the opportunity comes up that other participants are not able to complete the study, you could still be invited to participate at a later date.

Best Regards,
Ena Smith
[e-mail redacted]

The e-mail I would send back to volunteers who I select to continue in the study will be:

Dear Volunteer,

Thank you for your interest in my study. I have good news; there is an open opportunity for you to participate in my study at this time. A participant was not able to complete the study which means that there is an opening for you to take part in this important research. Therefore, I now officially invite you to participate in my study. Please let me know if you are still available to participate."

Best Regards,
Ena Smith
[e-mail redacted]

Appendix B: Invitation to Participate in the Study for Professors

Dear **Name of Professor Will Be Inserted Here**,

My name is Ena Smith and I am a doctoral student at Walden University. I am comparing first-year and final-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions at [university name and location redacted]. Invitation to participate in this study will be sent out by [Redacted] University on my behalf; however, this study is not sponsored by [Redacted] University. Note that if you choose to participate in the study, you can withdraw at any time without penalty.

I would greatly appreciate your participation. This would involve completing the following:

1. Coordinate with [university is redacted] Academic Dean, [name of school redacted] IRB, and I to obtaining participating students' discussion threads. All names will be removed and replaced with unique identification numbers.
2. Take part in an in-depth face-to-face semistructured interview, which will take approximately 45 minutes. Interviews will be audio-taped and will take place in a private meeting room at [name of university redacted] University's library at a time that is convenient for you.
3. You will take part in a transcription review process to verify the accuracy of the interview transcript, which will be arranged at a later date after the interview has been completed and the interview has been transcribed. You will provide your feedback about the accuracy of the transcript in a private meeting at the research site, which will take approximately 15 minutes.

Participants in this study will be offered a granola bar or similar snack at the interviews to show my appreciation. The information from interviews and discussion threads will be kept strictly confidential and no one who participates will be identified in any of the study's report that I prepare.

If you have any questions about the study, please feel free to e-mail me at [e-mail redacted] or give me a call at [telephone number redacted].
If you are interested in participating in the study, please go to the following link and complete the questions. [link redacted]

Thank you in advance for your consideration and assistance with my research project.

Sincerely,
Ena P Smith

Appendix C: Invitation to Participate in the Study for Students

Dear **Name of Student Will Be Inserted Here**,

My name is Ena Smith, and I am a doctoral student at Walden University. I am comparing first-year and final-year business and technology students' and professors' perspectives about supportive and challenging patterns of interactions, and how patterns and stages of knowledge construction occur for students experiencing different classroom interactions at [university name and location redacted]. Invitation to participate in this study will be sent out by [Redacted] University on my behalf; however, this study is not sponsored by [Redacted] University. Note that if you choose to participate in the study, you can withdraw at any time without penalty.

I would greatly appreciate your participation.

This would involve completing the following:

1. Take part in a semistructured interview and permission to use your discussion threads. To protect participants and non-participants, all names will be removed and replaced with unique identification numbers.
2. You will take part in an in-depth face-to-face semistructured interview, which will take approximately 45 minutes. Interviews will take place in a private meeting room at [Redacted] University's library and will be conducted at a time that is convenient for the participant.
3. You will take part in a transcription review process to verify the accuracy of the interview transcript, which will be arranged at a later date after the interview has been completed and the interview has been transcribed. You will provide your feedback about the accuracy of the transcript in a private meeting at the research site, which will take approximately 15 minutes.

Participants in this study will be offered a granola bar or similar snack at the interviews to show my appreciation. The information from interviews and discussion threads will be kept strictly confidential and no one who participates will be identified in any of the study's report that I prepare. If you have any questions about the study, please feel free to e-mail the campus representative who contacted you about my study.

If you are interested in participating in the study, please go to the following link and complete the questions: [link redacted]

Thank you in advance for your consideration and assistance with my research project.

