

An Exploration of SDT Need Fulfillment in a Synchronous Online Learning Environment

by

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ABSTRACT

In this paper, I report results from a qualitative case study that explores SDT need fulfillment within a synchronous online learning environment. SDT addresses how the sociocultural conditions an individual experiences impact their motivation, development, and wellness. An individual who experiences sociocultural conditions that satisfy their needs for autonomy, competence, and relatedness will develop autonomous motivation. As course instruction moves online, it is important to understand if and how online learning spaces can impact learner motivation. My data analysis and resultant code network reveal the fulfillment of the SDT need fulfillment pathway within a synchronous online learning environment. Additionally, the code network reveals that the structure of a course, the quality of communication and feedback, the provision of choice, and the instructor's personability and commitment are all linked to need fulfillment. This study's implications will inform course design within online learning environments and future research in online learning.

Keywords: SDT; online learning; synchronous; motivation

AUTHOR'S DECLARATION

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Andrew V. DiVito

STATEMENT OF CONTRIBUTIONS

I hereby certify that I am the sole author of this thesis and that no part of this thesis has been published or submitted for publication. I have used standard referencing practices to acknowledge ideas, research techniques, or other materials that belong to others. Furthermore, I hereby certify that I am the sole source of the creative works and/or inventive knowledge described in this thesis.

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LIST OF ABBREVIATIONS AND SYMBOLS

| | |
|------|---|
| SDT | Self Determination Theory |
| CET | Cognitive Evaluation Theory |
| OIT | Organismic Integration Theory |
| LMS | Learner Management System |
| CSCL | Computer-Supported Collaborative Learning |
| TAM | Technology Acceptance Model |
| PLN | Professional Learning Network |

Chapter 1: Introduction

1.1 Context

This study arose out of my quest to improve my own teaching practice. As a classroom teacher, my primary goal is to establish a learning environment where each of my students can thrive. To inform my own teaching practice, I began to review pedagogical literature related to student autonomy, creativity, drive, inquiry, and motivation. In what began as a personal quest to improve my own teaching practice, I became aware of a psychological metatheory with significant overlap to education: Self Determination Theory (SDT). SDT is a versatile theory that has been applied to a range of domains, including healthcare, sport, religion, education, work, and psychotherapy (Ryan & Deci, 2000). In my case, I was particularly interested in the application of SDT to education and pedagogy. Applied to the realm of education, SDT stipulates that satisfying a learner's needs for autonomy, competence, and relatedness will result in their experience of autonomous motivation, ultimately leading to improved learning outcomes. In education, autonomous motivation is linked to improved learning outcomes such as increased comprehension, improved performance, increased participation, more creativity, increased efficiency, and improved focus (Deci & Ryan, 2008a). Within the education domain, SDT has been used extensively within physical classroom environments as a framework to investigate motivation and its impact on course objectives. (e.g., Niemiec & Ryan, 2009). The sociocultural conditions that have the greatest impact on learners' autonomy, competence, and relatedness needs have been studied extensively.

While the research on SDT applied to physical learning spaces is robust, as will be discussed in Chapter 2, there are clear gaps in the research that applies SDT to online learning. I

found the lack of literature applying SDT to online learning environments surprising because of how ubiquitous online learning is becoming. In recent years, online learning has become an increasingly popular medium within post-secondary education, including within teacher education. Before COVID-19, 53% of Canadian universities' education programs were offered fully online (Bates, 2018). Additionally, in Ontario, the province that I reside, The Government of Ontario recently announced mandatory e-learning courses within funded high schools. Since so many of our learners will be receiving at least part of their education in online spaces, I thought it was important to understand how learner motivation occurs and is supported in online learning environments. As such, my inquiry evolved to focus specifically on the application of SDT to online learning environments.

In addition to there being clear gaps in the research that applies SDT to online learning, much of the research conducted around online learning fails to specify the online learning modality. A learner's experiences within an online course depend on the characteristics of the online course itself. For instance, a learner's experiences will differ between synchronous and asynchronous online courses. Thus, it is important to consider the format of online learning that is occurring when applying SDT constructs to online learning environments.

Although researchers have begun to explore the application of SDT and the SDT need fulfillment pathway to online learning, there are still clear gaps in the application of SDT to online learning environments. For instance, Chen et al. (2010) note that most studies that explore SDT in online learning environments only consider individual components of SDT and that there is a gap in "big picture" (p. 37) investigations. Therefore, there is a need for a study to explore the SDT need fulfillment pathway as a whole, as it applies to online learning environments.

1.2 Purpose

The purpose of my investigation was to utilize a qualitative approach to holistically explore the SDT need fulfillment pathway within synchronous online learning environments for pre-service teacher candidates. Pre-service teachers are well suited for this study because they are learners that can offer a unique perspective; after all, pre-service teachers are actively learning about pedagogical practice and are therefore more cognizant of effective teaching. For my investigation, I aim to explore:

- I. if and how pre-service teacher candidates' autonomy, competence, and relatedness needs are satisfied within a synchronous online semester;
- II. how SDT need fulfillment impacts a learner's autonomous motivation, and in-turn, learning outcomes; and,
- III. the external factors and constructs that have the greatest impact on the perception of SDT need fulfillment.

In light of these aims, I ask the following research questions:

1. Are SDT needs fulfilled within a fully synchronous online learning environment?
 - b. If SDT needs are fulfilled, how are they fulfilled?
2. Which instructional aspects within fully synchronous online learning environments are most supportive of learners' SDT needs?

To address these objectives, I use a qualitative multiple-case study approach to explore the social and environmental experiences created within synchronous online learning environments to develop an understanding of how synchronous online learning environments support or thwart the SDT need fulfillment pathway.

In the chapters that follow, I will first provide an overview of SDT (Chapter 2) and online learning as it applies to SDT (Chapter 3). Then, I will outline the methods that I used to conduct this investigation (Chapter 4), as well as the results (Chapter 5). Finally, I will discuss the findings (Chapter 6) and the implications (Chapter 7) of my study.

Chapter 2: Self Determination Theory

2.1 Introduction

Self Determination Theory (SDT) is a theory of motivation that addresses how the sociocultural conditions an individual experiences impact their motivation, development, and wellness (Ryan & Deci, 2000, 2008a, 2008b). SDT is a versatile theory used in various domains, including health care, sport, religion, education, work, and psychotherapy (Ryan & Deci, 2000). Deci and Ryan (1985) first introduced SDT in the 1980s. They sought to develop a psychological meta-theory that addressed a range of motivation phenomena. At the root of SDT is the idea that individuals are naturally motivated, driven, and curious, but their experiences can decrease or support optimal motivation (Deci & Ryan, 2008a). To support optimal motivation, experiences must satisfy the needs for autonomy, competence, and relatedness. Throughout this chapter, I provide examples from the field of education of each explored construct.

Autonomy, competence, and relatedness are basic needs for the development of autonomous motivation (Deci & Ryan, 2008a, 2008b). SDT emphasizes the importance of the type of motivation over quantity of motivation, distinguishing autonomous motivation from controlled motivation (Deci & Ryan, 2008a, 2008b). Specifically, autonomous motivation stems from choice and free will, whereas controlled motivation is the outcome of external pressures and influences. In the context of education, autonomous motivation is a greater predictor of learning outcomes than controlled motivation. Some of the learning outcomes resulting from autonomous motivation are increased comprehension, improved performance, increased participation, more creativity, increased efficiency, and improved focus (Deci & Ryan, 2008a).

Within schools, social and environmental contexts that support the needs for autonomy, competence, and relatedness supports autonomous motivation (Deci & Ryan, 2008a, 2008b). The

fulfillment of autonomy, competence, and relatedness needs impacts how the learner orients to the environment and their self-determination (Deci & Ryan, 2008b). Autonomy is experienced by individuals who feel as though they have control or an adequate understanding of why their control is reasonably limited (Filak & Nicolini, 2018). Within schools, teachers can provide students with a sense of autonomy by reducing assessment pressure, ensuring students have a voice within the classroom, and minimizing impositions (Niemiec & Ryan, 2009). A sense of relatedness is experienced by individuals who feel a sense of belonging or connectedness to other individuals (Filak & Nicolini, 2018). Within schools, teachers can provide students with a sense of relatedness by making their students feel like they genuinely care about them (Niemiec & Ryan, 2009). Finally, a sense of competence is experienced by individuals who seek out and develop expertise for tasks with meaningful outcomes (Filak & Nicolini, 2018). Within schools, teachers can provide students with a sense of competence by providing students with feedback and level-appropriate tasks (Niemiec & Ryan, 2009). The fulfillment of all three needs - autonomy, competence, and relatedness - leads to a greater sense of enjoyment and engagement and is a predictor for success within task-specific environments, such as schools (Filak & Nicolini, 2018).

2.1.1 Motivation

One of the core components of SDT is the distinction between intrinsic and extrinsic motivation. Learners are intrinsically motivated when they have an inherent interest in a learning activity or the direct satisfaction that the activity provides. In contrast, extrinsic motivation is based on external motivators, such as rewards or punishment avoidance. Intrinsic motivation is a type of autonomous motivation, whereas extrinsic motivation is not (Deci & Ryan, 2008a). Applied to education, students can be both intrinsically and extrinsically motivated. Students can

be intrinsically motivated by an interest in the academic content, and they can be extrinsically motivated by consequences of performing well (grades) or feedback from the teacher. Two sub-theories of SDT, Cognitive Evaluation Theory (CET) and Organismic Integration Theory (OIT), address intrinsic and extrinsic motivation, respectively.

