

The Influence of Virtual Community Participation
on Transactional Distance in an Online Computer Science Course

by

Lynne Anderson

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Graduate Supervisory Committee:

Craig Mertler, Chair
Ted Cross
Jacob Adams

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This dissertation is dedicated to my mom and best friend, Bobbie Fabish, who died unexpectedly in June. My mom was always learning and sharing her knowledge with others. She took a college course each semester for over twenty years, and finally, at the age of 60, graduated with a bachelor's degree in business administration from the University of Louisville. She has been a wonderful example to me of determination and faith. And though I miss her terribly, I feel her encouragement and support even from the other side of the veil.

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CHAPTER 1

INTRODUCTION AND PURPOSE

On February 7, 2017, The Church of Jesus Christ of Latter-day Saints announced the creation of a new online institution, BYU-Pathway Worldwide (BYU-PW) (BYU-Pathway Worldwide, 2017a). This new organization would be responsible for serving and supporting PathwayConnect and Brigham Young University-Idaho (BYU-I) students enrolled in online programs and would focus on the unique needs and challenges of PathwayConnect and BYU-I online students in ways that have not been utilized in the past.

Soon after the announcement, I became Dean of Students for the new organization. My title has since changed to Director of Student Affairs. Two of my new responsibilities are to “holistically assess and improve the quality of the BYU-Pathway student experience” and to “evaluate, create, test, and maintain current and future virtual student communities” (BYU-Pathway Worldwide, 2017b). Additionally, I need to find a way to better support students who transition from PathwayConnect to the BYU-I online program and help them be more successful in achieving their goals of earning a degree.

Larger Context

Online education has been growing rapidly over the past ten years. In the United States (US), over 2.8 million students took all their higher education courses online in the fall of 2014 (Allen, Seaman, Poulin, & Straut, 2016). According to Allen et al. (2016), this figure represents 14% of all higher education students in the US and represents an increase of 12.5% over the previous year. The number of students learning exclusively

online represents a growing proportion of the overall higher education student population. Between 2012 and 2014, the non-profit online student population grew by 26%, which is remarkable given that overall enrollments in higher education decreased by 431,631 students over that same two-year period (Allen et al., 2016).

Many higher education institutions have observed more students enrolling internationally, and the percentage of institutions creating programs with international students in mind grew from 25% in 2016 to 29% in 2017 (“Annual trends in online education,” 2018). There were seven US-based institutions, as of 2016, that enrolled more than a thousand international online students, but “only one—Brigham Young University-Idaho—[had] an international enrollment of more than 5,000” (“The continuing expansion of online learning in the US,” 2018, para. 10).

Online programs offer convenience, flexibility, variety, and a way for students to live at home, provide for their families, and remain employed while earning a degree. Though the disruptive innovation of online learning has become increasingly competitive through improved technologies and outcome-based curriculum (Christensen & Eyring, 2011), successfully completing asynchronous online programs has proven rather challenging for many students. Student persistence and the ability to balance academics in college can be daunting for any student (American College Testing, 2017), but seems especially difficult for those enrolled in online programs (Rovai, 2003).

The separation that exists between instructors and students, between students and content, and between students and other students in online courses can be significant and often varies (Moore, 1997; Zhang, 2003). Moore (1989, 1997) called this separation,

transactional distance, and described three variables that exist when space and time separates learners from instructors: (a) dialogue/interaction, (b) structure, and (c) learner autonomy/control. He found that as transactional distance increased, so did the need for increased student dialogue and interaction (Moore, 1989, 1997).

Local Context

BYU-I is a private, nonprofit, four-year institution, which has experienced phenomenal growth and change since it transitioned from a two-year institution over fifteen years ago. Every semester, BYU-I has an increasing number of students enrolled exclusively in online courses. Much of this growth is a result of the PathwayConnect program. PathwayConnect is a one-year, mixed-mode college preparation program designed to help members of the Church of Jesus Christ of Latter-day Saints gain confidence and basic skills as they work toward improving their quality of life (BYU-Pathway Worldwide, 2017a). PathwayConnect students meet once a week on Thursday evenings at their local church building and take one online course and either a face-to-face or online religion course for three consecutive semesters. In addition to religion, the courses include life skills, basic mathematics, and elementary English. There are two versions of PathwayConnect, one for native and one for non-native English speakers.

Over 2,473 volunteer service missionaries facilitate PathwayConnect programs at 458 different sites around the world. Since the beginning of the PathwayConnect program, over 72,800 students have taken courses in 77 countries, and this semester there are over 15,000 students enrolled in PathwayConnect (PathwayConnect, 2017). After

completing one year of coursework with a “B” average or better, students have the opportunity to matriculate and take BYU-I online courses (PathwayConnect, 2017).

BYU-I offers approximately 320 online courses, 21 online certificates, seven online associate degrees, and 12 online bachelor’s degrees (Brigham Young University-Idaho, 2017a). The certificates and degrees are stackable as illustrated in Figure 1, so that students can “gain skills and improve employability at each step along their educational journey” (Brigham Young University-Idaho, 2017a).



Figure 1. Stackable Certificate and Degree Programs. Reprinted from Brigham Young University-Idaho (2017).

The transition from a cohort-based, missionary-supported, mixed-mode environment to an online-only model is difficult for many students who successfully graduated from the PathwayConnect program. PathwayConnect students have remarkable support from service missionaries, online instructors, and each other. They are excited to complete PathwayConnect and move on to BYU-I online courses, but often feel less supported when they do so. BYU-I online graduates account for only a fraction of the PathwayConnect graduates. To date, 29,211 students have graduated from PathwayConnect, and there are 11,850 PathwayConnect graduates currently enrolled in

BYU-I online programs, but only 804 have earned a bachelor's degree, 1029 have earned an associate degree, and 576 have earned a certificate (PathwayConnect, 2017).

Most PathwayConnect and BYU-I online students are nontraditional. Nontraditional students are those that delay their enrollment into postsecondary education, attend only part-time, are financially independent, work full-time while enrolled, have dependents other than a spouse, are a single parent, or did not obtain a standard high school diploma (Horn, 2997). The average age of PathwayConnect students is 31 years old and the average age of BYU-I online students is 38 years old (Brigham Young University-Idaho, 2017b; PathwayConnect, 2017). PathwayConnect students take an average of 4.2 credits each semester and BYU-I online students take 5.9 credits each semester (Brigham Young University-Idaho, 2017b; PathwayConnect, 2017). Most BYU-I online students work full-time and have family responsibilities. PathwayConnect and BYU-I online students are increasingly non-native English speakers. Spring 2017 semester, about 34% of PathwayConnect, and over 14% of BYU-I online students lived outside of the United States and Canada (Brigham Young University-Idaho, 2017b; PathwayConnect, 2017).

All PathwayConnect and BYU-I online courses have an integrated curriculum, a cohort-based and semester-based structure, and a trained remote online instructor who facilitates the course for each student. Remote online instructors work approximately ten hours per week for a 3-credit course. All PathwayConnect and BYU-I online courses are co-designed by a curriculum designer and a full-time campus faculty member, who is called a “course leader.” Course leaders provide the discipline expertise for the course

and have oversight for outcomes, content, and assessments. They are ultimately responsible for curriculum decisions and changes to their courses. Course curriculum is the same across all online sections, though an instructor might facilitate the course differently.

PathwayConnect and BYU-I online courses contain fourteen week-long asynchronous modules and utilize the BYU-I Learning Model, which includes (a) student preparation, (b) teaching one another, and (c) ponder and prove activities or assessments (Brigham Young University-Idaho, 2015). Using the Learning Model, online students are encouraged and often required to utilize the discussion board feature of the learning management system. Relating to and connecting with course materials, instructors, peers, and support personnel exclusively through the Internet creates a high transactional distance that can negatively influence student participation (Moore, 1997; Zhang, 2003).

While PathwayConnect students who gather at the same location may be enrolled in a different course section, they take the same course as the rest of the cohort and often receive additional support from missionaries and peers during the gatherings each Thursday evening. However, once PathwayConnect students matriculate into the BYU-I online program, they are no longer members of their PathwayConnect cohort and their classes vary depending on their field of study. BYU-I online students no longer formally meet together physically, which severs the support network they built previously. Some students find ways to register for the same course sections with members of their PathwayConnect cohort, but most enroll in different courses and therefore have a different group of peers with every course they take.

BYU-I provides campus tutors for most of their online courses but setting up a tutoring appointment can be challenging if not impossible, especially in the late evening or early morning hours when many online students complete their homework. The BYU-I online organization is currently testing ways to provide on-demand tutoring to online students within the courses themselves. While this is an important step in providing students with additional academic support, it is unlikely this will address many of the just-in-time concerns of students (i.e. sense of isolation, etc.)

Like BYU-I campus students, each matriculated online student is assigned to work with a campus faculty mentor. The faculty mentor is a member of the student's college and helps the student to accomplish academic and career goals through networking and internships, as well as job and graduate school preparation. However, most online students have never interacted with their faculty member. An associate dean recently reported that some members of his college had over 500 mentees. His college is similar to others that have a large online student population. The number of full-time faculty at BYU-I has not kept up with the increase in online students. When asked how his faculty members cope with so many students, he stated that they only work with those students who contact them directly and do little if any outreach to online students.

Since the announcement of BYU-PW, the advising/mentoring team has changed their direction and now concentrate primarily on first-semester PathwayConnect students. This focus has reduced the number of advisors working with transitioning PathwayConnect and BYU-I online students. Campus peer advisors previously assigned to work with new incoming online students no longer work with them and only focus on

incoming campus students. Eventually, advising and mentoring will become more automated for online students but for now, this seems to be a gap in the services provided.

A systematic way for online students, peer advisors, and faculty mentors to engage in dialogue across courses and sections does not exist. Likewise, online students often do not have the same access to homework labs and department help centers in their courses. Not only is there less support given to online-only students, but there is also more expected of them in the matriculated BYU-I online program than there was in their previous PathwayConnect experience. Higher expectations coupled with a lower level of support may be contributing to a higher attrition rate among these students.

Intervention and Purpose of the Study

The purpose of this action research study was to measure the transactional distance of students who graduated from the PathwayConnect program and are currently enrolled in BYU-I online courses. Using data and results that I generated in previous cycles of my research, institutional data, a literature review, virtual observations, and online student surveys, I developed and moderated an online virtual community designed to lessen transactional distance using a sequential exploratory mixed-methods research design. The virtual community provided occasions for students and instructional team members to share their considerable life experiences and support each other academically and socially. The virtual community was designed to enable students to give and receive frequent feedback (Tinto, 2012), increase autonomy and their sense of belonging (Moore,

1997), and provide additional opportunities for them to learn from each other (Gorski, 2004). This action research study addressed the following research questions:

1. How and to what extent will participation in a virtual community influence the transactional distance between students and course content?
2. How and to what extent will participation in a virtual community influence the transactional distance between students and their instructors/teaching assistants?
3. How and to what extent will participation in a virtual community influence the transactional distance between students and other students in the same courses?

Summary

The number of college students enrolled in online courses and programs is increasing, and there are similar trends among students at BYU-I. However, some students who transition from the PathwayConnect college preparation program to BYU-I online courses seem to struggle and many drop out soon after they begin. Why these students do not persist is unclear. As part of the new BYU-PW organization, this study will help to learn more about these students and to develop an online virtual community intervention aimed at better supporting students and reducing transactional distance, thus enhancing opportunities for students to experience success.