Sincerely,
Ena P. Smith

Appendix D: Interview Guide for Students

Date:
Interview time:
Place:
Interviewee's name:
Course:
Gender:

Introduction

1. Welcome participant and introduce myself.
2. Give participant a granola bar or similar snack to show my appreciation.
3. Explain the general purpose of the interview and why the participant was chosen.
4. Discuss the purpose and process of interview.
5. Explain the presence and purpose of the recording equipment.
6. Outline general ground rules and interview guidelines such as being prepared for the interviewer to interrupt to assure that all the topics can be covered.
7. Review break schedule and where the restrooms are located.
8. Address the assurance of confidentiality.
9. Inform the participant that information discussed is going to be analyzed as a whole and participant's name will not be used in any analysis of the interview.

Discussion Purpose

The purpose of this study is to explore your experiences in business and technology classes.

Discussion Guidelines

As the interviewer, I will give participant the consent form and review it with him or her. I will explain to participant while reviewing the consent from that if he or she does not understand a question, to let me know. I will reassure the participant that I will keep his or her identity, participation, and remarks private, and explain that the session will be tape-recorded because I do not want to miss any comments.

General Instructions

When responding to questions that will be asked of you in the interview, please exclude all identifying information, such as your name and names of students, professors, and other parties; and the name of the school where the event occurred. Your identity will be kept confidential, and any information that will permit identification will be removed from the analysis.

Possible Probes

- Could you elaborate more on that?
- That was helpful, but could you provide more detail?
- Your example was helpful, but can you give me another example to help me understand further?
- Why do you think that happened?
- What does that really look like?

- When do you see that happening?
- How did that make you feel?
- How did he (or she) make you feel?
- If you could relive that moment, what would you do differently?
- That's interesting. Can you tell me more about that?
- Have you noticed anything that's changing?
- Can you tell me anything about this that stood out to you?
- Did everyone seem to have the same reaction to this?
- Let me make sure that I have this right, can you help me understand this better?
- What do you think might be a solution to these problems?
- Example?

Interview Questions

1. Tell me about your experience in blended learning discussions? What supportive interactions have occurred in the online portion of your blended learning discussions with other students? **If a probe is needed:** Example, agreeing with earlier statements, expressing appreciation, or acknowledging what others have said.
2. What supportive interactions have occurred in the online portion of your blended learning discussions with your instructor? **If a probe is needed:** Example, agreeing with earlier statements or expressing appreciation.
3. When there are supportive interactions with other students or your instructor, how do you increase your knowledge within the online discussions of your course? **If probing is needed to describe supportive interactions:** Example, agreeing with earlier statements, expressing appreciation, or acknowledging what others have said.
4. What challenging or nonsupportive interactions have occurred in the online portion of your blended learning discussions with other students? **If a probe is needed:** Example, disagreeing openly with peers' statements or constantly offering counterevidence.
5. What challenging or nonsupportive interactions have occurred in the online portion of your blended learning discussions with your instructor? **If a probe is needed:** Example, disagreeing openly with your instructor's statements.
6. When there are challenging or nonsupportive interactions with other students or your instructor, how do you increase your knowledge within the online discussions of your course? **If a probe is needed to describe challenging interactions:** Example, disagreeing openly with peers' statements or constantly offering counterevidence.
7. How do students make sense of new information and other students' viewpoints that they disagree with?
8. What are your thoughts about whether gender has an impact on how people communicate in online discussions? Have you had any experience where your

gender had an impact on how you or other people communicate in online discussions?

9. Can you think of any issue that might interfere with students' learning within the discussion area?
10. What are your thoughts about the new VoiceThread app being included as an interactive tool in the online discussions at the school?
11. In many courses, students are required to record their VoiceThread to the VoiceThread area and then share the link to the online discussions for further interactions. Have you personally used VoiceThread as part of your online discussion? If yes, describe your first experience using the VoiceThread application? If you have not used VoiceThread yet, explain why not?
12. In general, what impact do you feel VoiceThread have on how people communicate in the online discussions?
13. What do you like best about VoiceThread as a communication tool and what do you like least about it?
14. What are your thoughts about whether VoiceThreads have an impact on how people learn in the online discussions?
15. How would you feel if the school eventually make VoiceThread the only form of communication in online discussions?
16. What do you think learning would be like if the online discussion consisted only of VoiceThread posts?
17. Please describe any aggressive behaviors that may have occurred within the online discussions of your course?