In this section, I presented an overview of SDT theory and how it relates to education. In the next sections, I discuss two sub-theories that have branched off of SDT: Cognitive Evaluation Theory (CET) and Organismic Integration Theory (OIT), and apply them to educational contexts.

2.2 Cognitive Evaluation Theory (CET)

CET is a sub theory of SDT that focuses specifically on factors that affect intrinsic motivation (Ryan & Deci, 2000). Factors that affect a students' sense of autonomy or competence will impact their intrinsic motivation. In the context of education, providing students with choice enhances their intrinsic motivation by satisfying their need for autonomy (Deci & Ryan, 2008a). In contrast, evaluating students, threats of punishment, and constant supervision diminish a sense of autonomy and reduce intrinsic motivation. The need for competence also influences intrinsic motivation. Positive feedback leads to feelings of competence, leading to increased intrinsic motivation. On the other hand, negative feedback erodes feelings of competence, resulting in decreased intrinsic motivation. Consequently, educators should be aware of their potential impact on students' perceived autonomy and competence, but they should also be aware of the climate and context they create within the classroom. A supportive and informational environment and context are conducive to intrinsic motivation (Deci & Ryan, 2008a).

Motivation, specifically intrinsic motivation, is essential to learning. Individuals who are motivated experience enhanced performance, retention, persistence, course satisfaction, creativity, achievement, self-esteem, and well-being (Chen & Jang, 2010; Ryan & Deci, 2000). As noted above, intrinsic motivation is supported through autonomy and competence need fulfillment. As a result, educators must establish learning environments that fulfill students' needs for autonomy and competence. Establishing learning environments that fulfill students' needs for autonomy and competence will support a sense of intrinsic motivation within learners.

CET claims that autonomy and competence are necessary for intrinsic motivation, but a lack of relatedness can block intrinsic motivation. The idea that a lack of relatedness can block intrinsic motivation is supported by Ryan and Grolnick (1986). Within their study, Ryan and Grolnick (1986) found that when students perceive their instructor as distant, intrinsic motivation decreases. Additionally, some studies demonstrate a positive link between a sense of relatedness and increased intrinsic motivation. For example, Pat-El et al. (2012) found that teacher interpersonal behaviours positively impacted intrinsic motivation. Together these studies suggest the absence of relatedness can hinder intrinsic motivation (Pat-El et al., 2012; Ryan & Deci, 2000; Ryan & Grolnick, 1986).

Critiques of SDT often compare autonomy to independence. These critiques associate the notion of autonomy with the notion of independence. This association is contradictory to SDT because independence contrasts with relatedness (Deci & Ryan, 2000). However, studies like Ryan and Lynch (1989) have distinguished autonomy from independence. In terms of their respective definitions, autonomy refers to self-regulation or self-determination, whereas independence refers to self-reliance. The definitions of autonomy and independence are distinct in that an individual does not need to be self-reliant to be self-determined (Ryan & Lynch, 1989).

This concept that an individual does not need to be self-reliant to be self-determined is further supported by the notion that an independent individual can have an autonomous or controlled orientation (Deci & Ryan, 2008a). As such, to answer the critics, autonomy and independence are not the same. Studies have shown that relatedness, along with autonomy and competence, are conducive to intrinsic motivation. The positive benefits of relatedness on intrinsic motivation contradict the notion that autonomy is independence.

CET addresses intrinsic motivation; therefore the principles of CET only apply to tasks that are inherently interesting to the learner (Ryan & Deci, 2000). Within the context of education, the notion that CET applies only to inherently interesting tasks is a challenge because of the mandated or required curriculum. The curriculum mandates create rigidity by controlling the topics of study within learning environments (Wiggins, 2015). As such, not all school-oriented tasks may be inherently interesting to students (Niemi & Ryan, 2009). To combat curriculum rigidity, educators can provide agency or choice to learners. Educators who provide choice offer learners an opportunity to work within a set curriculum on topics that are interesting to them (Boaler, 2016). Although offering choice can be challenging to implement, choice provides learners with a sense of autonomy. Due to the challenges associated with offering choice, in practice, educators also rely on additional extrinsic motivators to entice students to complete learning tasks (Niemi & Ryan, 2009). These additional extrinsic motivators create a need to explore Organismic Integration Theory (OIT), the second sub theory of SDT.

2.3 Organismic Integration Theory (OIT)

Organismic Integration Theory (OIT) is a sub theory of SDT that identifies a range of motivation from amotivation to intrinsic motivation, highlighting the regulatory styles within each type of motivation (Ryan & Deci, 2000). The different regulatory styles of extrinsic

motivation are one of the core principles of OIT. OIT stipulates extrinsic motivation is internalized through introjected regulation, identified regulation, or integrated regulation. These three terms vary on a spectrum based on the extent to which the extrinsic motivator is internalized. Introjected extrinsic motivators are the least internalized, and integrated extrinsic motivators are the most internalized. The more internalized an extrinsic motivator is, the greater the sense of autonomy it will provide (Ryan & Deci, 2008a). As a result, identified and integrated extrinsic motivators lead to autonomous self-regulation (Niemic & Ryan, 2009). Whereas introjected or non-internalized extrinsic motivators are forms of controlled motivation (Ryan & Deci, 2000). Conversely, external regulation is not internalized. External regulation is experienced by learners who avoid punishment or seek salient rewards (Niemic & Ryan, 2009).

Extrinsic motivation that is regulated through an identified or integrated approach has an internal locus of causality (Ryan & Deci, 2000). Having an internal locus of causality means that the determinants of integrated and identified behaviours are internal. In the context of education, learners who are extrinsically motivated can still experience a sense of autonomy as they internalize the extrinsic motivator (Ryan & Deci, 2008a). Typically, learners with an internal locus of causality experience better learning outcomes. For example, Ryan and Connell (1989) reported that externally motivated students demonstrated less interest and effort towards tasks than internally motivated students. In addition, Deci and Ryan (2000) identified several studies that have highlighted the positive outcomes of students who internalize extrinsic motivators. Some of these outcomes include improved participation, increased persistence, increased grades, and increased learning perception (Deci & Ryan, 2000).

SDT proposes that the internalization of extrinsic motivators is supported by basic needs (autonomy, competence, relatedness) fulfillment (Ryan & Deci, 2008a). For example, a sense of

relatedness is important for the internalization of extrinsic motivation. Relatedness impacts internalization because modelled or valued behaviours from respected figures are the primary reason individuals internalize an extrinsic motivator (Deci & Ryan, 2000). The importance of relatedness is supported by Ryan, Stiller, and Lynch (1994), who found that students who perceived a connection to their teachers internalized desired behavioural outcomes. In addition to relatedness, Deci and Ryan (2000) also identify autonomy as an important component for internalizing extrinsic motivation. Autonomy in the form of choice and freedom allows people to internalize extrinsic motivators as their own (Deci & Ryan, 2000). To promote autonomy within classrooms, teachers should help students to see the value of behaviours and tasks so that they internalize them. This notion is supported by Deci, Eghrari et al. (1994), who found that providing a rationale for tasks, opportunities for choice, and acknowledging a variety of perspectives promoted internalization within learners (Deci & Ryan, 2008a).

In summary, OIT stipulates that through need fulfillment, learners will internalize extrinsic motivators. The internalization of extrinsic motivators is important because internalized extrinsic motivators are forms of autonomous motivation. Throughout this chapter, I have highlighted the benefits of autonomous motivation.

2.4 Modelling SDT Online

The link between intrinsic motivation and improved learning outcomes has been supported within online learning environments (Giesbers et al., 2013); however, it has also been challenged (Chen & Jang, 2010). Within their study, Chen and Jang (2010) created a model of SDT and applied it to an online course. Their model demonstrated that contextual support led to perceived need satisfaction, leading to self-determination (in-line with SDT). However, within their model, self-determination did not predict learning outcomes (contrary to SDT) (Chen & Jang, 2010). Of

note, relatedness support was omitted in favour of perceived relatedness within Chen and Jang's (2010) model. As noted above, relatedness is a predictor of increased motivation within online learning environments. The impact of relatedness on motivation seemed to be recognized within the follow-up study conducted by Chen and colleagues (Chen et al., 2010). Their follow-up study attempted to measure the importance of autonomy, competence, and relatedness to learning outcomes within an online environment. The authors noted:

this study shed important light on online learner support: multiple strategies should be integrated into the online learning environment to ensure that all three types of learner support are addressed. With sufficient support of autonomy, affiliation [relatedness], and ability [competence], students are more likely to internalize goals and values of online courses and become self-determined online learners (Chen et al., 2010, p. 46).

I felt it was important to include both Chen and Jang (2010) and Chen et al. (2010) because the Chen et al. (2010) study provided additional insight, as it was a follow up study to Chen and Jang (2010). The conclusions from Chen et al. (2010) support to idea that future studies should explore Chen and Jang's (2010) model while accounting for relatedness support to see if relatedness would produce alternate results.