CHAPTER 2

THEORETICAL PERSPECTIVE AND RESEARCH LITERATURE

The previous chapter addressed the need to reduce transactional distance, thus encouraging online students to engage more fully with the course material, their online instructors, and fellow students. This chapter includes a theoretical framework, a review of current literature that will guide this action research project, a report from previous cycles of my research, and related background information.

Sociocultural Theory

Vygotsky's sociocultural theory (1962) built upon the idea that learners create or construct personal meaning through their interaction with others. Learners construct meaning for themselves by using existing knowledge to interpret new ideas, and they construct active learning within communities. Vygotsky theorized that culture was the primary determining factor for knowledge construction and that learning could not be separated from its social context. He believed that social environments deeply influenced the learning process and were constantly changing, resulting in new opportunities for learning (John-Steiner & Mahn, 1996).

When learning something new, students learn to rely on the expertise of others and gradually take more responsibility for their learning through participation (Lave & Wenger, 1991). This co-construction of knowledge becomes internalized over time as learners practice and continue to construct their knowledge in social contexts (John-Steiner & Mahn, 1996). Zhu (2012) found that online learning systems enriched collaborative learning activities for knowledge construction through group interaction.

He also noted that learning with peers enhanced perceived satisfaction, as well as overall student performance. Conversely, Adams (2013) found that international students were often frustrated connecting with their peers and tended to focus more on task completion rather than community building.

Vygotsky (1978) identified the distance that exists between the learner's current ability and what they can do with the assistance of others (see Figure 2) as the zone of proximal development. For students to learn, they should be given meaningful activities that involve concepts and ideas that are just beyond their ability to solve on their own. Borthick, Jones, and Wakai (2003) discovered that designing learning experiences within learners' zones of proximal development increased students' capacities to "characterize relevant information, find required information, manipulate relationships, shift between problem representations, and make inferences" (p. 126). Learning was maximized when the instruction was targeted at a learner's zone of proximal development through guidance and collaboration with experts or peers that were more experienced.

The greatest knowledge development occurred when learners were cooperatively interacting with others within their environment. It was this dialogic teaching of one another—both teacher-to-student and student-to-student—that transformed thinking. Dialogue is a way for members of a community to develop and share knowledge among themselves, as well as a way to structure the process and content of individual thought and felt that a close relationship existed between these entities (Vygotsky 1962, 1978).

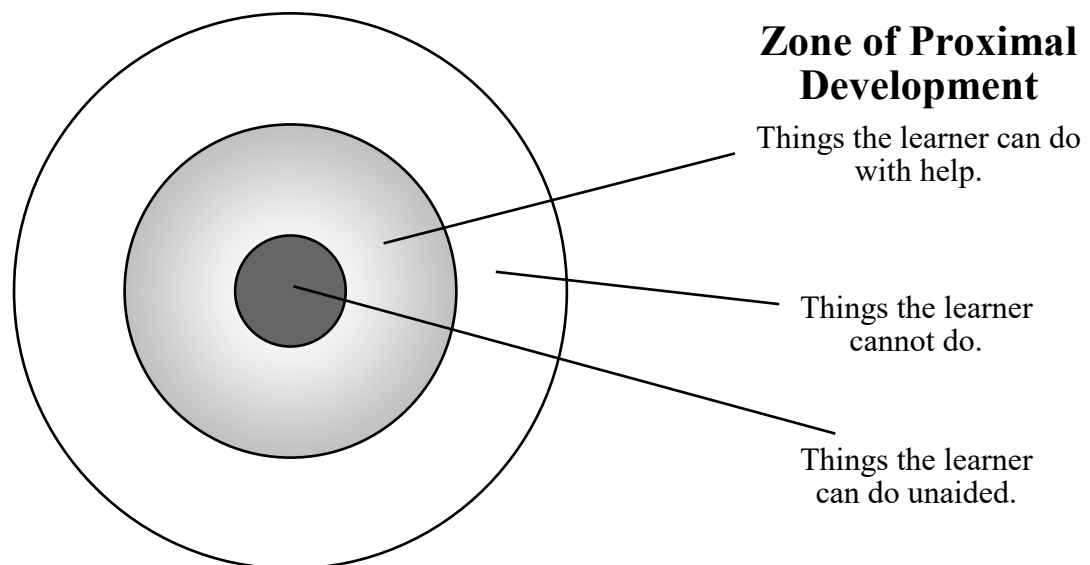


Figure 2. Zone of Proximal Development. As described by Vygotsky, L. S. (1978).

Transactional Distance Theory

Moore attempted to visualize a theory surrounding distance education in 1972, which eventually became the Theory of Transactional Distance (Moore, 1972). Moore (1997) explained that student dialogue; course structure; and student autonomy could vary substantially when learners and instructors are separated by space and/or time. The way these three variables interacted with each other caused transactional distance to either increase or decrease. Online courses by their very nature have a larger transactional distance than face-to-face courses and therefore have a greater need for student dialogue and interaction.

Moore (1989) identified three types of interaction learners experienced in an online course. The first was the interaction between the learner and the course content or

subject. He argued that without this interaction between learners and content, education did not actually take place because it was the interaction with the subject matter that changed a learner's understanding and perspective. He went further to explain that the manifestation of such an interaction could be observed when a student talked with himself or herself about their learning.

The next interaction took place between the learner and the instructor. It was this interaction that made learning individualized. He felt that assisting learners with the application of new knowledge was especially important because students did not understand the subject well enough to (a) apply it correctly, (b) apply it as intensively or extensively as needed, or (c) be aware of all the possible applications. He maintained that feedback and reality testing were the most valuable interactions learners have with their instructors. A third interaction Moore (1989) identified took place between learners or what he called inter-learning interaction. At the time, he felt that student-to-student learning would challenge current thinking and educational practice.

Moore's transactional distance theory demonstrated that as learner-learner or instructor-learner interaction increased, transactional distance decreased. Providing opportunities for students to interact with each other and instructors and teaching assistants would logically promote greater connectedness and a sense of community through dialogue, which would in turn decrease transactional distance.

Zhang (2003) found that the strongest factor affecting students' learning engagement was the transactional distance between students. Her study reinforced the idea of establishing online learning communities and emphasized the significance of

student-student interaction in online courses. She stated, “many students do not seem to be aware of the importance of their relationship and interaction with the other students in a course” (p. 159). Her study confirmed that transactional distance “correlates negatively with student engagement and learning...and with students’ sense of satisfaction and intention to persist in an online study course” (p. 165). She also noted the powerful positive influence instructors could have when they “encourage, facilitate, and even require active peer learning” to “enhance student-student relationships” (p. 160). Zhang created a transactional distance scale (see Appendix A) to measure Moore’s three interactions and added a fourth to include the interaction that occurred between students and the technology used to deliver the course. Paul, Swart, Zhang, and MacLeod (2015) further refined and validated Zhang’s scale (see Appendix B) through structural equation modeling.

Self-Determination Theory

The primary tenet of self-determination theory is choice—the capacity for one to choose and have that choice determine one’s action. Self-determined individuals do not act because of coercion or obligation, but because of their own choosing. Deci and Ryan discovered that the “psychological hallmark of self-determination is flexibility in managing the interaction of oneself and the environment” (1985a, p. 38).

Self-determination theory evolved from studies that differentiated intrinsic and extrinsic motivations in the early 1970s. Intrinsic motivation consists of engaging in behaviors because the behavior or activity itself is personally rewarding. Extrinsic motivation involves doing things to avoid punishment or to earn a reward. Deci and

Ryan (1985a, 1985b, 1991) expanded this initial work with intrinsic and extrinsic motivation to include competence, autonomy, and relatedness. These three basic human needs within a social context help determine an individual's well-being (Deci & Ryan, 2002).

Competence—a psychological need to feel capable—is closely related to intrinsic motivation when an activity is “optimally challenging” and “not constrained by the situation” (Deci & Ryan, 1985a, p. 59). Competence and self-efficacy increase when goals are mastered, and positive feedback is given (Ryan & Deci, 2000). Deci (1971) found that intrinsic motivation increased when verbal reinforcement and positive feedback were used. He also found that unexpected positive feedback increased an individual's intrinsic drive to complete the task.

When learners feel competent, they are more likely to complete work that is challenging or difficult. Additionally, when given a meaningful and relevant rationale as to why an activity is useful, learners are more likely to participate in activities that may seem boring or uninteresting at first (Deci, Eghrari, Patrick, & Leone, 1994; Reeve, Jang, Hardre, & Omura, 2002). “Students will more likely adopt and internalize a goal if they understand it and have the relevant skills to succeed at it” (Ryan & Deci, 2000, p. 64). Providing learners with opportunities to see themselves as competent empowers them to learn and develop new skills and to become successful.

Autonomy is the human desire for the power to act for oneself and take control of one's life. Autonomy allows learners to make choices that are meaningful and pertinent to themselves. Reeve and Jang (2006) argued that student engagement and sense of

autonomy relies on the supportive quality of the learning environment. He suggested the following ways to improve autonomy-support in the classroom community: (a) coordinating instructional activities with students' competencies and preferences, (b) helping students diagnose their performance and prescribe the needed action, (c) communicating value and providing rationale, and (d) acknowledging and accepting students' negative expressions (pp. 229-230). These behaviors increased student autonomy and provided opportunities for them to feel more connected to instructors and the curriculum.

Relatedness is the human need to interact with and be connected to others. Relatedness is deeply associated with a learner's sense of belonging (Niemic & Ryan, 2009) and "encompasses a person's striving to relate to and care for others, to feel that those others are relating authentically to one's self, and to feel a satisfying and coherent involvement with the social world more generally" (Deci & Ryan, 1991, p. 243). Baumeister and Leary (1995) maintained that the need to belong requires regular personal contact, stability, affective concern, and potential continuation. When students feel that they are understood and valued, they will more likely accomplish the learning tasks assigned. They become part of a community connected with fellow students and their instructor.

Sense of Community and Online Environments

Gorski (2004) believed that if "education is to be truly student-centered, then the experiences, perspectives, voices, and ideas of the students must be brought to the fore in

the learning experience” and that students need to be “given opportunities to share their voices and to learn from each other's experiences” (p. 41).

Rovai (2000) defined online learning environments as educational classroom communities and found that online students interacted with each other mostly through text, without the opportunity to see or hear each other. He examined factors that influenced the sense of community and strongly influenced discourse in an online learning environment. These factors included the following:

1. Student-instructor ratio
2. Transactional distance
3. Social presence and instructor immediacy
4. Lurking
5. Social equality
6. Collaborative learning
7. Group facilitation
8. Self-directed learning

While describing the opportunities online discussion forums provide in helping students and instructors participate in critical dialogue, Boyd (2016) asserted,

“Dialogue is not simply a teaching technique, but also a process essential to the nature of human beings. We come to know the world and ourselves in and through our interaction with others; knowledge is created in the dialogical encounter. Moreover, this knowledge is not something held by an individual but is held corporately by those in the dialogue” (p. 178).

He went on to say that in the critical dialogue process where inquiry and student perspectives combine, the learning that takes place between instructors and students becomes transformative. Hilton (2013) explained that engaging in transformative and robust learning experiences that involve critical dialogue is the desired outcome of online learning in higher education.