    If any aggressive behaviors occurred, follow-up questions:

    a. What do you think may have caused the aggressive behavior?
    b. How did the aggressive behavior affect your knowledge construction or learning?
18. Thank you so much, your responses have been very helpful. Before I end this interview, is there anything else you would like to add?

Conclusion

Discuss the transcription review process with the participant, ask and answer any questions, and thank the participant for his or her time. Participants will take part in a transcription review process to ensure that what was said was complete and totally clarified, which will be arranged at a later date after the interview has been completed and the interview has been transcribed. Participants will provide your feedback about the accuracy of the transcript in a private meeting at the research site, which will take approximately 15 minutes.

Appendix E: Interview Guide for Professors

Date:
Interview time:
Place:
Interviewee's name:
Course:
Gender:

Introduction

1. Welcome participant and introduce myself.
2. Give participant a granola bar or similar snack to show my appreciation.
3. Explain the general purpose of the interview and why the participant was chosen.
4. Discuss the purpose and process of interview.
5. Explain the presence and purpose of the recording equipment.
6. Outline general ground rules and interview guidelines such as being prepared for the interviewer to interrupt to assure that all the topics can be covered.
7. Review break schedule and where the restrooms are located.
8. Address the assurance of confidentiality.
9. Inform the participant that information discussed is going to be analyzed as a whole and participant's name will not be used in any analysis of the interview.

Discussion Purpose

The purpose of this study is to explore your experiences in business and technology classes.

Discussion Guidelines

As the interviewer, I will give participant the consent form and review it with him or her. I will explain to participant while reviewing the consent from that if he or she does not understand a question, to let me know. I will reassure the participant that I will keep his or her identity, participation, and remarks private, and explain that the session will be tape-recorded because I do not want to miss any comments.

General Instructions

When responding to questions that will be asked of you in the interview, please exclude all identifying information, such as your name and names of students, professors, and other parties; and the name of the school where the event occurred. Your identity will be kept confidential, and any information that will permit identification will be removed from the analysis.

Possible Probes

- Could you elaborate more on that?
- That was helpful, but could you provide more detail?
- Your example was helpful, but can you give me another example to help me understand further?
- Why do you think that happened?
- What does that really look like?

- When do you see that happening?
- How did that make you feel?
- How did he (or she) make you feel?
- If you could relive that moment, what would you do differently?
- That's interesting. Can you tell me more about that?
- Have you noticed anything that's changing?
- Can you tell me anything about this that stood out to you?
- Did everyone seem to have the same reaction to this?
- Let me make sure that I have this right, can you help me understand this better?
- What do you think might be a solution to these problems?
- Example?

Interview Questions

1. Tell me about your experience in blended learning discussions? What supportive interactions have occurred among students in the online portion of the blended learning discussions? **If a probe is needed:** Example, students agreeing with earlier statements, expressing appreciation, or acknowledging what others have said.
2. What supportive interactions have occurred among you and students in the online portion of your blended learning discussions? **If a probe is needed:** Example, agreeing with earlier statements or expressing appreciation.
3. When there is supportive interactions among students or with the instructor, how do students increase their knowledge within the online discussions of the course? **If probing is needed to describe supportive interactions:** Example, agreeing with earlier statements, expressing appreciation, or acknowledging what others have said.
4. What challenging or nonsupportive interactions have occurred among students in the online portion of the blended learning discussions? **If a probe is needed:** Example, students disagreeing openly with their peers' statements or constantly offering counterevidence.
5. What challenging or nonsupportive interactions have occurred among professors and students in the online portion of blended learning discussions? **If a probe is needed:** Example, disagreeing openly with the instructor's statements.
6. When there are challenging or nonsupportive interactions among students or with the instructor, how do students increase their knowledge within the online discussions of the course? **If a probe is needed to describe challenging interactions:** Example, disagreeing openly with peers' statements or constantly offering counterevidence.
7. How do students make sense of new information and other students' viewpoints that they disagree with?
8. What are your thoughts about whether gender has an impact on how students and instructors communicate in the online discussions? Have you had any experience

where your gender had an impact on how you or other people communicate in online discussions?