A second important finding from Chen and Jang's (2010) study is that perceived support was a better predictor of learning outcomes than contextual support. Two important conclusions can be drawn from this. The first conclusion suggests that merely providing support is insufficient if it does not address student needs. The second conclusion suggests support/perceived support within online learning environments is more impactful. These two findings are important to instructors teaching within online learning environments, and future research is needed for further exploration.

In the next chapter, I present an overview of research related to online learning that is framed using SDT. At the end of the chapter, I tie the online learning research back to SDT.

Chapter 3: Research on Online Learning

3.1 Introduction

Distance learning is an umbrella term used to describe any course where the learner does not need to be physically present at the educational institution. Distance learning courses can be delivered through a variety of mediums; however, online is by far the most popular (Bates, 2018). In recent years there has been a substantial increase in distance learning courses (Bates, 2018; Chen et al., 2010). A recent Canadian national report (in Bates, 2018) noted that in 2017, 98% of universities and 96% of colleges offered distance learning courses. Of these distance learning courses, 98.3% were delivered primarily through the Internet, 44.8% involved some form of audio or video conferencing, and 11.2% involved live or recorded lectures. In contrast, only 22.4% utilized print resources. Together, these statistics show the prevalence of online learning, a type of distance learning that uses the Internet.

Online learning is the most prevalent form of distance learning. Online learning courses use the Internet and can be delivered using a synchronous or asynchronous approach (Bates, 2018). Considering both synchronous and asynchronous delivery methods, in 2017, 98.1% of universities and 94.4% of colleges offered online courses. These percentages are representative of an increase in the prevalence of online learning. The data from Bates' (2018) national investigation showed a clear upward trend in the prevalence of online learning courses. For example, between 2011 and 2015, there was roughly a 150% increase in Canadian universities' online courses. Similarly, there was an approximately 160% increase in the number of online courses offered by Canadian colleges outside Quebec. Student enrollment data mirrors the substantial increase in online course offerings. By 2015, 16% of all enrollments within Canadian

universities and 12% of all enrollments within Canadian colleges were for online courses (Bates, 2018).

The increase in the popularity of online courses is not uniform within all domains. Online courses are much more prevalent in the domain of education. Within the domain of education, the field of focus for this thesis, 77% of course offerings were available online. Over 50% of Canadian universities' education programs are offered fully online (Bates, 2018).

An increase in the prevalence of online courses is not unique to the post-secondary level. Recently, within Ontario, the Provincial Government announced mandatory online learning courses for all secondary students. As such, there is a need to explore online learning, especially since there is a significant variance in the delivery approaches of online courses (Bates, 2018).

3.2 Types of Online Courses

Online learning courses come in all shapes and sizes. Online courses can be unique in their delivery method (synchronous, asynchronous, or hybrid) and delivery platform or Learner Management System (LMS). The different delivery methods and platforms used within online courses will be discussed in the following paragraphs.

In terms of delivery methods, asynchronous delivery is by far the most popular. Skylar (2009) notes that in 2007, 92% of institutions offering online learning reported using an asynchronous method. Within asynchronous delivery, learners work through learning materials at their own pace - there is no live instruction or learning. Typically, an asynchronous delivery approach offers learners increased flexibility since learners can engage with learning materials at their own pace. Asynchronous learning can occur through various mediums, including discussion boards or recorded lessons, and a variety of platforms or LMS (Skylar, 2009). Alternatively, synchronous learning occurs when the learners and instructor interact with one another and the

learning material in real-time. Typically, conferencing platforms, like Zoom, Google Meet, or Adobe Connect, are used within the synchronous delivery approach (Skylar, 2009). Synchronous online learning offers less flexibility than asynchronous learning due to the obligations of live instruction. However, synchronous online learning is generally regarded as having more similarities to traditional instruction than asynchronous learning (Skylar, 2009).

Learning Management Systems (LMS) are a type of delivery platform used within synchronous and asynchronous online courses. LMSs are by far the most popular technology used within online courses, being used extensively within 87% of online course offerings (Bates, 2018). There are several different types of LMS, including Blackboard, Canvas, and Moodle. Some LMSs integrate video streaming and conferencing; however, neither video streaming nor conferencing are popular delivery methods within online courses. In fact, video streaming and conferencing are only used extensively within 20% and 24% of course offerings, respectively.

In terms of the prevalence of synchronous versus asynchronous learning - asynchronous online learning is significantly more popular. However, advances in technology have led to a recent increase in the prevalence of synchronous delivery. According to Skylar (2009), only 8% of institutions offer synchronous delivery in 2007. In comparison, Bates (2018) reports that 25% of institutions offer some form of synchronous delivery within their online courses.

I will further discuss the impact that the delivery platform and method have on online learning within the *learner experiences in online learning* section of this chapter. It should be noted that much of the online learning research does not indicate the type of online learning occurring. When a publication does not state the type of online learning occurring, I assumed that asynchronous online learning is occurring because 75% of online courses occur asynchronously (Bates, 2018). However, the lack of clarity regarding the type of online learning

creates a need for a systematic review of online learning literature to compare the findings of synchronous versus asynchronous online learning research. In the subsequent section, I will discuss the positive and negative attributes of online learning.

3.3 Positives and Negatives of Online Learning

Within online learning environments, the use of the Internet and computers allows learners to be in separate geographical regions. This physical distance is a significant contributor to the convenience of online courses as physical distance affords learners greater flexibility and improved access (Bates, 2018; Song et al., 2004). Participants in Bates' (2018) study selected greater flexibility and improved access as being perceived benefits of learning online. Improved flexibility, collaborative learning, and convenience are common themes in many studies (e.g., Bates, 2018; Marks et al., 2005; Song et al., 2004) that are often perceived as being most beneficial in choosing online instruction.

Online learning can be disadvantageous as well. When learners experience physical separation in online learning environments, the separation can result in psychological and communication gaps. These gaps lead to many of the challenges most commonly associated with online learning (Dennen et al., 2007). For example, psychological or communication gaps within online learning environments can result in a lack of prompt correspondence, delayed feedback, and feelings of solitude (Song et al., 2004). Importantly, features of online courses can result in communication gaps as well. For example, Song et al. (2004) identified the use of chat features as being restrictive of communication. Within Song and colleagues' (2004) investigation, learners noted that it was challenging to keep up with discourse and respond appropriately due to the volume of responses and information.

Challenges resultant from psychological or communication gaps are not the only identified issue with online learning environments. Within Bates' (2018) national inquiry, 83% of participants identified inadequate resources as a drawback to online learning. Additionally, 69% of participants identified inadequate instructor training as a drawback of online learning.

As noted in the previous section, online courses vary in their delivery method and platform. The differences between the delivery method and platform alter a learner's experience and the perceived positive and negative attributes of online courses. As such, examining learners' experiences within online learning can provide valuable insight into the teaching practices, delivery approaches, and overall structures of online courses that are most conducive to learning. These teaching practices, delivery approaches, and overall structures will help minimize the negative outcomes of psychological and communication gaps resulting from physical distancing. In the next section of this chapter, I will discuss research examining learner experiences within various online learning environments. These learner experiences are presented in four sections, connectedness, feedback, structure, and instructor, and are aligned with SDT.

3.4 Learner Experiences in Online Learning

Online learning is fundamentally different from in-person learning. These fundamental differences alter learners' experiences and interactions within online learning versus in-person learning environments. For example, the ways learners interact are different between online and in-person courses (Dennen et al., 2007). Additionally, the ways that learners interact with synchronous and asynchronous online courses also differ. Essentially, this means that different types of online courses will vary differently from in-person courses. The differences experienced by learners between online and in-person learning depends on several characteristics of the

online course. Some of these characteristics are the delivery method (synchronous or asynchronous), learning medium (LMS), and instructor. The differences between the characteristics of face-to-face, synchronous online, and asynchronous online create the need to consider the varying characteristics of online courses when comparing them to in-person learning.

Learners interact differently in online environments, regardless of format, compared to an in-person setting. Learner interactions change in online courses - these interactions include student-student interaction, student-instructor interaction, and student-content interaction (Dennen et al., 2007). In their investigation of interactions in online learning environments, Marks et al. (2015) found instructor-student interactions to be the greatest predictor of perceived learning. Additionally, student-student interactions also impacted perceived learning. Conversely, the impact of student-content interactions on learning was only partially supported.

Marks and colleagues' (2015) study partially supported the impact of student-content interactions on perceived learning. The lack of connection between student-content interaction and perceived learning within Marks et al.'s (2015) study can be attributed to the variables assessed by the authors. For example, the authors only measured concrete variables like frequency of PowerPoint presentations or number of individual/group projects. Marks et al. avoided theoretical constructs like interest. Interest in content is related to intrinsic motivation, which is a significant predictor of learning outcomes (Chen and Jang, 2010; Ryan & Deci, 2000). Additionally, the authors did not include quality measures in their variables. For example, a few exceptionally crafted PowerPoint presentations are likely superior to many subpar PowerPoint presentations. Together, the avoidance of theoretical constructs and the lack of quality measures

may have contributed to Marks and colleagues' (2005) findings only partially supporting the link between student-content interaction and perceived learning.