McCollum (2011) felt that the opportunity for students to collaborate and participate in social learning was much more than a means to an end. Boyd (2016) argued that online discussion boards should provide students opportunities to construct their learning and participate in the critical and collaborative learning process. Koller (2012) described ways that virtual study groups helped create a global community of learners where fellow students often give feedback.

Hilton (2013) explained that a crucial critical literacy skill includes the ability to reflect. When learners begin to “self-reflect on their biases, recognize multiple perspectives, question the claims of others and become more comfortable with disagreement as a locus for understanding rather than marginalization” (p. 610), one can be assured that critical dialogue has been successfully implemented in the online course. He argued that to provide learners with critical dialogue opportunities, a human-centered course design that provides a space for people to connect socially, provides necessary privacy while providing many occasions for socialization, encourages active engagement, variability in learning and teaching strategies, and provides some ownership on the part of the learners, is necessary.

Young (2017) found that effective communities pushed members to continue even when challenges arose. He noted that communities provided a means for participants to trust each other and feel good about themselves. Furthermore, community members felt a connection with each other and greatly benefited from feedback and shared experiences. Young's (2017) studies revealed that successful communities promoted lasting change by addressing six human psychological needs: (a) the need to trust, (b) the need to fit in, (c) the need for self-worth, (d) the need for a social magnet, (e) the need to be rewarded, and (f) the need to feel empowered. Young (2017) stressed the importance of adding peer role models to the community to improve engagement and build trust among community members.

Common Challenges of Online Students

Baxter (2012) found that online students do not have a clear understanding and have limited expectations of what they will experience when taking an online course. Many students were surprised by the collaborative environment and academic requirements. She noted that if these false expectations were not checked, they led "to a sense of let-down and erosion of confidence and feelings of agency" (p. 6), which in turn, moved quickly toward attrition. Student success seemed to be related to a combination of internal determination, academically supportive home environment, and regionally supportive university interventions such as tutoring. Another important aspect of her research findings focused on the need for students to understand their agency as it relates to academic progress, motivation, and commitment. Feelings of exclusion and a lack of confidence were identified as common risks for students enrolled in online courses.

Similarly, Bambara, Harbour, Davies, and Athey (2009) found that isolation and loneliness were common experiences with students in high-risk courses. This combined with the false expectation that online courses would be easy rather than “unfamiliar, complex, and non-intuitive,” caused many students to lose hope and become disconnected. Students who recognized they had agency and the ability to act were more successful. Their motivation, commitment, independence, self-direction, and resourcefulness became inherent. On the other hand, students who felt they were not able to control their situation began to acquiesce through “silent submission, compromise, and loss” (p. 233). This is the determination that Baxter (2012) described above. It stands to reason that, if caught in time, tutoring and other supportive interventions would help these students as well.

Baxter’s (2012) description of support intervention complements Russo-Gleicher’s (2013) findings that many community college online faculty are not aware of student support services provided by their institution, nor do they recognize their potential for improving student success. She recommended educating and encouraging online faculty to utilize these services on behalf of their struggling students. As Bambara et al. (2009) pointed out, the sequential order and cumulative effect of learning can cause students to get behind quickly, become overwhelmed, and lose hope and motivation.

Adult Learners

As stated previously, most online students are older than traditional university students. In his study of adult learners, Knowles (1984) noted that these nontraditional students became more self-directed as they aged and accumulated experiences on which

to draw for learning. His (1984) theory of andragogy (methods and practice of teaching adults) included the following principles: (a) adult learners are self-directing, but conditioned to dependency on teachers; (b) adults are the richest sources of experience for one another; (c) readiness to learn is dependent on a need to know or do something; (d) orientation to learning is problem-centered; (e) the most powerful motivators are internal. Young (2017) noted that successful communities offer a way for participants to trust, to fit in, to feel good about themselves, to be rewarded, and to feel empowered to understand the need to learn something.

Persistence in Online Programs

Persistence, as defined by Rovai (2003) is “the behavior of continuing action despite the presence of obstacles” (p. 1). Rovai (2003) also pointed out that online students are typically adults and that “age, especially being over 24,” was “one of the most common variables in studies of nontraditional student attrition” (p. 2).

As noted by Bean and Metzner (1985), the additional responsibilities of work and family sometimes prevented nontraditional students from accomplishing their educational goals. Carr (2000) found that students enrolled in distance education programs were 10-20 percent less likely to persist than students in traditional programs did. Most online-only students at BYU-I are nontraditional in that they are older (81% are over 26), are part-time students (less than six credits per semester), have families, and often work full-time jobs to provide for them while enrolled in their courses (Brigham Young University-Idaho, 2017b).

Rovai (2003) created a persistence model synthesizing Tinto's (1975) model and Bean and Metzner's (1985) model. He also included requisite online skills, student needs, and the necessity to correlate pedagogy with learning and teaching styles in his model as illustrated in Figure 3. Rovai's model represents among other things, the need online students have for social integration, learning communities, interpersonal relationships, satisfaction, and self-esteem.

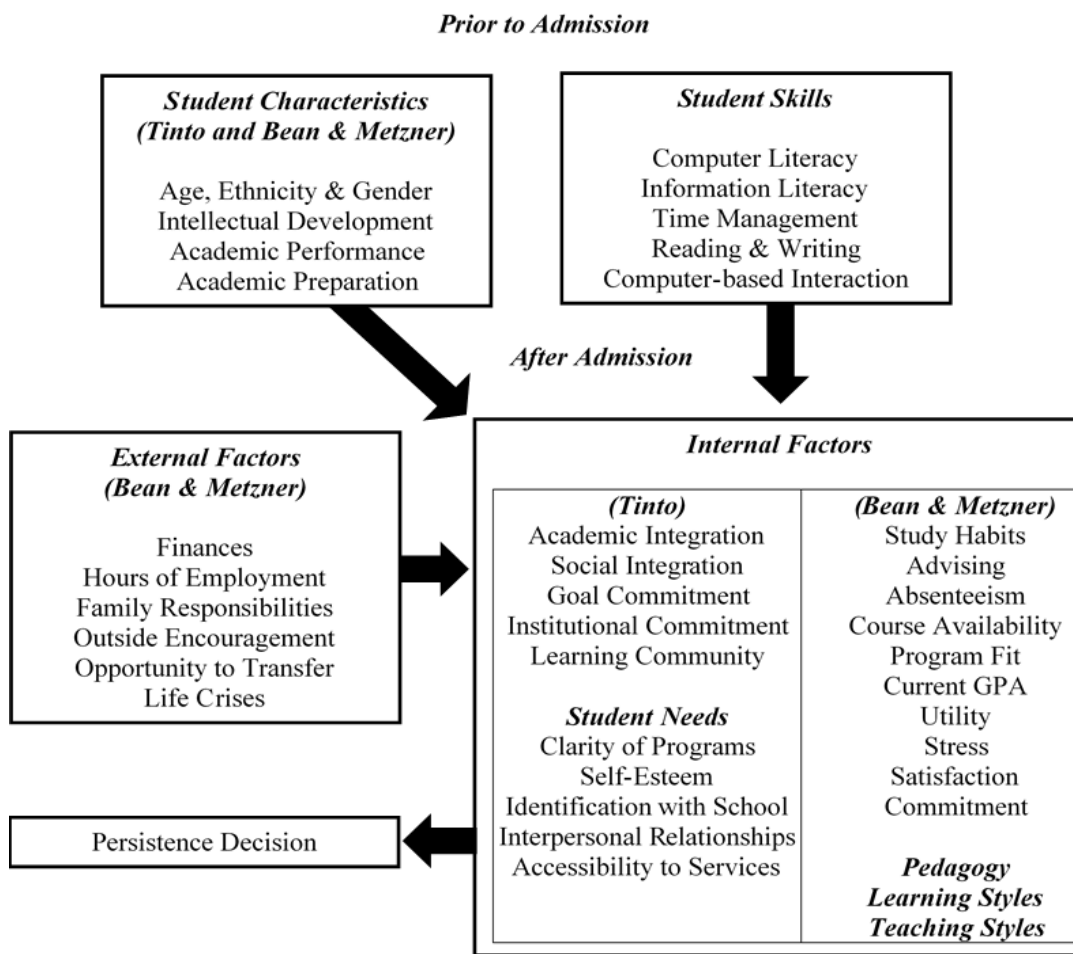


Figure 3. Composite Persistence Model. Adapted from Rovai, A. P. (2003).

Engstrom and Tinto (2008) found that in addition to being more academically and socially engaged, students who participated in learning community programs were five to ten percent more likely to persist to the following academic year than students who did not participate in learning community programs. Learning communities provided a safe place to learn, a supportive place to learn, an increased sense of belonging, and an integrated, linked curriculum (Engstrom & Tinto, 2008).

Previous Research Cycles

Last spring, I conducted an interpretive hermeneutic research study to better understand the lived experience of three PathwayConnect graduates who transitioned to the BYU-I online program. After becoming BYU-I online students, two dropped out entirely, and one became a BYU-I campus student. I built upon my previous understanding of PathwayConnect and BYU-I online learning by reviewing the literature regarding self-determination, adult learners, and common challenges of online students in an attempt to situate my research within a historical and cultural context (Crotty, 1998). I grew my knowledge even more through systematically analyzing and interpreting interview data using the zoom model (Pamphilon, 1999) and by participating in reflective writing to create new understanding and meaning. The zoom model enabled me to analyze the various data layers and focus or “zoom in and out” of my data for a more holistic understanding.

The participants in my study often spoke about their positive experiences with peer teaching/mentoring. As part of the PathwayConnect program, all students were required to facilitate weekly discussions at least once during each term. Additionally,

online courses were designed to follow the BYU-I Learning Model which emphasized the role of students in the learning process through preparing ahead of time, teaching one another, and pondering and proving what they had learned (Brigham Young University-Idaho, 2015). The participants spoke most often about helping or being helped by fellow students in their cohorts and classes. One participant remarked,

I was able to help others in the class. Either we would stay after class, or they would make time to connect through Skype with me, so I could explain what was going on, and that was pretty fulfilling. I enjoyed that.

Another participant told about helping a “kid” in his PathwayConnect group every week who “wasn’t particularly good at math.” Of this experience, he said,

...it felt pretty good [to teach someone]. I kind of like teaching people things. I like helping people understand things. It kind of fulfilled that itch or urge [I had] to help people understand.

The third participant often commented on how much his fellow students encouraged him. He felt he received more than he gave when it came to peer teaching, “I was helped more than I helped others.”

It appeared that the participants found teaching one another personally rewarding and even engaging. When asked about why her elementary English course in Pathway seemed more exciting and relevant to her than her business English course, one participant remarked, “definitely because of the people. I was able to help others in the [PathwayConnect] class.”

Another dominant discourse was relatedness. The participants discussed both the benefits and risks associated with connecting or not connecting with their peers and instructors in both face-to-face and online environments. Said one participant, “...being part of a group and meeting together was huge!” Another related,

I definitely felt more connected in [classes] with physical meeting[s] to the other students around me than I did in the classes that didn’t. [I had an online] class where I had no idea who my classmates were. The only person I interacted with was the teacher, and that was it. ...I didn’t get a whole lot out of that course.

A third participant spoke of the connection he felt with his peers in an online programming course,

I was on a team where everybody was from different places. ...and we created a program, “minesweeper,” and posted it on YouTube. So, everybody was nervous. ...but among us, there was [encouragement] one to another and praying before we started the project. ...It was a very fantastic experience.