9. Can you think of any issue that might interfere with students' learning within the discussion area?
10. What are your thoughts about the new VoiceThread app being included as an interactive tool in the online discussions at the school?
11. In many courses, students are required to record their VoiceThread to the VoiceThread area and then share the link to the online discussions. Have you personally used VoiceThread as part of your online discussion? If yes, describe your first experience using the VoiceThread application? If you have not used VoiceThread yet, explain why not?
12. In general, what impact do you feel VoiceThreads have on how people communicate in the online discussions?
13. What do you like best about Voicethreads and what do like least about it?
14. What are your thoughts about whether VoiceThreads have an impact on how people learn in the online discussions?
15. How would you feel if the school eventually make VoiceThread the only form of communication in online discussions?
16. What do you think learning would be like if the online discussion consisted only of VoiceThread posts?
17. Please describe any aggressive behaviors that may have occurred?
    If any aggressive behaviors occurred, follow-up questions:
    a. What do you think may have caused the aggressive behavior?
    b. How did the aggressive behavior affect students' knowledge construction or learning?
18. Thank you so much, your responses have been very helpful. Before I end this interview, is there anything else you would like to add?

Conclusion

Discuss the transcription review process with the participant, ask and answer any questions, and thank the participant for his or her time. Participants will take part in a transcription review process to ensure that what was said was complete and totally clarified, which will be arranged at a later date after the interview has been completed and the interview has been transcribed. Participants will provide your feedback about the accuracy of the transcript in a private meeting at the research site, which will take approximately 15 minutes.

Appendix F: Student Interview Questions Alignment with Research Questions

Interview questions	Research Questions
1. Tell me about your experience in blended learning discussions? What supportive interactions have occurred in the online portion of your blended learning discussions with other students? If a probe is needed: Example, agreeing with earlier statements, expressing appreciation, or acknowledging what others have said.	RQ1: What are first- and final-year students' supportive and challenging patterns of interactions that occur in the online portion of blended learning discussions?
2. What supportive interactions have occurred in the online portion of your blended learning discussions with your instructor? If a probe is needed: Example, agreeing with earlier statements or expressing appreciation?	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?
3. When there are supportive interactions with other students or your instructor, how do you increase your knowledge within the online discussions of your course? If probing is needed to describe supportive interactions: Example, agreeing with earlier statements, expressing appreciation, or acknowledging what others have said?	RQ2: What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions?
4. What challenging or nonsupportive interactions have occurred in the online portion of your blended learning discussions with other students? If a probe is needed: Example, disagreeing openly with peers' statements or constantly offering counterevidence?	RQ1: What are first- and final-year students' supportive and challenging patterns of interactions that occur in the online portion of blended learning discussions?
5. What challenging or nonsupportive interactions have occurred in the online portion of your blended learning discussions with your	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors

instructor? If a probe is needed: Example, disagreeing openly with your instructor's statements.	in the online portion of technical and business blended learning discussions?
6. When there are challenging or nonsupportive interactions with other students or your instructor, how do you increase your knowledge within the online discussions of your course? If a probe is needed to describe challenging interactions: Example, disagreeing openly with peers' statements or constantly offering counterevidence	RQ2: What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions?
7. How do students make sense of new information and other students' viewpoints that they disagree with?	RQ2: What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions?
8. What are your thoughts about whether gender has an impact on how people communicate in online discussions?	RQ1: What are first- and final-year students' supportive and challenging patterns of interactions that occur in the online portion of blended learning discussions? RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?
9. Can you think of any issue that might interfere with students' learning within the discussion area?	RQ2: What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions?
10. What are your thoughts about the new VoiceThread app being included as an interactive tool in the online discussions at the school?	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?