Within the online learning literature, student-instructor, student-student, and student-content interactions are affected by various factors. To simplify this chapter, I grouped these factors into four categories: connection, feedback, instructor, and structure. This chapter focuses specifically on how connection, feedback, the instructor and course structure impact learners' experiences within online courses. I chose to focus on connection, feedback, instructor, and structure because they appeared within the code network discussed in Chapter 5.

3.4.1 Connectedness is Online Learning

Communication barriers within online learning environments may decrease an individual's perceived sense of connectedness. A sense of connectedness is experienced by individuals who feel a sense of belonging to a community of learners (Filak & Nicolini, 2018). Fostering connectedness is important because learners that are part of a community are less likely to burnout or feel isolated (Rovai & Jordan, 2004). Additionally, experienced connections can have both cognitive and affective benefits. In terms of cognitive benefits, connectedness and community can expose learners to various viewpoints that may broaden their understanding of concepts. Additionally, in terms of affective benefits, connectedness and community have been linked to increases in learner motivation (Chen et al., 2010). Considering both cognitive and affective benefits, it is clear that fostering connectedness should be a priority for online instructors. With that said, learners can experience connectivity to many aspects of an online course. Learners can become connected to one another (student-student interaction), to their instructor (instructor-student interaction), or to the content itself (student-content interaction) (Marks et al., 2005).

All three forms of interaction (student-student, instructor-student, and student-content) have been demonstrated to impact perceived learning within online learning environments. Within the context of online learning, the perceived sense of interactivity amongst students increases with opportunities for small group discussions (Marks et al., 2005). In addition to student-student interaction, the perceived level of instructor-student interaction can also be enhanced within online learning environments. The quantity of student-instructor interactions is less significant than the quality of interactions (Dennen et al., 2007).

Marks et al. (2005) found instructor-student interaction can be the most significant predictor of perceived learning. Instructor behaviours that improved instructor-student interactions are “encouraging discussions, providing feedback, and sharing personal experiences” (p. 547). An example of how an instructor can encourage discussion includes positive welcome messaging and introductory conversations. It also creates stimulating discussion topics within synchronous and asynchronous discussions. These findings are in line with Dennen et al. (2007), who noted that instructor interactions that maintain “whole class presence” are more meaningful than instructor interactions targeted at individual students.

Interestingly, regarding student-student interaction measures, Marks et al. (2005) noted that small group discussions and peer-teaching opportunities did not have an impact on perceived learning. The authors did suggest this could be due to the low usage of small group discussions and peer-teaching opportunities. In contrast, Song et al. (2004) noted that synchronous meetings within online courses improved a learner’s connection to the instructor and other students - these connections helped to build community. Note that the flexible nature of online courses simplifies the collaboration process. The collaboration process is simplified because learners can interact online instead of arranging physical meeting times (Song et al., 2004).

Dennen et al. (2007) conducted a survey to determine which instructor actions had the greatest impact on learning within online environments. The authors surveyed instructors and students to determine which actions they believe impact student performance and satisfaction. The instructors identified instructor actions associated with communication, such as modelling communication protocols, prompt response to student inquiries, and clear communication of expectations as most impactful on student performance and satisfaction. Conversely, online learners rated instructor actions associated with communication, such as frequently checking emails, posting on discussion boards, and responding to questions as most important. Interestingly, students place greater value on instructor actions associated with interpersonal communication (Dennen et al., 2007). The fact that online learners value interpersonal communication further demonstrates the importance of connection in online learning environments. It is important to note that almost all of the instructor actions polled within Dennen and colleague's (2007) survey were rated as important by most participants. In addition, the authors themselves note that the application of their rankings to other online courses depends on the individual learners and unique course context. In addition to instructor actions associated with communication, Dennen et al. (2007) found instructor actions associated with feedback to be a significant predictor of learning within online environments.

3.4.2 Feedback in Online Learning

Feedback was identified as an important measure to support autonomy, competence, and relatedness within Chapter 2. Feedback fulfills the need for relatedness through care (Lawrence 2018), the need for autonomy when informational (Shroff & Vogel, 2009), and has also been linked to competence by Deci & Ryan (2008a). Feedback in online learning environments can increase student motivation (Xie et al., 2006).

Dennen et al. (2007) found that online instructors rated instructor actions associated with feedback, such as providing extensive feedback, timely feedback, and examples as most important. Learners also identified instructor actions associated with feedback, such as providing examples and timely feedback, as most important (Dennen et al., 2007). These findings are supported by Hara & Kling (2001), who note that a lack of timely feedback has been linked to feelings of anxiety, frustration, and confusion within online learners. Of note, within Dennen et al. (2007), students did not rate “provide extensive feedback” as highly as instructors. Students likely did not rate “provide extensive feedback” as high as instructors because of the wording - students want adequate personal feedback over extensive feedback.

In addition to its impact on students, feedback, or lack thereof, can also adversely affect online instructors. For example, the lack of social cues typically associated with online platforms fails to provide instructors with adequate feedback to recognize that students may be experiencing challenges. For example, in an in-person environment, an instructor may pick up on looks of confusion, whereas in an online environment, a student would have to express their confusion actively. As noted above, only 25% of online courses offer some form of synchronous delivery approach (Bates, 2018), suggesting that within 75% of online courses, the instructor may not have an adequate gauge of student understanding. As a result, it is more challenging for the instructor to pick up on students’ feelings of isolation, frustration, anxiety, and confusion within online learning platforms (Hara & Kling, 2001).

3.4.3 Structure in Online Learning

Within this chapter, the structure of an online course is used as an umbrella term to describe the design and delivery of a course. In essence, the structure refers to the instructional mediums (i.e., PowerPoint, recorded video, live video), the instructional platform (i.e., LMS),

and the overall approach used (i.e., synchronous, asynchronous, hybrid). The online course structure has a significant impact on interactivity (Marks et al., 2005). Additionally, the course design impacts how successful a learner will be (Song et al., 2004). For example, Song and colleagues (2004) identified familiarity with technology as an important aspect of learner success. The familiarity of technology can be improved through a course's structure by including an introductory lesson or tutorial to familiarize students with the learning tools.

The level of interactivity within an online course is also affected by the structure of the online course. Interactivity is important because interactivity within online learning environments is positively related to learning outcomes (Marks et al., 2005). One example of the impact that structure can have on interactivity is threaded dialogue within online discussions. Threaded dialogue can hinder collaborative learning, thus decreasing student-student interaction (Marks et al., 2005).

Other structural components within online environments that negatively affect learning include unclear or vague instruction. Unclear instruction can lead to feelings of anxiety, frustration, and confusion within online learners (Hara & Kling, 2001). It should be noted that correcting uncertainties has proven to be more challenging when utilizing text as opposed to in-person communication (Chen et al., 2010).

A few examples of course structures that learners have identified as positive include upfront information, concrete examples, and timely responses to inquiries and tasks (Dennen et al., 2007). Some of the instructor behaviours noted that impact the structure within an online course are clear assignment directions and course organization (Marks et al., 2005).

Within online learning environments, the course structure impacts student learning by affecting student-content interactions. As Marks et al. (2005) note, the utilization of various

instructional mediums can enhance student-content interactions. For example, multimedia technologies, like videoconferencing, can improve student-content interactions. Asynchronous, text-based online learning environments lack media richness and social presence, hindering student-content interactions (Marks et al., 2005).

3.4.4 Instructor Impacts on Online Learning

Instructors greatly influence the structure of an online course. As a result, there is some overlap between an instructor's impact and the course structure's impact. This section aims to highlight specific instructor actions that impact online learning. For example, an enthusiastic instructor has a positive impact on learning outcomes within online courses. Additionally, instructors who refer to students by name and offer knowledgeable responses to queries positively impact learner's experiences with online learning (Dennen et al., 2007).

Dennen et al. (2007) note that online instructors should maintain a regular presence within the online classroom. Whether that online classroom is a discussion space or LMS, instructors should be available for communication and contribute to the discourse. This notion is supported by Song et al. (2004) who found that students appreciated an instructor who maintained a presence within online discussion forums. Instructors can maintain a presence within discussion forums by encouraging participation and guiding discourse (Song et al., 2004). In addition to maintaining a presence, instructors should also strive to outline expectations including the provision of concrete examples clearly.

3.5 Application of SDT to Online Learning

SDT and its sub-theories have proven to be a useful framework to investigate motivation and its impact on course objectives in physical classroom environments (e.g. Niemiec & Ryan, 2009) and in online learning environments (e.g. Chen & Jang, 2010). Within the research that

applies SDT to online learning environments, I have uncovered clear gaps. The most significant gap being the lack of a holistic investigation that explores the entirety of the SDT need fulfillment pathway in an online learning environment. This section explores studies that have utilized SDT as a framework to investigate motivation and its impact on course objectives in online learning environments.

Recent studies have begun to apply SDT to a variety of online learning constructs. For example, Rienties et al. (2009) found that intrinsically motivated learners contribute and become more centralized than extrinsically motivated students within Computer-Supported Collaborative Learning (CSCL) environments. Xie et al. (2006) found that intrinsic motivation is linked to increased participation within online discussion boards. Moreover, Giesbers et al. (2013) noted a positive relationship between intrinsic motivation and engagement within an online learning environment. On a more specific level, recent literature has begun to provide insights on how the need for relatedness, competence, and autonomy are fulfilled within online learning environments. In the subsequent sections, I will highlight the recent contributions to each SDT need.