One student was often concerned with other PathwayConnect students, not just those in her former cohort, but also PathwayConnect participants in her local area. Her comments below demonstrated this concern:

...my biggest concern was some of the people I did Pathway with were probably not going to make it in the online program. I was afraid they would just be too overwhelmed and give up. It’s those that are weaker...weaker in English and maybe didn’t finish high school or don’t understand algebra. I know one in particular; she’s struggling with the math. ...going to this online program where

you don't have that support of meeting together with people in person regularly, just kind of being lost and stopping.

This participant's perception seemed to align well with the critical self-determination construct of relatedness identified by Deci and Ryan (2002) and addressed the negative impact to persistence that a lack of confidence created. One of my assumptions was that we do not provide a sufficient bridge for students to move easily from a supported cohort-blended learning model to an "on your own" online-only model.

Summary

What became clear during my previous cycle of research was the benefit students derived from supporting and connecting with each other; an experience that seemed to dissolve when PathwayConnect students transitioned to the BYU-I online program. It helped me focus on the important role student-student interaction played in transforming thinking (Borthick, Jones, & Wakai, 2003; Vygotsky, 1978); reducing transactional distance (Moore, 1972, 1989, 1997; Zhang, 2003); increasing competence, autonomy, and relatedness (Deci & Ryan, 1985a, 1985b, 1991, 2002; Niemiec & Ryan, 2009; Ryan & Deci, 2000); building community in online environments (Boyd, 2016; Hilton, 2013; Gorski, 2004; McCollum, 2011; Rovai, 2000; Young, 2017), and its potential impact on student retention (Bean & Metzner, 1985; Rovai, 2003).

CHAPTER 3

METHODOLOGY

The preceding chapters included the theories, current literature, and the previous inquiry I used to shape my research questions regarding how and to what extent participation in a virtual community will influence transactional distance between students and course content, between students and their instructors/teaching assistants, and between students and other students in the same course. This chapter will focus on my research design including the setting, participants, intervention, methodology, instruments, and rationale.

Setting

Brigham Young University-Idaho (BYU-I) is in Rexburg, a small community of approximately 27,000 people in southeastern Idaho. The Church of Jesus Christ of Latter-day Saints guides and supports BYU-I, whose mission is to “develop disciples of Jesus Christ who are leaders in their homes, the Church, and their communities” (Brigham Young University-Idaho, 2016). Fall 2017 semester, over 19,000 students were enrolled in courses on the BYU-I campus. In addition, 11,850 students attended online-only classes, and over 15,000 participated in the PathwayConnect program (Brigham Young University-Idaho, 2017c).

Each BYU-I online course contains 14 weeklong modules that are delivered asynchronously. Modules often have two or more mid-week due dates to help students with pacing, and some may occasionally require a weekly synchronous group meeting. Most modules utilize the BYU-I Learning Model (Brigham Young University-

Idaho, 2015) which includes three steps: (a) preparing, (b) teaching one another, and (c) pondering or proving. The first step includes spiritual, individual, and group preparation to help students come ready to learn.

The second learning model step, teaching one another, is especially relevant to my study. I learned through my previous research cycle about the benefits of student-to-student learning and have observed seemingly average students perform beyond typical expectations because they knew how to work with and teach others. Recall the comment made by a student that his classmates from different cultures were nervous, yet they encouraged each other, and created a successful computer program.

The last step of pondering and proving is the application of knowledge that often takes place after the lesson is over and becomes the beginning of the first step for the next lesson. Learning Model activities are pre-designed and often utilize the discussion board feature of the learning management system. Due to the limitations of the discussion board tool, students sometimes feel that activities are contrived, irrelevant, and untimely. Discussion board threads are not easy to access, appear buried under lesson layers, and are not searchable.

My intervention involved students enrolled in online sections of the Computer Science (CS) 124 course at BYU-I and took place during the winter 2018 semester (January-April). Computer Science (CS) 124 (*Software Development*) is the first course in the BYU-I Programming Certificate and a requirement for the Computer Programming Associate and Software Engineering Bachelor's degrees. It is often the first course students who are interested in computer science take after they complete

PathwayConnect (Figure 4) and provides much fewer opportunities for students to interact and connect with each other than their previous PathwayConnect courses.

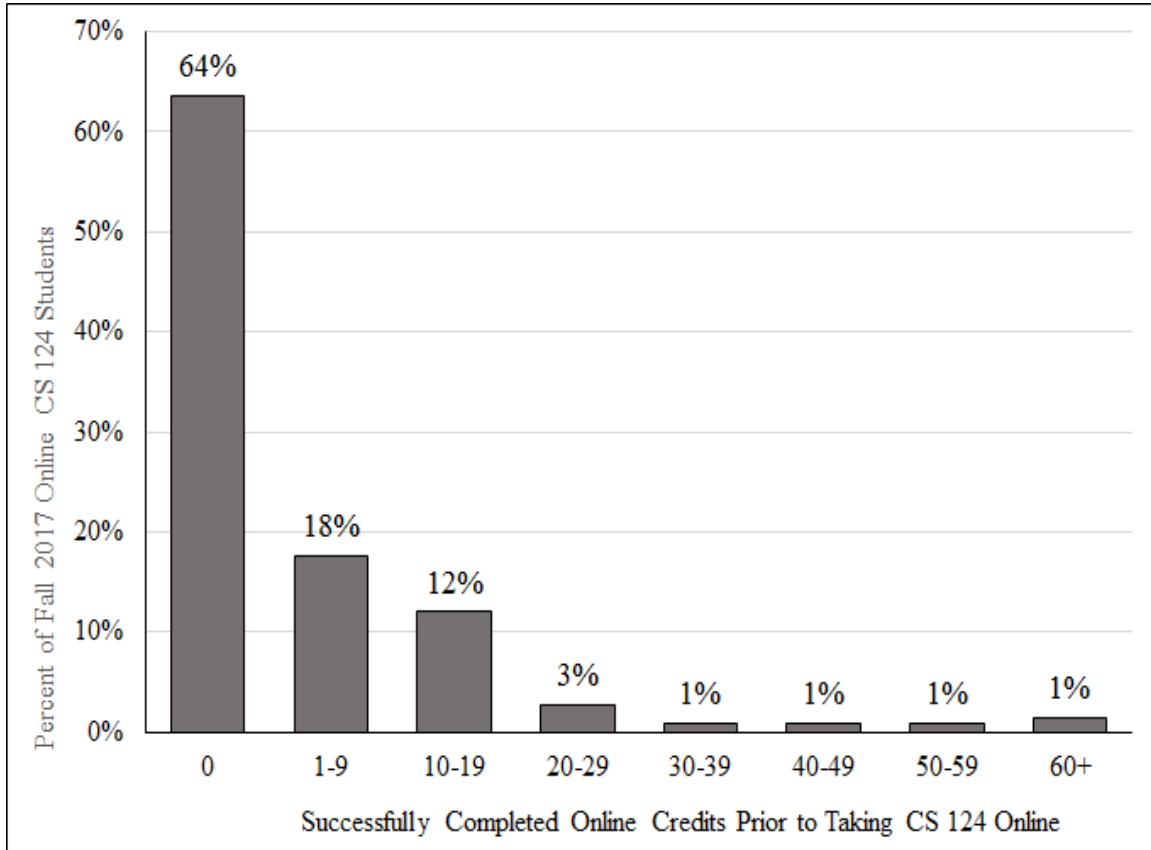


Figure 4. Number of Previously Successfully Completed Online Credits (by Students in Online Sections of CS 124 During Fall 2017)

Notes: $n = 217$, Mean = 5.33, Median = 0, Mode = 0, Standard Deviation = 11.44

CS 124 is one of two courses that teach C++ coding and focuses on how to write procedural programs. It is a challenging course, and many students drop out or receive a failing grade (see Table 1). It is interesting to note that a computer lab designed to help students with their homework has been available to campus students but not to online students.

Table 1

BYU-I's Programming Certificate Course Scorecard

Course	Citizenship	Enrollment	GPA	Withdrawal Rate	Success Rate
CS 124	Domestic	69	2.80	33.3%	55.1%
	International	33	2.04	36.4%	42.4%
CS 165	Domestic	42	3.45	21.4%	78.6%
	International	16	2.40	0.0%	75.0%
CS 213	Domestic	21	2.86	9.5%	85.7%
	International	7	2.97	0.0%	85.7%
CS 235	Domestic	21	3.19	9.5%	81.0%
	International	6	2.80	16.7%	66.7%
CS 246	Domestic	17	3.69	0.0%	94.1%
	International	1	3.00	0.0%	100.0%

Note: The denominator of the success rate includes students who withdrew from the course.

Participants

The participants for this action research study included approximately 200 students enrolled in six online sections of Computer Science (CS) 124, the online instructors who taught the course, the CS 124 course leader, the CS 124 online course representative, the CS 124 instructional designer, teaching assistants, two advisors, and

the action researcher. In addition to administering the transactional distance survey to online students enrolled during the winter 2018 semester, I also collected baseline data from 200 CS 124 online students enrolled in the fall 2017 semester. I chose CS 124 because of its overall low retention rate compared with other online courses and the fact that it has the highest dropout rate of any other computer science course.

Students. Each semester, BYU-I online students tend to be older than their campus counterparts are and many of them work full-time to provide for their families. BYU-I online student demographics were very similar during the fall 2017 and winter 2018 semesters. Students took six credits per semester, were female (66% and 67% respectively), married (67%) and had a grade point average of 3.5 on a 4-point scale (Brigham Young University-Idaho, 2017b). The average age of a BYU-I online student was 38 years old, ranging in age from 17 to 80, with 82% being older than 25 (Brigham Young University-Idaho, 2017b). The CS 124 course that online students completed during fall 2017 and winter 2018 was identical. Surveys were administered to both fall 2017 and winter 2018 semester students, though only the winter 2018 students participated in the CS 124 Winter Cohort online community and used Slack to participate in their course's developers' forum.

Instructors. BYU-I remote online instructors facilitate the delivery of online courses which are developed by a team of university faculty and instructional designers. As part of their roles, online instructors are encouraged to share their ideas and insights to identify inadequacies in course design and recommend more efficient and effective alternatives. BYU-I remote online instructors teach one or two sections of an

online course and are typically employed in their profession outside of the University. Each department-approved online instructor is trained and evaluated in online practices and BYU-I's Learning Model that invites students to participate in their learning by preparing ahead of time, teaching one another, and pondering and proving what they have learned. The winter 2018 online instructors for CS 124 contributed to the study by participating in the individual course communities, encouraging students to participate in the larger online community, and supplying feedback and perspective to the researcher.

Course leader. All BYU-I online courses are designed by a curriculum designer in partnership with a course leader and an online course representative. The course leader, curriculum designer, and online course representative comprise the Course Council for an online course. Course leaders are full-time campus faculty members who provide the discipline expertise for the course. Course leaders have oversight for outcomes, content, and key assessments and chair the Course Council for all BYU-I online courses (Brigham Young University-Idaho, n.d.-a). They are ultimately responsible for curriculum decisions and changes to their courses. Along with the researcher, the course leader for CS 124 helped facilitate the online community and provided needed computer science and content expertise.

Online course representative. Online course representatives are experienced online instructors who provide operational expertise for the course. They have oversight for how the course is facilitated and often provide student and instructor perspective regarding usability and functionality. Along with the course leader and instructional

designer, the online course representative helped address and resolve online instructor and student concerns with Slack and helped facilitate changes to the course structure and instructions.