11. In many courses, students are required to record their VoiceThread to the VoiceThread area and then share the link to the online discussions for further interactions. Have you personally used VoiceThread as part of your online discussion? If yes, describe your first experience using the VoiceThread application? If you have not used VoiceThread yet, explain why not?	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?
12. In general, what impact do you feel VoiceThreads have on how people communicate in the online discussions?	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?
13. What do you like best about Voicethread as a communication tool and what do like least about it?	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?
14. What are your thoughts about whether VoiceThreads have an impact on how people learn in the online discussions?	RQ2: What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions?
15. How would you feel if the school eventually make VoiceThread the only form of communication in online discussions?	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?
16. What do you think learning would be like if the online discussion consisted only of VoiceThread posts?	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions? RQ2: What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom

	interactions in the online portion of technical and business blended learning discussions?
17. Please describe any aggressive behaviors that may have occurred within the online discussions of your course? If any aggressive behaviors occurred, follow-up questions: c. What do you think may have caused the aggressive behavior? d. How did the aggressive behavior affect your knowledge construction or learning?	RQ2: What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions?
18. Thank you so much, your responses have been very helpful. Before I end this interview, is there anything else you would like to add?	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?

Appendix G: Professor Interview Questions Alignment with Research Questions

Interview questions	Research Questions
1. Tell me about your experience in blended learning discussions? What supportive interactions have occurred among students in the online portion of the blended learning discussions? If a probe is needed: Example, students agreeing with earlier statements, expressing appreciation, or acknowledging what others have said?	RQ1: What are first- and final-year students' supportive and challenging patterns of interactions that occur in the online portion of blended learning discussions?
2. What supportive interactions have occurred among you and students in the online portion of your blended learning discussions? If a probe is needed: Example, agreeing with earlier statements or expressing appreciation?	RQ1.1: What are professors' perceptions of first and final-year students' interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?
3. When there is supportive interactions among students or with the instructor, how do students increase their knowledge within the online discussions of the course? If probing is needed to describe supportive interactions: Example, agreeing with earlier statements, expressing appreciation, or acknowledging what others have said?	RQ2: What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions?
4. What challenging or nonsupportive interactions have occurred among students in the online portion of the blended learning discussions? If a probe is needed: Example, students disagreeing openly with their peers' statements or constantly offering counterevidence?	RQ1: What are first- and final-year students' supportive and challenging patterns of interactions that occur in the online portion of blended learning discussions?
5. What challenging or nonsupportive interactions have occurred among professors and students in the online portion of blended learning	RQ1.1: What are professors' perceptions of first and final-year students' interactions with other students and with their instructors in the online portion of

discussions? If a probe is needed: Example, disagreeing openly with the instructor's statements?	technical and business blended learning discussions?
6. When there are challenging or nonsupportive interactions among students or with the instructor, how do students increase their knowledge within the online discussions of the course? If a probe is needed to describe challenging interactions: Example, disagreeing openly with peers' statements or constantly offering counterevidence?	RQ2: What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions?
7. How do students make sense of new information and other students' viewpoints that they disagree with?	RQ2: What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions?
8. What are your thoughts about whether gender has an impact on how students and instructors communicate in the online discussions?	RQ1: What are first- and final-year students' supportive and challenging patterns of interactions that occur in the online portion of blended learning discussions? RQ1.1: What are professors' perceptions of first- and final-year students' interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?
9. Can you think of any issue that might interfere with students' learning within the discussion area?	RQ2: What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions?
10. What are your thoughts about the new VoiceThread app being included as an interactive tool in	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors

the online discussions at the school?	in the online portion of technical and business blended learning discussions?
11. In many courses, students are required to record their VoiceThread to the VoiceThread area and then share the link to the online discussions for further interactions. Have you personally used VoiceThread as part of your online discussion? If yes, describe your first experience using the VoiceThread application? If you have not used VoiceThread yet, explain why not?	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?
12. In general, what impact do you feel VoiceThreads have on how people communicate in the online discussions?	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?
13. What do you like best about Voicethread as a communication tool and what do like least about it?	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?
14. What are your thoughts about whether VoiceThreads have an impact on how people learn in the online discussions?	RQ2: What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions?
15. How would you feel if the school eventually make VoiceThread the only form of communication in online discussions?	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?
16. What do you think learning would be like if the online discussion consisted only of VoiceThread posts?	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions? RQ2: What patterns and stages of knowledge construction occur when first-

	year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions?
17. Please describe any aggressive behaviors that may have occurred? If any aggressive behaviors occurred, follow-up questions: c. What do you think may have caused the aggressive behavior? d. How did the aggressive behavior affect students' knowledge construction or learning?	RQ2: What patterns and stages of knowledge construction occur when first-year and final-year students are experiencing different classroom interactions in the online portion of technical and business blended learning discussions?
18. Thank you so much, your responses have been very helpful. Before I end this interview, is there anything else you would like to add?	RQ1.2: What are first- and final-year students' perceptions of interactions with other students and with their instructors in the online portion of technical and business blended learning discussions?

Appendix H: Categories for Discussion Threads to Answer Research Questions

Categories for Discussion Threads	Research Question 1	Research Question 2	Related Studies
Argumentative-oriented responses	Yes	N/A	(Fauske & Wade, 2004)
Relationship-oriented responses	Yes	N/A	(Fauske & Wade, 2004)
Affable-oriented responses	Yes	N/A	(Fauske & Wade, 2004)
Inquiry-oriented responses	Yes	N/A	(Fauske & Wade, 2004)
Active participation or passive participation	Yes	N/A	(de Laat et al., 2007).
Phase 1: Sharing/ comparing information	N/A	Yes	Gunawardena et al., 1997)
Phase 2: Discovery and exploration of conflicts or mitigating disagreement	N/A	Yes	(Gunawardena et al., 1997; Paulus, 2006)
Phase 3: Negotiation of meaning/ coconstruction of knowledge	N/A	Yes	Gunawardena et al., 1997)
Phase 4: Testing and modification of proposed synthesis or coconstruction	N/A	Yes	Gunawardena et al., 1997)
Phase 5: Phrasing of agreement statements and applications of newly constructed meaning	N/A	Yes	Gunawardena et al., 1997)

Appendix I: Categories to Capture Data Related to Research Question 1

	Argumentative-oriented responses	Relationship-oriented responses	Affable-oriented responses	Inquiry-oriented responses	Active participation or passive participation
Course 1 Female Student					
Course 1 Male Student					
Course 1 Professor					
Course 2 Female Student					
Course 2 Male Student					
Course 2 Professor					
Course 3 Female Student					
Course 3 Male Student					
Course 3 Professor					
Course 4 Female Student					
Course 4 Male Student					
Course 4 Professor					

Appendix J: Categories to Capture Data Related to Research Question 2

	Phase 1: Sharing/ comparing information	Phase 2: Discovery and exploration of conflicts or mitigating disagreement	Phase 3: Negotiation of meaning/ coconstruction of knowledge	Phase 4: Testing and modification of proposed synthesis or coconstruction	Phase 5: Phrasing of agreement statements and applications of newly constructed meaning
Course 1 Female Student					
Course 1 Male Student					
Course 1 Professor					
Course 2 Female Student					
Course 2 Male Student					
Course 2 Professor					
Course 3 Female Student					
Course 3 Male Student					
Course 3 Professor					
Course 4 Female Student					
Course 4 Male Student					
Course 4 Professor					