3.5.1 Relatedness

A sense of relatedness is experienced by individuals who feel a belonging or connectedness to the people they deem important (Filak, & Nicolini, 2018). Unfortunately, the intricacies of communication within online learning environments may negatively impact the connectivity experienced by digital learners (Rienties et al., 2009). This was demonstrated in Järvelä et al., (2008), who found that face-to-face learners constructed more meaningful learning goals than virtual learners during collaborative tasks. Järvelä's outcome may be due to differences in communication within online formats. Some of the challenges of online communication relate to

the sanitized nature of academic writing, lack of context, for example, sarcasm through tone, and an absence of non-verbal communication (Rienties et al., 2009). Instructors of online courses must overcome these challenges to foster peer-to-peer and peer-to-facilitator connectivity to fulfill students' need for relatedness.

A recent study by Lawrence (2018) used SDT to explore students' perceptions of their instructors' care in online learning environments. Instructor care is a meaningful measure as it contributes to a sense of relatedness. Lawrence's (2018) findings indicated that increased instructor caring does not have a direct impact on students' perceptions of their learning; however, it does have an indirect effect through motivation and affect. This notion of an indirect impact is in line with Deci and Ryan (2000), who indicated that a sense of relatedness contributed to the internalization of extrinsic motivators. In addition, Ryan and Grolnick (1986) found that students who perceive their instructor as distant experienced a decrease in intrinsic motivation. Within her study, Lawrence (2018) identified six themes (instructor passion, personalized feedback, timely communication, increased engagement, accountability, and differentiation for individual needs) for students to perceive their instructors as caring. These themes provide valuable insight for digital instructors hoping to overcome the challenges associated with connectivity in online learning.

Other studies like Xie et al. (2006), who explored the link between intrinsic motivation and participation in online discussion boards, found opportunities for peer interaction were a positive influence on motivation. The authors predicted peer interaction increased student interest (intrinsic motivation) by exposing learners to a variety of perspectives. Interestingly, within the study, peer interactions were not explored as a measure of relatedness. In fact, Xie et al. (2006) found that students who had an instructor who emphasized the importance of online discussions

perceived those discussions as more important. However, the authors did not draw parallels to other SDT research findings regarding students who internalize desired behavioural outcomes because of a perceived connection to their teachers (Ryan et al., 1994).

Another study that has applied SDT to online learning platforms is Giesbers et al. (2013), who investigated the relationship between motivation and engagement within an online learning environment. The authors were able to show that increasing feedback and social interaction amongst students and instructors is a predictor of increased engagement (Giesbers et al., 2013). Giesbers' findings align with SDT as increased feedback and socialization will help fulfill students' needs for competence and relatedness. Together, findings from the aforementioned studies suggest that a caring instructor, ample opportunity for collaboration, adequate feedback, and socialization will help fulfill the need for relatedness. The need for competence will be discussed further in the next section.

3.5.2 Competence

Competent learners are cognizant of their ability to produce successful learning outcomes (Giesbers et al., 2014). Learners experience competency by seeking out and mastering tasks they determine to have meaningful outcomes (Filak, & Nicolini, 2018). Competency involves understanding what is required to achieve outcomes and an internal belief that those outcomes are attainable (Shroff & Vogel, 2009). Within the context of online learning, competency is supported by content-related feedback, especially when it is provided promptly through a synchronous approach (Giesbers et al., 2014). Feedback is related to competence because it informs learners of the requirements to achieve learning outcomes and promotes confidence that those outcomes are attainable. Additionally, to support the development of competency educators should help students construct challenging yet attainable goals (Roca & Gagné, 2008).

Several studies have noted the importance of competence within the context of online education. For example, Chen et al. (2010) found that competence was the most significant predictor of amotivation. Within their study, Chen et al. (2010) attempted to measure the importance of autonomy, competence, and relatedness to learning outcomes within an online environment. Chen and colleagues found that within the online learning environment, learners who lacked competence were amotivated. In addition to amotivation, competency is linked to persistence. The impact of competency on persistence will be discussed in the next paragraph.

Within online learning, a sense of competence is a predictor of persistent behaviours (Roca & Gagné, 2008). Competency-supported persistence is particularly important to the utilization of the online learning platform itself. Xie et al. (2006) reported that competency-supported persistence is important to sustained use of the online learning platform. They noted that students unfamiliar with digital technologies might experience decreased motivation and resort to more familiar means of communication and learning. In other words, if learners do not perceive themselves as competent with the online learning platform or related technologies, it will decrease their motivation. This potential decrease in motivation was addressed in Roca and Gagné (2008), who applied SDT to the Technology Acceptance Model (TAM). When applying SDT to TAM, it was revealed that perceived competence, autonomy, and relatedness are predictors of technology acceptance. Within their study, Roca and Gagné (2008) linked perceived competence, autonomy, and relatedness to TAM constructs (i.e., ease of use). TAM is a useful theory for examining students' acceptance of online learning platforms because it addresses individuals' adoption of foreign information technologies.

In contrast to SDT, Xie et al. (2006) did not find a link between competence and motivation. However, their competence measure involved rudimentary computer skills over

understanding and mastery of course content, which could yield inaccurate results (Chen & Jang, 2010). In fact, Xie et al. (2006) noted their competency measure could have been skewed since almost all the learners perceived themselves as competent. As a result, this contradictory finding requires further investigation.

Together, findings from the aforementioned studies suggest that feedback, technology support, and the creation of achievable goals will all help fulfill learners' need for competence within online learning environments. I will discuss the need for autonomy in the next section.

3.5.3 Autonomy

A sense of autonomy is experienced by individuals who feel as though they have control or an adequate understanding of why their control is reasonably limited (Filak & Nicolini, 2018). Within the context of in-person instruction, Reeve and Jang (2006) explored which instructional behaviours promote or restrict autonomy. Their findings revealed that instructors could support student autonomy by promoting learner choice and voice, removing external participation pressures, and encouraging student independence (Reeve & Jang, 2006; Shroff & Vogel, 2009). For example, "listening, creating time for independent work, giving the student opportunities to talk,... and acknowledging the student's perspective and experiences" (Reeve & Jang, 2006, p. 216) were autonomy-supportive instructional behaviours. Conversely, autonomy restricting instructional behaviours, such as "monopolizing the learning materials,... uttering directives and commands,... and using controlling questions" (Reeve & Jang, 2006, p. 216) restrict learner choice and voice. Reeve and Jang's (2006) findings suggest that the instructional content and delivery method can impact autonomy based on the level of choice and control it affords. Fortunately, the nature of online learning environments is autonomy-supportive in itself as it provides flexibility to learners to participate on their own accord (Chen et al., 2010). In fact, in a

study conducted by Shroff and Vogel (2009), students perceived more choice in online courses over in-person courses. With that said, it is still important to explore how autonomy-supportive and restrictive behaviours identified within Reeve and Jang's (2006) investigation apply to online learning.

Shroff & Vogel (2009) found that informational feedback, choice, and reduced control improved autonomy. They noted the importance of perceived choice as a fundamental construct of autonomy. Learners have choice when they are provided with options and the ability to make decisions free of external pressures (Shroff & Vogel, 2009). Similar to Shroff & Vogel (2009), Xie et al. (2006) explored the implications of autonomy within online learning environments. Xie et al. (2006) investigated the link between choice and engagement in online discussion boards, within their study. Xie and colleagues found that an increase in autonomy (choice) corresponded to an increase in participation. In contrast, an increase in instructor control decreased student motivation. Other studies (Chou & Liu, 2005; Drennan et al., 2005) have also shown that autonomy leads to increased course satisfaction and an improved learning climate (Chen et al., 2010). Together, these studies confirm that Reeve and Jang's (2006) findings apply to online learning environments. As such, it becomes clear that supporting learner choice and voice, removing external pressures, and the encouragement of independence are autonomy-supportive in online learning environments.

Chen et al. (2010) attempted to measure the importance of autonomy, competence, and relatedness to learning outcomes within an online environment. Of note, autonomy was the most significant predictor of motivation. However, autonomy, competence, and relatedness were all important for the internalization of regulations. Autonomy alone led to introjected (least internalized) regulation, autonomy and relatedness led to identified (more internalized)

regulation, and autonomy, competence, and relatedness together led to intrinsic (most internalized) regulation.

This chapter's findings suggest that the type of online learning method and the delivery approach used within online learning will impact a learner's SDT need fulfillment. In the subsequent chapter, I outline the methodology used to explore my research objectives.

Chapter 4: Methods

In this chapter, I outline the methods I used to conduct this investigation. This methods chapter addresses the research design, participant recruitment, interviewing, and data analysis.

4.0 Research Design (Overview)

This study is grounded in Self Determination Theory (SDT), which states that learners have an innate curiosity, drive, and motivation that can be supported or thwarted by their social and environmental experiences. Social and environmental experiences that satisfy a learner's needs for autonomy, competence, and relatedness promote autonomous motivation resulting in improved learning outcomes. As such, I use a qualitative multiple case study (Yin, 2009) approach to explore the social and environmental experiences within synchronous online learning environments to understand how synchronous online learning environments support or thwart a learner's needs for autonomy, competence, and relatedness. A qualitative multiple case study approach allowed me to critically analyze the phenomenological fulfillment of a learner's autonomy, competence, and relatedness needs. Analyzing the phenomenological fulfillment of a learner's SDT needs, in turn, allowed me to gain a more in-depth understanding of the learning experiences within synchronous online learning environments that fulfill a learner's autonomy, competence, and relatedness needs.