Instructional designer. Instructional designers collaborate with the course leader and online course representative to design, develop, and improve BYU-I online courses (Brigham Young University-Idaho, n.d.-a). They serve as project managers and are primarily responsible for the design and pedagogy involved in creating and delivering online courses. The instructional designer for CS 124 made the necessary changes to student and instructor instructions, added unique links to the student community for each lesson by course section, and helped identify potential issues before they happened.

Teaching assistants. Teaching assistants are exemplary students who have previously been successful in the course to which they are assigned. As previously mentioned, a computer lab operated by teaching assistants was available to campus students but was not available to online students. For the sake of this study, various computer lab teaching assistants participated in a similar role to that of the instructor by providing timely feedback and encouragement to students in the CS 124 Winter Cohort online community.

Advisors. Online advisors assist students with course and graduation planning, course sequencing, and other academic-related issues (Brigham Young University-Idaho, n.d.-b). A computer science advisor was invited to monitor the CS 124 Winter Cohort virtual community for questions regarding administrative and academic processes and procedures. Given her experience with advising online students, the advisor helped guide

and encourage students in the community. Additionally, a former BYU-I CS graduate participated in the CS 124 Winter Cohort community. He helped answer questions students had about the program, but also provided moral as well as academic support.

Role of the Researcher

I acted as an insider researcher in my study. This means that I was familiar with the online environment at BYU-I and PathwayConnect and had a specific research problem I wanted to understand in my area. Before my current role as Student Affairs Director, I served as both the Dean of Online Student Services and the Managing Director of Curriculum Development. I worked with the CS 124 course leader and department chair to help develop and improve their online courses. I was familiar with BYU-I's learning management system, the Learning Model, and the challenges associated with designing online lab environments for students. As Student Affairs Director, I was intimately aware of the confidence that students built during the PathwayConnect program and the gap that seemed to exist when they transitioned to the BYU-I online program.

Intervention

I used a sequential exploratory mixed-methods research design (Mertler, 2014) for my intervention, using the qualitative data from my previous research cycle to further explore how a virtual community might influence an online student's educational experience. Specifically, my intervention involved designing an online community that enabled students in online sections of CS 124 to learn from and engage with each other more willingly and synchronously. To evaluate the influence of the online community, I

proposed to measure the transactional distance at the end of the semester of one to two sections of CS 124 that did not participate in my intervention as well as two to three sections of CS 124 that did participate. However, the members of the CS 124 course council decided that all CS 124 students enrolled in the winter 2018 semester would participate in my study, which necessitated a change in my methodology. To collect baseline data, I administered the transactional distance scale developed by Paul et al. (2015) to fall 2017 CS 124 online students in December 2017. I administered the same survey to winter 2018 CS 124 online students in April 2018 following my intervention. These two groups of students were comparable demographically. I then conducted a descriptive statistical analysis using data from both groups.

I used Slack (<https://slack.com/>), a free communication software that is familiar to many computer science practitioners to create the virtual community. I chose Slack because it works rather like a chat room and can be limited to a specific group. It was simple to use and provided students a way to connect and communicate across class sections. Slack is an acronym for “Searchable Log of All Conversation and Knowledge” and unlike some other social media tools, students, teaching assistants, advisors, and online instructors were able to locate and post information regarding particular lessons, topics, or assignments.

With the help of the members of the CS 124 course council, I developed instructions for using the Slack so that students and online instructors could more easily participate in the virtual community. Along with instructions, I created links to the community that appeared in email messages and course announcements to students.

While I observed, fellow students, teaching assistants, advisors, and instructors monitored and responded to students in the community assisting them through the zone of proximal development (Vygotsky, 1978).

Instruments and Data Sources

Interviews. In a previous cycle of research, I conducted a qualitative study using a small, purposeful sample of three PathwayConnect graduates (two previously enrolled BYU-I online students and one currently enrolled BYU-I campus student). I conducted interviews via phone, Skype, and in person. I used semi-structured questions related to the students' experience in the Pathway and BYU-I online programs such as "What was your experience as a Pathway student?" and "How did your experiences in Pathway and BYUI-Idaho online affect your feelings about your future?" (see Appendix C for a complete list of my interview questions). I conducted, audiotaped, and transcribed verbatim the interviews during March 2017. I took notes during the interview sessions and recorded notes about my experience afterward. Once the transcriptions were complete, I conducted member checks via email to the participants to verify accuracy.

Surveys. Near the end of the thirteenth week of the fall 2017 and winter 2018 semesters, I measured transactional distance of online CS 124 students that participated in a virtual online community and those that did not participate. I evaluated transactional distance between students and teachers consisting of the instructor and teaching assistant (TDST), transactional distance between the student and content (TDSC) and transactional distance between student and other students (TDSS) using the refined scale developed by Paul et al. (2015). I modified the scale slightly with the author's permission. I used a 5-

point Likert scale, with 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, and 5 = *Strongly Agree*. Examples of survey items that illustrated the student-instructor distance construct included, “The instructor or teaching assistant pays no attention to me,” and “The instructor or teaching assistant can be turned to when I need help in the course.” The second construct measured the transactional distance between students and content.

Examples of items for this construct included, “This course emphasized SYNTHESIZING and organizing ideas, information, or experiences into new, more complex interpretations and relationships,” and “This course emphasized APPLYING theories and concepts to practical problems or in new situations.” The third construct measured the transactional distance between students and other students. Examples of items for this construct included, “I feel valued by the class members in this online class,” and “My classmates in this online class value my ideas and opinions very highly.” See Appendix D for the modified, revised transactional distance survey.

Limitations

Limitations of this study included the use of Slack software, the survey instrument used, reliance on self-reported data, and the fact that results from two different online student cohorts were compared. As students’ experience with technology was unknown, it was possible that using a new tool contributed, rather than alleviated their transactional distance in the course. Previously, Paul et al. (2015) found that the revised scale of transactional distance instrument used in this study had greater statistical validity and reliability than the original scale developed by Zhang (2003). That was the reason I

chose to use the survey, but I did not test it in my local context. Next, since not all students took the survey, it was likely some bias occurred. Perhaps students that benefited from the virtual community did not take the survey. Finally, though the online student populations were similar demographically, I did not conduct a pre- and post-survey using the same population. Instead I used the CS 124 fall 2017 cohort as a baseline and compared their results to the winter 2018 cohort.

Recruitment Strategy

Students were encouraged to participate in the transactional distance survey through announcements in their course and email messages from their instructors. The survey appeared as an ungraded quiz in their course learning management system during the thirteenth week of both the fall 2017 and winter 2018 semesters. The first question of the survey requested students' consent to participate in the study.

Procedure and Timetable

The preparation for my intervention took place in the fall of 2017 (see Table 2 for the complete timeline). I submitted and defended my proposal and made modifications to my original Institutional Review Board request. I administered the transactional distance survey to fall 2017 CS 124 online students. I worked with the computer science department to ensure the hiring and training of teaching assistants. I created a Slack channel for the CS 124 Winter 2018 Cohort virtual community as well as 14 Developers' Forum channels for each of six course sections. I developed instructions and informational messaging for students, instructors, advisors, and teaching assistants.

Table 2

CS 124 Student Community Intervention Timeline

Time Frame	Actions & Procedures	Participants
November 2017	Submitted and defended dissertation proposal	Researcher & committee members
December 2017	Submitted IRB modifications	Researcher
	Worked with CS department to enlist TAs, former BYU-I CS graduate, and advisor to participate	Researcher, course leader, teaching assistants, advisors
	Administered Qualtrics survey to all online students enrolled in CS 124 (fall 2017)	Researcher, online students
	Identified and trained online instructors to pilot online community, created CS 124 Winter cohort online community, individual course communities, instructor and student training, and communication plan	Researcher, course leader, online instructors, online course representative, curriculum designer
January 2018	Sent out communication to students enrolled in all online sections of CS 124	Researcher, online students
January-April 2018	Implemented and monitored intervention	Researcher, online students, online instructors, teaching assistants, advisors
April 2018	Administered Qualtrics survey to all online students enrolled CS 124	Researcher, online students
August 2018	Analyzed transactional distance survey data for CS 124 online students	Researcher
October 2018	Completed dissertation draft and scheduled dissertation defense	Researcher, committee members

In January 2018, I sent out a communication to students enrolled in online sections of CS 124 and facilitated the moderation of the online community through the end of the semester in April 2018. During the thirteenth week of the course, I administered the revised version of the transactional distance scale using Qualtrics. During the summer, I analyzed the data using SPSS version 24 software and completed my study.

Summary

I used a sequential exploratory qual-QUAN mixed methods action research design (Mertler, 2014) to see how a virtual online community might influence an online student's educational experience. With the aid of the CS 124 course council, instructors, advisors, teaching assistants, and students, I used Slack to design and facilitate the online community during the winter 2018 semester. By means of a survey originally developed by Zhang (2003) and further modified by Paul et al. (2015) I measured transactional distance in a BYU-I online computer science course that has had high attrition and poor student success. I compared the results of students that participated in an online virtual community and those that did not through descriptive statistical data.

CHAPTER 4

RESULTS

This chapter includes the results of analyses of the quantitative data I collected following my intervention involving students who completed PathwayConnect and were enrolled in online sections of Computer Science 124 (CS 124) during the fall 2017 and winter 2018 semesters. I will revisit the qualitative data I gathered from my previous research cycles in Chapter 5.

Recall that my planned intervention involved the development of an online virtual community designed to lessen transactional distance (Moore, 1997) by enabling students to give and receive frequent feedback (Tinto, 2012), increasing autonomy and their sense of belonging (Moore, 1997), and providing additional opportunities for them to learn from each other (Gorski, 2004). My study addressed the following research questions:

1. How and to what extent will participation in a virtual community influence the transactional distance between students and course content?
2. How and to what extent will participation in a virtual community influence the transactional distance between students and their instructors/teaching assistants?
3. How and to what extent will participation in a virtual community influence the transactional distance between students and other students in the same courses?

The survey I used to measure transactional distance was based on a scale developed by Zhang (2003) and updated by Paul et al. (2015). Zhang's (2003) scale measured four dimensions that inhibit a student's engagement with learning and consisted of 31 items with six items corresponding to transactional distance between

student and student (TDSS), six items to transactional distance between student and teacher (TDST), 11 items to transactional distance between student and content (TDSC), and eight items to transactional distance between student and interface (TDSI). Through further studies, Paul et al. (2015) found that three of Zhang's (2003) original transactional distance subscales were "significant and unique predictors of students' engagement with learning and satisfaction" (p. 379). Paul et al. (2015) further updated the instrument to improve statistical validity and reliability.

I created a survey in Qualtrics© survey software using Paul et al.'s (2015) instrument and embedded it in all fall 2017 and winter 2018 online course sections. It became available near the end of each semester to 216 students in December and 211 students in April. Eighty-five fall 2017 students and 91 winter 2018 students completed the survey, with a response rate of 39% and 43%, respectively. Of those respondents only 70 fall 2017 students and 62 winter 2018 students completed PathwayConnect. It should be noted that there were no students who took the survey in the fall 2017 semester who also took the survey in the winter 2018 semester.

I used the data resulting from both the fall 2017 and winter 2018 surveys to evaluate three general constructs: (a) transactional distance between students and instructors (TDST), (b) transactional distance between students and course content (TDSC), and (c) transactional distance between student and other students (TDSS). The answer choices for the transactional distance constructs were provided along a 5-point Likert scale consisting of strongly agree, somewhat agree, neither agree nor disagree,

somewhat disagree, and strongly disagree. I collected the fall 2017 data as a baseline and the 2018 data to evaluate the influence of my intervention on transactional distance.

Construct 1: Transactional Distance between Students and Teachers

I performed an initial descriptive analysis once the responses were collected. Shown in Table 3 are the descriptive statistics and response frequencies for the 4-item construct surrounding transactional distance between students and instructors (TDST) for both fall 2017 and winter 2018 semesters. I ranked items according to the value the respondents placed on them as indicated by the mean of their collective agreement with the statements. I calculated the mean response for each statement, indicating respondents' average level of agreement using SPSS version 24 software. I then used SPSS to calculate the standard deviation of the responses to each statement as well as the combined means and standard deviations for construct one. Standard deviation measured the spread of data around the mean of the population sample and indicated how consistent or variable students were in their answers (Fisher & Marshall, 2008; Marshall & Jonker, 2010).

I then ranked the response frequency items by the incidence with which respondents chose 5 representing “strongly agree”, 4 representing “somewhat agree”, 3 representing “neither agree nor disagree”, 2 representing “somewhat disagree” and 1 representing “strongly disagree”.

Table 3

CS 124 Survey Response Descriptive Statistics and Percentages (Construct 1: Transactional Distance between Student and Instructor)

Term	Item	N	Mean	Standard Deviation	5 Strongly Agree	4 Somewhat Agree	3 Neither Agree nor Disagree	2 Somewhat Disagree	1 Strongly Disagree
44 Fall 2017	Q3: The instructor or teaching assistant pays no attention to me.	70	3.91	1.41	55.7%	10.0%	12.9%	12.9%	8.6%
	Q4: I receive prompt feedback from the instructor or teaching assistant on my academic performance.	70	4.00	1.33	54.3%	18.6%	5.7%	15.7%	5.7%
	Q5: The instructor or teaching assistant was helpful to me.	70	4.14	1.03	48.6%	27.1%	15.7%	7.1%	1.4%
	Q6: The instructor or teaching assistant can be turned to when I need help in the course.	70	4.00	1.18	45.7%	28.6%	8.6%	14.3%	2.9%
	C1: Transactional Distance between Student and Instructor	70	4.01	1.00	51.1%	21.1%	10.7%	12.5%	4.6%
Winter 2018	Q3: The instructor or teaching assistant pays no attention to me.	62	3.61	1.50	41.9%	19.4%	11.3%	12.9%	14.5%
	Q4: I receive prompt feedback from the instructor or teaching assistant on my academic performance.	62	4.00	1.20	45.2%	30.6%	8.1%	11.3%	16.1%
	Q5: The instructor or teaching assistant was helpful to me.	62	4.05	1.12	43.5%	35.5%	6.5%	11.3%	3.2%
	Q6: The instructor or teaching assistant can be turned to when I need help in the course.	62	3.95	1.17	41.9%	30.6%	11.3%	12.9%	3.2%
	C1: Transactional Distance between Student and Instructor	62	3.90	1.01	43.1%	29.0%	9.3%	12.1%	6.5%

A 5-point Likert scale was used for all survey items: 5, strongly agree; 4, somewhat agree; 3, neither agree nor disagree; 2, somewhat disagree; and 1, strongly disagree. Question 3 was reverse coded to maintain the integrity of the original instrument.

The greatest mean occurred for question five related to the instructor or teaching assistant being helpful to them in both the fall 2017 ($M = 4.14$) and winter 2018 ($M = 4.05$) surveys, followed by question four related to receiving prompt feedback from the instructor or teaching assistant with matching means of $M = 4.00$. The highest standard deviation occurred in question three relating to the attention paid to them by the instructor or teaching assistant ($SD_{fall2017} = 1.41$ and $SD_{winter2018} = 1.50$).

As indicated by Table 3, 54.3% of respondents in fall 2017 and 45.2% in winter 2018 strongly agreed that they received prompt feedback from the instructor or teaching assistant. A high percentage of CS 124 online students strongly disagreed (55.7% in fall 2017 and 41.9% in winter 2018) with the statement that their instructor or teaching assistant paid no attention to them.

The descriptive statistics in Table 3 show higher means for fall 2017 ($M = 4.01$) than winter 2018 ($M = 3.90$), thus demonstrating that transactional distance between students and their instructors was slightly greater and consequently student engagement with learning and satisfaction slightly less in winter 2018 than in fall 2017. The standard deviation for this construct ranged from $SD = 1.00$ to $SD = 1.50$. My research question for this construct was, “How and to what extent will participation in a virtual community influence the transactional distance between students and their instructors/teaching assistants?” There seemed to be no evidence through the data collected that the use of Slack to create and facilitate an online community influenced the transactional distance

between students and instructors or their teaching assistants for students enrolled in online sections of CS

Construct 2: Transactional Distance between Students and Content

Descriptive statistics and response frequencies for the 3-item construct surrounding transactional distance between students and course content (TDSC) for both fall 2017 and winter 2018 semesters are displayed in Table 4. I ranked items according to the value the students assigned them as specified by the mean of their shared agreement with the survey statements. Using SPSS version 24 software, I calculated the mean response for each statement, indicating their average level of agreement. I also calculated the standard deviation of their responses to each statement. I then combined means and standard deviations for construct two (TDSC). Next, I ranked the items by frequency of response.

There was a higher student response mean for question nine in both the fall 2017 ($M = 4.44$) and winter 2018 ($M = 4.37$) surveys. This question addressed the course's application of theories and concepts to practical problems in new situations. Question seven related to the course's emphasis on synthesizing and organizing ideas, information, or experiences had means of $M = 4.20$ (fall 2017) and $M = 3.98$ (winter 2018). Question eight related to the course helping students make judgements about the value of information, arguments, or methods had the widest variability in responses for construct two with $SD = 1.00$ in fall 2017 and $SD = 1.05$ in winter 2018.

Students strongly agreed (62.9% in the fall 2017 and 51.6% in the winter 2018 semester) that the course emphasized applying theories and concepts to practical

problems or in new situations. Fall 2017 students also strongly agreed (45.7%) that the course emphasized synthesizing and organizing ideas, information, or experiences into new, more complex interpretations and relationships.

The mean for construct two was somewhat less in winter 2018 ($M = 4.07$) than in fall 2017 ($M = 4.20$) indicating that transactional distance between students and course content (TDSC) was slightly higher for students enrolled in CS 124 during the winter 2018 semester. The standard deviation for this construct ranged from $SD = 0.77$ and $SD = 0.80$, signifying a lower variability around the mean than was identified for construct one. My research question for this construct was, “How and to what extent will participation in a virtual community influence the transactional distance between students and course content?” Again, there seemed to be no evidence through the data collected in the survey that the use of Slack influenced the transactional distance between students and course content for students enrolled in online sections of CS 124. The means of each question were lower for the students using Slack during winter 2018 semester than those using the discussion board tool during fall 2017.

Table 4

CS 124 Survey Response Descriptive Statistics and Percentages (Construct 2: Transactional Distance between Student and Content)

Term	Item	N	Mean	Standard Deviation	5 Strongly Agree	4 Somewhat Agree	3 Neither Agree nor Disagree	2 Somewhat Disagree	1 Strongly Disagree
48 Fall 2017	Q7: This course emphasized SYNTHESIZING and organizing ideas, information, or experiences into new, more complex interpretations and relationships.	70	4.20	0.94	45.7%	35.7%	14.3%	1.4%	2.9%
	Q8: This course emphasized MAKING JUDGEMENTS about the value of information, arguments, or methods such as examining how others gathered and incorporated data and assessing the soundness of their conclusions.	70	3.93	1.00	32.9%	37.1%	22.9%	4.3%	2.9%
	Q9: This course emphasized APPLYING theories and concepts to practical problems or in new situations.	70	4.44	0.96	62.9%	28.6%	2.9%	1.4%	4.3%
	C2: Transactional Distance between Student and Content	70	4.19	0.80	47.1%	33.8%	13.3%	2.4%	3.3%
Winter 2018	Q7: This course emphasized SYNTHESIZING and organizing ideas, information, or experiences into new, more complex interpretations and relationships.	62	3.98	0.97	37.1%	32.3%	22.6%	8.1%	0.0%
	Q8: This course emphasized MAKING JUDGEMENTS about the value of information, arguments, or methods such as examining how others gathered and incorporated data and assessing the soundness of their conclusions.	62	3.85	1.05	29.0%	45.2%	9.7%	14.5%	1.6%
	Q9: This course emphasized APPLYING theories and concepts to practical problems or in new situations.	62	4.37	0.77	51.6%	37.1%	8.1%	3.2%	0.0%
	C2: Transactional Distance between Student and Content	62	4.07	0.77	39.2%	38.2%	13.4%	8.6%	0.5%

A 5-point Likert scale was used for all survey items: 5, strongly agree; 4, somewhat agree; 3, neither agree nor disagree; 2, somewhat disagree; and 1, strongly disagree.

Construct 3: Transactional Distance between Students and Students

Shown in Table 5 are the descriptive statistics and response frequencies for the 5-item construct surrounding transactional distance between students and other students (TDSS) for the fall 2017 and winter 2018 semesters. As with the previous two constructs, I ranked these items according to the value students placed on them as designated by the mean of their agreement with the survey statements. Again, using SPSS version 24 software, I calculated the mean response for each statement as well as the standard deviation. I also calculated the combined means and standard deviations for construct three. I then ranked the response frequency by item.

Overall, the means of the third construct related to transactional distance between student and other students was higher than the other two construct means for both semesters with fall 2017 means of $M_{C1} = 4.01$, $M_{C2} = 4.19$, and $M_{C3} = 4.28$, respectively, and winter 2018 means of $M_{C1} = 3.90$, $M_{C2} = 4.07$, and $M_{C3} = 4.31$.

Students seemed to be as united in their answers for questions in construct three as they were for the previous constructs. Question 10 related to them getting along well with their classmates had some of the highest means ($M_{fall2017} = 4.53$ and $M_{winter2018} = 4.47$). Question 13 related to classmates valuing a student's ideas and opinions very highly had means $M = 4.43$ during fall 2017 and $M = 4.48$ during winter 2018 surveys. The broadest variability in responses occurred in question 12 related to classmates valuing a student's ideas and opinions in fall 2017 (.98) and question 11 related to feeling valued by fellow classmates (1.08) in winter 2018.

As shown in Table 5, 65.7% of the students enrolled in CS 124 during the fall 2017 semester and 64.5% of the students enrolled during the winter 2018 semester strongly agreed with the statement that they got along well with their classmates. Fall 2017 (62.9%) and winter

2018 (64.5%) students also strongly agreed that classmates respected them in the class. The mean for construct three was somewhat higher in winter 2018 ($M = 4.31$) than in fall 2017 ($M = 4.28$) indicating that transactional distance between students and other students (TDSS) was slightly lower for students enrolled in CS 124 during the winter 2018 semester. The standard deviation for this construct ranged from $SD = 0.77$ to $SD = 0.79$.