4.1 Methodology

The use of the case study method allows researchers to explore a phenomenon contextually. Researchers develop the context of the phenomenon through theoretical research, which helps to frame the case study. As such, the case study method provides researchers with a strategy for research design, data collection, and data analysis (Yin, 2009). In this study, I use a multiple case study approach.

The multiple case study method is a specific approach to case study research, where the same study contains more than one case. I obtained data from individual cases to draw cross-case conclusions (Yin, 2009). I chose a multiple case study approach because it allows researchers to explore both the relationships within each and across individual cases. A multiple case study approach can include both in-grain (within each case) and across-grain (across individual cases) analysis. This study, due to time constraints, focuses on across the grain analysis because the emphasis of this thesis was a holistic understanding. My intention is to include both in-grain and across-grain analysis in future investigations. For my multiple case study approach, I chose to include four participants, meaning my research has four cases.

There are two approaches to conduct a multiple case study - holistic and embedded. The holistic case study approach does not consider an investigation's subunits and is typically a more abstract approach to case study research. Conversely, an embedded multiple case study approach allows researchers to focus on the big picture investigation (Yin, 2009). I followed an embedded, multiple case study approach. Specifically, the SDT need fulfillment pathway served as the big picture, while the individual needs (autonomy, competence, and relatedness) served as subunits. Using SDT needs as subunits allowed me to apply individual needs to the SDT pathway.

The multiple case study design is considered a more robust approach than a single case study design. A multiple case study design is a more robust approach because it duplicates the findings across each case, thus supporting the initial proposition. Duplication within the multiple case study approach is supported by using a sound theoretical framework (Yin, 2009) - in this case, SDT.

Yin (2009) recommends using two to three cases within a multiple case study approach when using a robust theoretical framework and five to six cases when using a subtle theoretical

framework. In this study, I use SDT, which is a robust theoretical framework. As such, the use of four cases within this investigation is sufficient. Additionally, since each case mirrored the other cases' results, there was no need to include additional participants (Yin, 2009).

4.2 Data Collection

There are two components to data collection:

- (i) pre-interview: an approximately one-hour semi-structured interview conducted at the onset of a synchronous online semester;
- (ii) post-interview: an approximately 45-minute semi-structured interview conducted upon the conclusion of the synchronous online semester

4.2.1 Participants

In total, two male and two female pre-service teachers undertaking a Bachelor of Education program at an Ontario University participated in this study. All four pre-service teachers were in the third semester of a four-semester Bachelor of Education program. Students within the program are required to complete twenty, 36-hour, three-credit courses and undertake three in-field practicums. The participants were undertaking a fully synchronous online semester.

Pre-service teachers are well suited for this study because they can offer a unique perspective. The participants in this study all had experience learning online in asynchronous formats through their prior Bachelor of Education classes, all delivered in a blended format. As part of their course requirements, the pre-service teachers involved in this study participated in critical discussions that compared affordances of different online learning environments. These distinctive features of the Bachelor of Education program, and participants' advanced stage in the program, is what qualifies the pre-service teachers participating in this study to offer a unique perspective. Additionally, due to the nature of a Bachelor of Education program, pre-service

teachers are often more cognizant of pedagogical practice and effective teaching. After all, pre-service teachers are actively learning about pedagogical practice and their teaching.

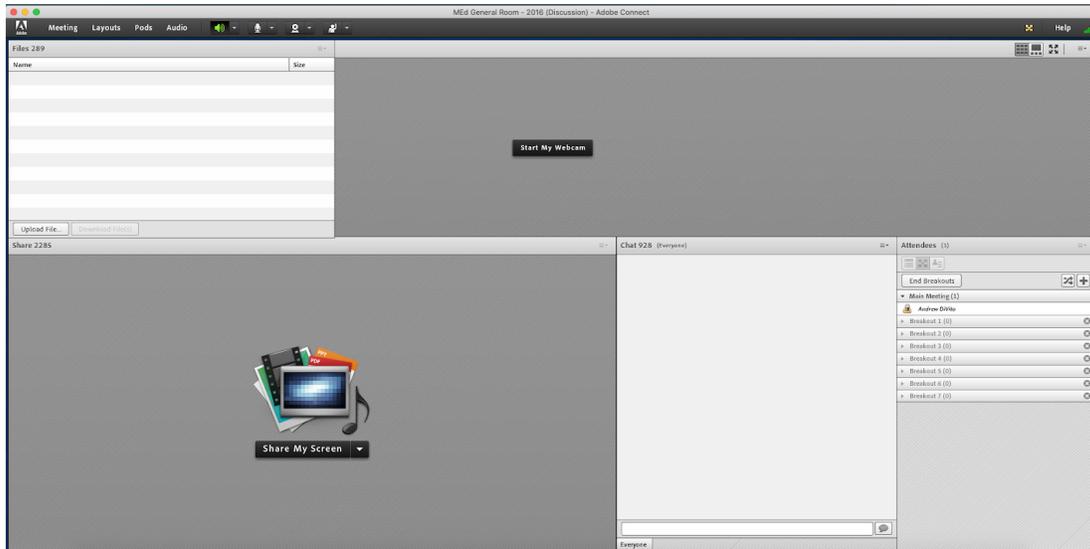
I conducted sampling for this study on a first-come, first-serve basis. Once I received Research Ethics Board approval, I had the Universities' Global Communications department send out a letter of invitation via email to all students within the Bachelor of Education program at the Ontario University. The invitation letter requested that interested participants reach out to schedule an interview within the first few weeks of the upcoming online semester. I accepted all Bachelor of Education students who requested to participate in the study. I assigned pseudonyms to participants and used their pseudonyms throughout the thesis.

4.2.2 Online Context

Participants of this study undertook a nine-week fully online semester, with three hours per week in synchronous learning and one hour per week in asynchronous learning. Within the online semester, each teacher candidate enrolls in five unique courses offered in multiple sections. Multiple course offerings resulted in participants experiencing different instructors. The synchronous portions of the courses use the Adobe Connect virtual classroom platform (see Figure 4.1).

Figure 4.1

A screenshot of the Adobe Connect platform



The Adobe Connect platform includes “pods” that provide various pedagogical opportunities. For example, participants can chat, share files, and exchange notes. The Adobe Connect platform also allows instructors to divide students into breakout rooms or small virtual groups with access to all Adobe Connect’s pods.

In addition to the synchronous meeting times, course objectives required students to complete asynchronous readings and assignments. As noted in Chapter 2, the synchronous delivery approach for online learning is unique. Only 25% of Canadian institutions offer some form of synchronous online delivery, and even fewer use synchronous delivery as the primary medium (Bates, 2018).

4.2.3 Interviewing

Once participants agreed to participate, I conducted two semi-structured interviews through the Zoom platform, which allowed me to obtain audio and video recordings. Interviewing served as the only form of data collection for this multiple case study investigation. I conducted semi-structured interviews (Ginsburg, 1997) to understand how pre-service teachers

perceive the fulfillment of their autonomy, competence, and relatedness needs. Semi-structured interviews also allowed me to gain insight into the factors, structures, and influences within synchronous online learning environments that significantly impact a learner's perceived need fulfillment. The nature of semi-structured interviews promotes flexibility to make in-the-moment interaction decisions based on participants' answers to questions while allowing the interview to remain in-line with research goals (Ruttenberg-Rozen, 2018).

Before conducting the semi-structured interviews, I created an interview guide for both the initial and follow-up interview (Appendix A and B). The interview guide outlined a range of intended potential questions while affording the flexibility needed to ask additional follow-up questions based on the responses received. These follow-up questions were real-time in-the-moment decisions. Additionally, based on responses, some of the interview guide sections were passed over (Basit, 2010). For example, for participants who had no previous experience with online learning environments, the interview guide section regarding past experiences was omitted.

The pre-interview contained three main sections - the first being a brief introductory section. The introductory section collected background information related to the learner's previous experiences with online learning environments, how those online learning environments differed from one another, and any perceived effect of those differences.

The second section and bulk of the pre-interview contained questions grouped into four main themes (See Appendix A). These themes were: (i) motivation, (ii) desire, (iii) individuality and connectedness, and (iv) agency. Within each of these themes, I prompted participants to provide specific examples of when they felt that SDT-related concepts were impacted within online environments. Each of the four themes followed a similar flow of questioning:

- I. questions about how participants perceived motivation, desire, individuality/connectedness, and/or agency;
- II. questions about how the concepts of motivation, desire, individuality/connectedness, and/or agency are related;
- III. questions about how motivation, desire, individuality/connectedness, and/or agency impact one another;
- IV. questions about how motivation, desire, individuality/connectedness, and/or agency affect the learner's perceived learning and learning outcomes.

I used the final section of questioning within the pre-learning interview to collect students' initial perceptions and expectations of online learning based on previous experiences. I focussed on how pre-service teachers believed their needs for autonomy, competence, and relatedness would be fulfilled within an online learning environment.

Once participants completed their synchronous online semester, I conducted a follow-up interview. Within the follow-up interview, I used the participants' first interview responses to create the interview guide. As such, the post-learning interview was more personalized. The purpose of the post-learning interview was to explore the elements that the participants had deemed important in their first interview.

Questions within the post-learning interview were focused on four primary areas:

- I. how the learners' initial perceptions of online learning changed;
- II. whether or not learners felt that their autonomy, competence, and relatedness needs were fulfilled within the synchronous online learning environment;
- III. the impact that needs fulfillment, or lack thereof, had on participants' perceived learning and learning outcomes;

- IV. the synchronous online semester aspects that had the most significant impact on learners' autonomy, competence, and relatedness needs.

4.3 Data Analysis

Data analysis was a three-step process:

- a) transcribing;
- b) coding;
- c) finding relationships between codes

After I collected the data, I transcribed the data and then re-checked it using ATLAS.ti for accuracy. ATLAS.ti is a qualitative data analysis software that offers transcribing and coding tools. I used ATLAS.ti software to code the transcribed interviews using descriptive coding (Saldana, 2015). Descriptive coding generally results in a descriptive catalogue of the data (Saldana, 2013). In this case, during the coding process, a series of factors that affect SDT need fulfillment within synchronous online courses was catalogued.

I selected descriptive coding for two primary reasons:

- I. descriptive coding is recommended for novice qualitative researchers such as myself (Saldana, 2013)
- II. this investigation uses a top-down method of coding

The coding process was iterative, and codes were continually redefined and merged throughout the process. I focused the codes based on distinguishing characteristics. I collapsed similar codes into one where the distinguishing characteristics were unclear. For example, *connection* is the core concept of *relatedness*, so I merged those codes.

In addition to descriptive coding, I used lumpner coding (Saldaña, 2015). Within lumpner coding, a single code is used to capture the essence of an excerpt. Lumpner coding contrasts

splitter coding, which splits the quote into smaller, individually coded sections (Saldaña, 2015). Within this investigation, I used lumped coding because I lumped the codes based on SDT constructs. Splitter coding involves expanding codes, whereas I collapsed codes based on SDT constructs.

The codes and their definitions that resulted from the coding process are included in Table 4.1 below.

Table 4.1

Codes and code definitions generated and used within this investigation

| Code | Definition |
|----------------------------|---|
| Agency | "Agency is the power of the individual to choose what happens next" (Lindgren & McDaniel, 2012, p. 344). Agency is important to create a self-determined and purposeful experience. Agency refers to an individual having a choice that impacts them, in this case, their learning. |
| Collaboration | Collaboration is the act of working with someone to produce or create something. Collaboration "is the mutual engagement of participants in a coordinated effort to solve a problem together. Collaborative interactions are characterized by shared goals, symmetry of structure, and a high degree of negotiation, interactivity, and interdependence" (Lai, 2011, p. 2). Includes contributions of students to their learning environment. |
| Communication | Communication refers to the exchanging of information (Schramm, 1954). Communication is an essential component of collaboration. |
| Communication (non-verbal) | Communication through facial expression and attitude. According to Mehrabian's communication theory (Mehrabian, 2008), over 50% of messaging pertaining to feelings is related to attitudes and facial expressions. |
| Competence | Competence refers to the ability to do something successfully or efficiently. A sense of competence is experienced by individuals who seek out and master tasks that they determine will have meaningful outcomes (Filak & Nicolini, 2018). |
| Competence (understanding) | The same concept as competence (Filak & Nicolini, 2018); however, the meaningful aspect is missing; students are just looking to develop an understanding (ability to do something successfully or efficiently). |

| | |
|----------------------------------|--|
| Connection | Instructors need to connect with students and foster a learning environment where students can connect. Connectedness is a predictor of student involvement (Sidelinder & Booth-Butterfield, 2010). Connectedness refers to a sense of belonging with a particular person or group (Filak & Nicolini, 2018). |
| Connection (isolation) | When a sense of connectedness or belonging is missing or lacking to either the instructor, another student, or the learning material itself (Filak & Nicolini, 2018). |
| Connection (relatedness) | A sense of relatedness is experienced by individuals who feel a sense of belonging or connectedness to individuals they deem important (Filak & Nicolini, 2018). |
| Desire | Your desires are your wants and wishes - what you would like to achieve or attain (Schroeder, 2006). |
| Facilitator influence | Facilitator influence refers to situations where the professor and the environment they establish can overcome the challenges typically associated with the medium they are teaching within (Dennen et al., 2007). |
| Facilitator influence (negative) | Negative facilitator influence (Dennen et al., 2007) refers to situations where the facilitator negatively influences the course and cannot overcome challenges typically associated with the teaching medium. |
| Feedback | Feedback is an important aspect for a learner to develop a sense of competence. This code is used specifically to highlight when feedback is provided or not provided (Deci & Ryan, 2008). |
| Interest | Interest refers to an inherent desire to want to learn more about a topic. "Interest is both a psychological state of attention and affect toward a particular object or topic, and an enduring predisposition to re-engage over time (Harackiewicz, Smith, & Priniski, 2016). Interest is a motivational process. |
| Learning outcomes | Refers to outcomes of a course, whether that is perceived retention or something measurable like performance (Deci & Ryan, 2008). |
| Learning outcomes (retention) | Using this code when interviewees feel as though they have a stronger grasp of learning material. When they feel like they have retained the information and not just superficially learned it. Related to learning outcomes (Deci & Ryan, 2008). |
| Motivation | Motivation refers to the desire to act in service of a goal. There are different types of motivation, and the kind of motivation that an individual experiences will impact their performance, relational, and well-being outcomes (Deci & Ryan, 2008). |

| | |
|--------------------------------------|---|
| Online Learning Platform (positives) | This sub-code refers specifically to positives related to the medium or platform in which online learning occurs (Shroff & Vogel, 2009). |
| Online Learning Platform (negatives) | This sub-code refers specifically to negatives related to the medium or platform in which online learning occurs (Shroff & Vogel, 2009). |
| Structure | Structure refers to the arrangement of a course. The guidelines that have been put in place by the instructor within the course that controls or regulates learning (Shroff & Vogel, 2009). |

Exploring the 20 distinct codes within ATLAS.ti revealed a series of relationships between codes through code occurrences. A code co-occurrence refers to two or more codes assigned to the same piece of transcribed text within an interview. Exploring code co-occurrences within ATLAS.ti revealed 17 strong relationships between 11 unique codes. I defined co-occurring codes as having a strong relationship based on two conditions:

- I. the codes must co-occur at a minimum frequency of five. I chose a frequency of five as I believed it was sufficient to provide the research with internal validity and simultaneously prevent an abundance of codes within the code network;
- II. each co-occurrence must present itself within the interviews of at least three participants. I determined that codes must present themselves within three interviews to ensure that co-occurrences were not coincidental. I chose three interviews as it represents the majority in a set of four.

Together, these two conditions ensured a strong relationship exists between co-occurring codes. I only included codes that I classified as having a strong relationship within the code network. I omitted codes that did not associate strongly with other codes from the code network.

I then focused the code relationships into themes and concepts related to SDT. For example, agency and interest are part of the autonomy theme. Concentrating on the codes

allowed me to integrate the teacher candidate’s beliefs into the conceptual framework that I established using SDT. The table below (Table 4.2) indicates which codes were associated with the individual SDT needs and which codes were associated with need fulfillment.

Table 4.2

Code groupings by SDT themes

| SDT Need | Associated Codes |
|---|---|
| Autonomy (Figure 5.2) | Agency Interest Motivation Learning outcomes |
| Competence (Figure 5.3) | Feedback Motivation Learning outcomes |
| Relatedness (Figure 5.4) | Collaboration Connection Motivation Learning outcomes |
| SDT need fulfillment (orange codes in Figure 5.1) | Communication Online learning platform Facilitator influence Structure |

I then plotted the codes represented in Tables 1 and 2 into a network or mind map. I generated the network by first plotting the co-occurring codes into a map. Then, I analyzed the text-excerpts tagged with the corresponding co-occurring codes to determine the mapped codes’ relationship. Exploring the text-excerpts where codes co-occurred allowed me to determine whether there was a positive or negative relationship between co-occurring codes. I used these relationships to alter the pathway arrows linking the mapped codes.

In the next chapter, I present the results of my investigation. Within the results chapter, I will discuss the code map in great detail and I will use the code map as a framework to outline

the satisfaction of the SDT need fulfillment pathway within a synchronous online learning environment.