My research question for construct 3 was, “How and to what extent will participation in a virtual community influence the transactional distance between students and other students in the same courses?” There seemed to be little evidence through the survey data that the use of Slack influenced the transactional distance between CS 124 online students and other students in their course, though of the three constructs, this is the only one that seemed to show a decrease in transactional distance. Question 14 showed the greatest difference in means with a 0.16 increase from fall 2017 to winter 2018. This question concerned class members being supportive of a student’s ability to make his or her own decisions. Other positive differences in means ranged from 0.02 for question 12 regarding classmates valuing students’ ideas and opinions very highly to 0.05 for question 13 that involved classmates respecting students. There was a negative difference in means (-0.06) for question 10 on the subject of students getting along well with their classmates.

Table 5

CS 124 Survey Response Descriptive Statistics and Percentages (Construct 3: Transactional Distance between Student and Other Students)

Term	Item	N	Mean	Standard Deviation	5 Strongly Agree	4 Somewhat Agree	3 Neither Agree nor Disagree	2 Somewhat Disagree	1 Strongly Disagree
Fall 2017	Q10: I get along well with my classmates.	70	4.53	0.79	65.7%	25.7%	5.7%	1.4%	1.4%
	Q11: I feel valued by the class members in this online course.	70	4.14	0.95	42.9%	35.7%	17.1%	1.4%	2.9%
	Q12: My classmates in this online class value my ideas and opinions very highly.	70	4.06	0.98	40.0%	34.3%	18.6%	5.7%	1.4%
	Q13: My classmates respect me in this online class.	70	4.43	0.86	62.9%	20.0%	15.7%	0.0%	1.4%
	Q14: The class members are supportive of my ability to make my own decisions.	70	4.23	0.94	51.4%	24.3%	21.4%	1.4%	1.4%
	C3: Transactional Distance between Student and Other Students	70	4.28	0.79	52.6%	28.0%	15.7%	2.0%	1.7%
Winter 2018	Q10: I get along well with my classmates.	62	4.47	0.84	64.5%	21.0%	12.9%	0.0%	1.6%
	Q11: I feel valued by the class members in this online course.	62	4.18	1.08	53.2%	22.6%	16.1%	4.8%	3.2%
	Q12: My classmates in this online class value my ideas and opinions very highly.	62	4.08	0.98	45.2%	22.6%	29.0%	1.6%	1.6%
	Q13: My classmates respect me in this online class.	62	4.48	0.76	64.5%	19.4%	16.1%	0.0%	0.0%
	Q14: The class members are supportive of my ability to make my own decisions.	62	4.39	0.78	56.5%	25.8%	17.7%	0.0%	0.0%
	C3: Transactional Distance between Student and Other Students	62	4.31	0.77	56.8%	22.3%	18.4%	1.3%	1.3%

A 5-point Likert scale was used for all survey items: 5, strongly agree; 4, somewhat agree; 3, neither agree nor disagree; 2, somewhat disagree; and 1, strongly disagree.

Summary

I collected survey data from 132 online CS 124 students who had previously completed the PathwayConnect program during the fall and winter semesters of 2017-2018. Through a descriptive analysis of the transactional distance survey results, I was able to calculate that the transactional distance between students and their teachers (TDST) as well as the transactional distance between students and their course content (TDSC) slightly increased when students used Slack to facilitate their discussions. At the same time, the transactional distance between students and their classmates (TDSS) somewhat decreased for students who used Slack.

CHAPTER 5

DISCUSSION

This chapter includes lessons learned, findings, implications for practice and research, and a personal reflection concerning my research study of CS 124 online students who completed PathwayConnect. I have also included some of my previous research findings as well as additional institutional research data.

The purpose of my research study was to examine the influence of student participation in a virtual community designed to reduce the transactional distance (Moore, 1997) of Brigham Young University-Idaho (BYU-I) online students who completed the PathwayConnect program. My intended intervention involved designing an online community in Slack to enable students in two to four sections of Computer Science 124 (CS 124) to learn from and engage with each other. I planned to measure the transactional distance of all online sections of CS 124 including at least one section of students not participating in the virtual online community at the end of the winter 2018 semester. I had hoped to reduce transactional distance and better support PathwayConnect students who transitioned to BYU-I.

Lessons Learned

Initially, with the course leader's approval, I designed one virtual Slack community to be used across multiple CS 124 online sections so that students, instructors, teaching assistants, and advisors could all participate together. This design allowed students enrolled in selected sections of CS 124 to still participate in their course's Developers' Forums but focused on providing access to the larger Slack

community. The course leader planned to remove the requirement to participate in the Developers' Forum.

CS 124 has used the Developers' Forum as a requirement of the online course for the past few years. This forum utilized the learning management's discussion board tool and accounted for much of a student's participation grade in the course. Each online course section had a separate forum and students, as well as their instructor, were able to ask questions and provide feedback to each other. Online instructors used the forum to grade students' participation in the course. However, unlike campus sections of CS 124, online students did not have access to fellow students outside of their course, computer lab teaching assistants, alumni, or advisors. The Slack community was designed to give them that access.

After weeks of planning however, the course leader along with the online course representative seemed uncomfortable changing the current Developers Forum model. Additionally, they wanted to use Slack instead of the discussion board tool for the Developers' Forum for all online sections of CS 124. Though I did create the larger virtual community in Slack for all online sections of CS 124, students were still required to participate in their individual Slack communities for a grade. Thus, few students participated in the larger virtual community when they were required to use their section Developers' Forums.

The decision to move the Developers' Forum to Slack in all online CS 124 sections no longer provided me with a way to compare my results. Therefore, before the end of the fall 2017 semester, I used the survey I planned for the winter 2018 semester to

gather comparative data. At the course leader's request, in addition to the original Slack channel, I created individual channels for six sections of CS 124 for each of the 14 lessons in the course, making a total of 85 channels. Though the Slack discussion tool allowed for greater synchronicity, 14 separate channels in each course and access to one larger channel did not provide discussion continuity within the course or across sections.

Findings

Over 72 students, teaching assistants, and advisors participated in the CS 124 2018 Winter Cohort Slack Channel with 430 posts as shown in Table 6. In comparison, students and instructors posted anywhere from 3,535 to 27,269 messages in their course sections.

Table 6

CS 124 Slack Channels, Members, and Messages Sent

Slack Channels	Channel Members	Messages Sent
CS 124 Winter Cohort	72	430
CS 124:13	49	3,535
CS 124:14	43	27,269
CS 124:15	48	7,257
CS 124:16	42	3,811
CS 124:17	42	8,221
CS 124:18	46	9,720

Note. Channel members included students, instructors, teaching assistants, advisors, and the researcher.

My research study was designed to measure the transactional distance of online students who completed the PathwayConnect program and participated in a virtual community and compare them to those who did not participate. My research questions were:

1. How and to what extent will participation in a virtual community influence the transactional distance between students and course content? (TDSC)
2. How and to what extent will participation in a virtual community influence the transactional distance between students and their instructors/teaching assistants? (TDST)
3. How and to what extent will participation in a virtual community influence the transactional distance between students and other students in the same courses? (TDSS)

I noted the transactional distance survey results in the previous chapter. These descriptive analysis results demonstrated that the transactional distance of winter 2018 students who used Slack as their primary means to communicate in the Developers' Forum instead of the learning management's discussion board tool used by students who completed PathwayConnect in the fall 2017 semester varied only slightly. The difference in means for Construct 1 measuring the transactional distance between students and instructors ($M_{fall\ 2017} = 4.01$ and $M_{winter\ 2018} = 3.90$) was a little less (0.11) for PathwayConnect completers enrolled in the winter 2018 semester. The difference in means for Construct 2 measuring the transactional distance between students and course content ($M_{fall\ 2017} = 4.19$ and $M_{winter\ 2018} = 4.07$) was also little less (0.12) for students who

completed PathwayConnect and used Slack instead of the discussion board tool. The difference in means for Construct 3 measuring the transactional distance between students and other students ($M_{fall\ 2017} = 4.28$ and $M_{winter\ 2018} = 4.31$) was slightly higher (0.03) for winter 2018 students who completed PathwayConnect.

I was unable to isolate the data for winter 2018 students who participated in the CS 124 Winter Cohort Slack Community that I created and those who did not participate. Changes in my original virtual community design, the required Developers' Forum tool, and limitations in gathering data from only students who participated in the CS 124 Winter Cohort Slack Community made it impossible to answer my original research questions.

I attribute my inability to answer the original research questions to many factors, including my own inexperience. I thought that using data from the transactional distance scale developed and tested by Zhang (2003) and then Paul et al. (2015) would help me narrow my focus and provide more valid results. I thought that I would be able to implement my intervention as designed and I thought that I would be able to compare the experience of PathwayConnect completers who participated in the virtual community and those who did not.

First, I would like to address the survey tool I used to measure transactional distance. Zhang (2003) and later Paul et al. (2015) tested and successfully used this tool to measure transactional distance effectively. While the instrument I used may have been a reliable measure of transactional distance, it may not have adequately measured the influence of my intervention. Because my study did not specify any other means of

collecting data, I was not able to conclude that there was evidence that the use of Slack in CS 124 lessened transactional distance, though it may have improved students' engagement, their sense of satisfaction, and their intention to persist in the course.

I wanted to see if institutional aggregated data might demonstrate that the use of Slack may have influenced engagement and persistence in the form of higher final grades and course pass rates and lower withdrawal rates (see Tables 7-9). Interestingly, there was an increase in average final grade (2.37 to 2.54; bolded in Table 7) and in pass rate (68% to 73%; bolded in Table 8) for online students between fall 2017 and winter 2018. Furthermore, the student withdrawal rate dropped from 20% in fall 2017 to 18% in winter 2018 (bolded in Table 9). These data may or may not be related to students' use of Slack and were not part of my original research design, though they seem to address my underlying objective to improve the experience of our online students through participation in a virtual community.

Table 7
CS 124 Historical Final Grade Information

Mode	Fall 2016	Winter 2017	Spring 2017	Fall 2017	Winter 2018	Spring 2018
Campus	2.60	2.28	2.38	2.37	2.27	2.21
Online	2.48	2.38	2.27	2.37	2.54	1.82

Note. Average final grades based on a 4.00 scale. The grades include unofficial withdrawal rates.

Table 8
CS 124 Historical Pass Rate Information

Mode	Fall 2016	Winter 2017	Spring 2017	Fall 2017	Winter 2018	Spring 2018
Campus	78%	69%	70%	66%	68%	65%
Online	73%	66%	70%	68%	73%	55%

Note. Percent of students who received a C- grade or above.

Table 9
CS 124 Historical Withdrawal Rate Information

Mode	Fall 2016	Winter 2017	Spring 2017	Fall 2017	Winter 2018	Spring 2018
Campus	6%	8%	8%	9%	8%	8%
Online	33%	26%	24%	20%	18%	25%

Note. The number of students with an enrollment status of “Withdrawn” divided by the number of students with an enrollment status of “Registered” or “Withdrawn.”

Second, I was not able to implement my intervention in the way that I had initially intended. There is no way to know if my research design results would have differed had I been able to create a virtual community designed to address student engagement without tying participation to grades. While I do think the use of Slack enabled students to receive frequent feedback more readily (Tinto, 2012), increase autonomy and their sense of belonging (Moore, 1997), and provide additional opportunities for them to learn from each other (Gorski, 2004), I did not measure these items in my study. The average number of messages sent in the Slack Developers’ Forum channels was 9,969 (see Table 6). I do not have data on the number of posts that fall 2017 students made to their Developers’ Forums in their discussion boards, nor did I measure the substance of students’ comments. It is possible that some comments were merely an acknowledgment of a message received, which may or may not have helped students feel more a part of a

community. Construct 3 measuring the transactional distance between students and other students was the only one that showed an increase in means, albeit very small (see Table 5) for winter 2018 students.

Finally, I was not able to differentiate between those students who participated in the CS 124 Winter Cohort Slack Community and those who did not. While all CS 124 students used Slack in their online courses during the winter 2018 semester, I have no way of knowing which of those students participated in the larger virtual community I created. My lack of forethought in finding a way to gather the data once the research design was modified meant that the data I did collect was not targeted, but came from any PathwayConnect completer enrolled in CS 124 during the winter 2018 semester.

I believe the use of Slack did make a positive difference for students, though it did not seem to decrease their transactional distance according to the survey results. I met with online instructors following the first week of the winter 2018 semester and they were impressed with the frequency of students' responses to other students as well as everyone's ability to address issues via their cell phones. The discussion board tool from the learning management system did not allow them to facilitate discussions or identify issues as readily. I believe using Slack did provide a way for students to increase dialogue and interaction and allowed for greater learner autonomy (Moore, 1989, 1997).

Additionally, the increase in final grades (+0.17) shown in Table 7 and course pass rates (+5%) shown in Table 8, as well as the decrease in course withdrawal rates (-2%) shown in Table 9 seem to indicate that learning increased for online students. Of course, it is not known if that increase is due to the use of Slack or some other variable or

combination of variables. It is interesting to note that during the spring 2018 semester, online students used Slack as their Developers' Forum tool but did not have access to the larger Slack community. Their final grades dropped from 2.54 during winter 2018 to 1.82 during spring 2018. The course pass rate dropped from 73% to 55%, and the course withdrawal rate increased from 18% to 25%.

Implications for Practice

In my current role as Student Affairs Director, I will continue to focus on helping students overcome obstacles they face in their online experience to help improve their persistence and success. While I believe using Slack did make a difference for CS 124 online students, I believe there is still much that needs to be done to reduce transactional distance and thus increase learning and improve the overall experience for students who completed the PathwayConnect program and transition to BYU-I. I am now even more convinced that the need for students to create and construct personal meaning through their interaction with others (Vygotsky, 1962) is necessary and am determined to find a way for more of our students to have the opportunity to participate in a virtual environment.

Having been an online student for over six years and having worked to resolve online student concerns for the past five years, I have come to better understand the need for students to participate with others to stretch beyond their own capacity (Borthick, Jones, & Wakai, 2003) and to share in learning that is relevant and problem-focused (Knowles, 1984). We are in the process of changing the way we serve our PathwayConnect students to help them feel more connected. For example, we are

creating a student portal so that students can access the services they need from one website location. We are embedding teaching assistants in each online course. We are providing mentors to at-risk student populations as well as to those whose participation or grades start to drop.

The use of Slack seemed somewhat successful at providing that opportunity for them. During my intervention, I was able to read comments posted to Slack from classmates, advisors, and teaching assistants just minutes after students sent a request for help. These conversations seemed universal across all CS 124 online sections and took place throughout the day and night. Students seemed to benefit from sharing and learning from each other's experiences (Gorski, 2004) and expressed relief and gratitude for the help they received.

Implications for Research

Through my previous cycle of research, I found that students felt less connected and less supported in their BYU-I online courses than their PathwayConnect courses and that teaching one another was personally rewarding and engaging for them. While survey results from this cycle of research provided little evidence that the use of Slack for the CS 124 Developers' Forum reduced transactional distance, aggregated final grades, pass rates and withdrawal rates for online students did improve. Moreover, online instructors commented that students seemed to participate in online discussions more often due, at least in part, to Slack's ability to provide more synchronous conversations. Most of the conversations were comprised of students asking and answering questions as well as them sharing concerns and successes.

From this action research cycle, I recognized the importance of using more than one instrument to measure my results and testing an instrument before using it. Perhaps I should have specified the comparison of grades, pass rates, and withdrawal rates along with the transactional distance in my Institutional Review Board request. Additionally, it may have been beneficial to have provided pre- and post-test transactional distance surveys. For instance, I could have surveyed students after the first or second lesson and then again after the last lesson of the course.

As an extension of my study, I would like to compare the winter 2018 transactional distance data of domestic and international students. I wonder what the differences will be in student responses as they relate to transactional distance between students and instructors, students and course content, and students and other students.

Adams (2013) found that international students seemed to exhibit a “pattern of isolation and independence” (p. 66) and highly valued interaction with their instructors. Furthermore, international students were often frustrated with group assignments and interrelating with their peers and focused more on task completion rather than building community (Adams, 2013). It would be fascinating to explore similarities and differences in the responses of the winter 2018 student population filtered by geography. Would I find that a student’s cultural values and norms affected their sense of community and level of academic engagement? Understanding how culture influences a student’s transactional distance will have design implications for PathwayConnect and BYU-I online communities, especially when student populations are so culturally diverse.

I would also like to conduct a small case study that would involve PathwayConnect students during the third semester of their program. I believe placing the virtual community in the last semester of their program will help to establish it before students matriculate and will address the experience gap that occurs when they transition from the PathwayConnect program where they have had physical support in a weekly gathering to a fully online program with no gatherings whatsoever.

Possible research questions might be, “What are the benefits of participating in a virtual community?” and “What are the drawbacks of participating in a virtual community?” I believe much of what I will learn about our online students, the services we provide them, and how they interact with our programs will be better understood through studying specific cases in detail and within context (Yin, 2017). I am hopeful my case study will raise awareness and provide insight regarding the need online students have to participate in synchronous communication utilizing technology tools that support and help build community among each other.

Personal Reflection

Who would have guessed that I, someone with a previous aversion to research and a disdain for those who participated in it, would now respect and embrace the action research process? Of course, knowing what I know now, I would probably have changed many things about my research study that would have made it more successful. Perhaps though, that would have made me think I had solved the problem with just one intervention and a few research cycles, and my dissertation and all I learned from it would just be put on a shelf and never revisited.

If reducing transactional distance and thus improving the online student experience were easy, many more experienced researchers than I would have figured it out by now. I think I may spend many more years working on the formula for an effective, scalable community model that will work across multiple disciplines and cultures for our PathwayConnect students. I believe my limited successes will cause me to delve deeper, to discover more, and to continue cycling through the iterative research process to find ways to improve the lives of our students around the world. I am honestly excited to conduct additional research and look forward to learning from the research of others, especially those working to improve the online student experience. I am grateful for all who have patiently taught me and stretched me and provided ways for me to create new understanding and meaning in my work. You have made a wonderful and positive difference in my life and have changed the way I look at the world and the problems to be solved.

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APPENDIX A

ZHANG'S SCALE OF TRANSACTIONAL DISTANCE AND OUTCOMES

ST = Transactional distance between students and teacher

1. The instructor generally answers the student's questions
2. The instructor pays no attention to me
3. I receive prompt feedback from the instructor on my academic performance
4. The instructor was helpful to me
5. The instructors are available to answer my questions
6. The instructor can be turned to when I need help in the course

SC = Transactional distance between student and content

7. The content of this course is of great interest to me
8. I don't know why I have to learn this
9. The examinations in this course have challenged me to do my best work
10. This course emphasized SYNTHESIZING and organizing ideas, information, or experiences into new, more complex interpretations and relationships
11. This course emphasized MAKING JUDGEMENTS about the value of information, arguments, or methods such as examining how others gathered and incorporated data and assessing the soundness of their conclusions
12. This course emphasized APPLYING theories and concepts to practical problems or in new situations

SS = Transactional distance between students and students

13. I learned a lot from observing the interactions among the students
14. The students in this online class challenged me to do my best work
15. I get along well with my classmates
16. I feel valued by the class members in this online class
17. My classmates in this online class value my ideas and opinions very highly
18. My classmates respect me in this online class
19. I am good at working with the other students in this online class
20. I feel a sense of kindred spirit with my fellow classmates
21. The class members can be turned to when I need help in the course
22. There are students I can turn to in this online class
23. The class members are supportive of my ability to make my own decisions

SI = Transactional distance between students and interface

24. It is difficult to pay attention to the instructor in the web environment
25. I have adequate access to the web resources I need
26. The fact that I am online does not inhibit my class participation
27. An efficient system is provided for students and instructor to exchange materials
28. I am comfortable using the computer
29. I hate using the web
30. It was easy for me to use the technology involved with this online class
31. The technology used in this course is difficult to learn and use

Outcomes

SL = Student learning

I have learned a great deal in this online class

LG = Learning goals

I have made tremendous progress towards my goal in the subject area of this course

SS = Student satisfaction

Overall, I am satisfied with this course

APPENDIX B

PAUL, SWART, ZHANG, AND MACLEOD'S REVISED SCALE

TDST = Transactional distance between students and teacher

1. The instructor pays no attention to me
2. I receive prompt feedback from the instructor on my academic performance
3. The instructor was helpful to me
4. The instructor can be turned to when I need help in the course

TDSC = Transactional distance between student and content

5. This course emphasized SYNTHESIZING and organizing ideas, information, or experiences into new, more complex interpretations and relationships
6. This course emphasized MAKING JUDGEMENTS about the value of information, arguments, or methods such as examining how others gathered and incorporated data and assessing the soundness of their conclusions
7. This course emphasized APPLYING theories and concepts to practical problems or in new situations

TDSS = Transactional distance between students and students

8. I get along well with my classmates
 9. I feel valued by the class members in this online class
 10. My classmates in this online class value my ideas and opinions very highly
 11. My classmates respect me in this online class
- The class members are supportive of my ability to make my own decisions

APPENDIX C

CYCLE 1: QUALITATIVE INTERVIEW QUESTIONS

1. How did you become interested in the PathwayConnect program?
2. What was your experience as a PathwayConnect student?
3. What was your experience as a BYU-Idaho online student?
4. How did these two experiences differ?
5. What challenges, if any, did you encounter?
6. How would you describe your life now related to learning?
7. How did your experiences in PathwayConnect and BYUI-Idaho online affect your feelings about your future?
8. What more would you like me to know about your experiences in PathwayConnect and BYU-Idaho online?
9. What, if anything, would you change?

APPENDIX D

MODIFIED REVISED SCALE OF TRANSACTIONAL DISTANCE

TDST = Transactional distance between students and teacher

1. The instructor or teaching assistant pays no attention to me
2. I receive prompt feedback from the instructor or teaching assistant on my academic performance
3. The instructor or teaching assistant was helpful to me
4. The instructor or teaching assistant can be turned to when I need help in the course

TDSC = Transactional distance between student and content

5. This course emphasized SYNTHESIZING and organizing ideas, information, or experiences into new, more complex interpretations and relationships
6. This course emphasized MAKING JUDGEMENTS about the value of information, arguments, or methods such as examining how others gathered and incorporated data and assessing the soundness of their conclusions
7. This course emphasized APPLYING theories and concepts to practical problems or in new situations

TDSS = Transactional distance between students and students

8. I get along well with my classmates
9. I feel valued by the class members in this online class
10. My classmates in this online class value my ideas and opinions very highly
11. My classmates respect me in this online class
12. The class members are supportive of my ability to make my own decisions