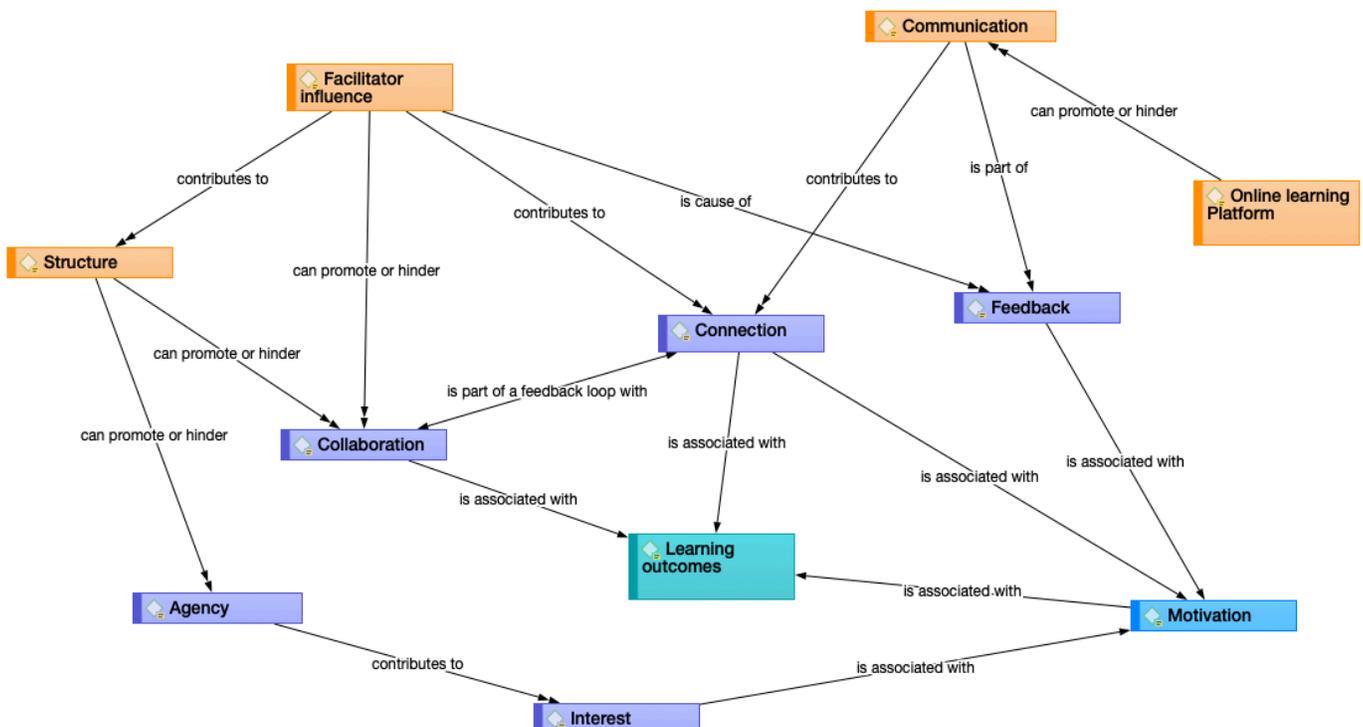
Chapter 5: Results

5.0 Results

In this chapter, I present the results of the data obtained from the participant interviews. The participant data provides insight into the fulfillment of SDT needs within a fully synchronous online learning environment. The results are organized in such a way that they mirror the need fulfillment pathway outlined in Deci and Ryan's SDT (discussed in Chapter 2). I begin the chapter with a brief overview of how the resultant code network mirrors SDT. Then, I explore how the resultant code pathway relates individually to each of the SDT needs - autonomy, competence, and relatedness. Then, I explore how the fulfillment of autonomy, competence, and relatedness needs leads to autonomous motivation and in-turn, improved learning outcomes. Finally, I outline the design and delivery elements of online learning that have the greatest impact on SDT need fulfillment.

Figure 5.1

Network representing co-occurring codes.



5.1 How to Read the Code Network

Figure 5.1 depicts a network representing co-occurring codes used in my analysis. In this network, all three SDT needs are present. Within the code network, the codes that represent SDT needs are shown in dark blue boxes; they are agency and interest (autonomy), connection and collaboration (relatedness), and feedback (competence). Within the code network, all of the codes representing SDT needs are linked with motivation (light blue) and motivation is linked with learning outcomes (turquoise). The codes representing relatedness (collaboration and connection) are the only SDT needs codes (dark blue) that are directly connected to learning outcomes (turquoise). Within the code network, the orange codes represent online learning elements that influence the SDT pathway. The SDT pathway is shown using cold colours (dark blue, light blue, and turquoise), and the elements of online learning that have the greatest impact on the SDT pathway are shown using warm colours (orange).

5.2 SDT Need Fulfillment Within a Fully Synchronous Online Learning Environment

The code network that I generated parallels the SDT need fulfillment pathway in three distinct ways.

- I. all three SDT needs (autonomy, competence, and relatedness) are represented through codes within the code network;
- II. all of the codes representing SDT needs are linked to motivation within the code network; and
- III. the motivation code is connected to the learning outcomes code within the code network

In the subsequent sections, the code co-occurrences representative of autonomy (5.2.1), competence (5.2.2), and relatedness (5.2.3) will be discussed in detail.

5.2.1 Autonomy Need Fulfillment

Within SDT, autonomy is experienced by individuals who feel as though they have control or an adequate understanding of why their control is reasonably limited. An individual who feels as though they have a choice will also experience autonomy (Filak, & Nicolini, 2018). This choice allows participants to feel as though they have control over their learning, thus satisfying the need for autonomy. As such, it became pertinent to create a code that highlighted instances within the transcribed interviews where learners experienced choice. The code agency was created and used to highlight instances where participants had a choice that impacts their learning. For example, in one instance, the code agency was used to highlight a situation where Darnel describes the learning within the online semester he was experiencing. He stated, “A lot of what we do like it's guided learning, but it's not necessarily strictly one way or the other like you have a lot more freedom to be able to do things and to tailor your learning to what you want to do”. The code agency was used within all of the transcribed interviews a total of 27 times.

Although the code agency was used a total of 27 times, there was no strong relationship between the codes agency and motivation. Instead, the code agency was linked to motivation through the code interest. The code interest was used to highlight situations within the transcribed interviews where learners described experiencing an inherent interest in a topic they were learning about. Participants indicated that having agency allowed them to work in areas they are inherently interested in. This interest is what led participants to experience increased motivation. Multiple participants recognized the pathway between agency, interest, and motivation, including Nicole. She stated, “there would be instances where we can choose which case study... that choice to see what they're most interested in”. As well as Clarice:

I think when you're able to give students choice, they can pick whatever method whether it's like a choice in an assessment, then they can choose first of all what tailors to their strengths, but also what tailors to their interest.

Participants noted that when they were able to work in areas of interest to them they experienced improved motivation. Clarice said, “those interests and those factors speak to I guess my motivation”. Similarly, Darnel noted:

When you're able to pick a topic because it interests you, not because you're forced to do it. You try so much harder. So having the freedom to be able to select certain things to do certain things, and do it because you want to do it will make you do better, to learn better.

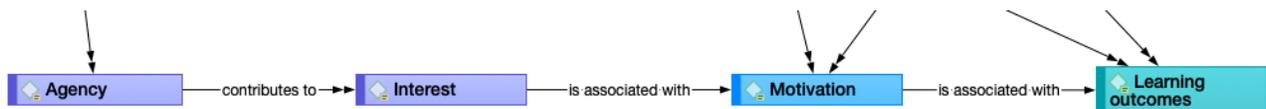
The link between interest and motivation was one of the strongest co-occurrences presenting on 12 instances, by all four participants and within seven of eight interviews. Code co-occurrences amongst, interest, agency, and motivation suggest agency allows students to work within their interests, which in turn promotes their motivation (Figure 5.2). This pathway, from agency to interest to motivation, was recognized by Clarice. Clarice noted that when granted autonomy on assignments, she was able to work in areas of interest to her. In turn, being able to work within areas of interest positively impacted her motivation. In contrast, when she was not interested in her assignments they were more tedious to complete. She said:

I just found [those assignments] easier to do because I was more interested in the content and they had more choice and flexibility in terms of what you wanted to do with them kind of thing. Whereas even right now, this assignment that I have to submit, it's due tomorrow night, but it's taken me like five days to complete because it's just so dry and I can't even plug in my personal opinion.

The pathway between the codes agency, interest, and motivation suggest that the fulfillment of the need for autonomy leads to an increase in motivation. The autonomy pathway is shown in Figure 5.2 below. In the subsequent section, the code pathway representative of competence will be discussed.

Figure 5.2

Network segment representing the autonomy pathway.



5.2.2 Competence Need Fulfillment

Within SDT, a sense of competence is experienced by individuals who seek out and develop expertise for tasks with meaningful outcomes (Filak, & Nicolini, 2018). The process of developing expertise is supported through feedback. Feedback is related to competence because it informs learners of the requirements to achieve learning outcomes and promotes confidence that those outcomes are attainable (Roca and Gagné, 2008). This was noted by several participants, including Darnel who said:

Positive feedback can do wonders for. I know it does wonders for me and for students like just knowing that you're doing good that you're on the right track things are okay having the support systems, having check-ins, like a lot of that is motivating to help you do better and to feel better.

As such, the code feedback was used to highlight instances within the transcribed interviews where feedback, whether written or verbal, improved learning. The feedback code was also used to highlight instances where the lack of feedback was detrimental to learning. For example, Nicole noted that when her instructor failed to provide adequate feedback, she was unaware of

the next steps for her learning and was demotivated. She said, “well, there's no feedback... it's just a couple of boxes that are checked off. And so we were very demotivate[d] at that point”.

In addition to informing the learners of the requirements to achieve learning outcomes, positive feedback can also lead to a task seeming more meaningful to a learner. This was observed within Clarice’s interview when she noted that she felt her work was appreciated more when she received positive feedback. Conversely, negative feedback can have adverse effects on a learner’s motivation.

Feedback was one of the most prevalent codes used in data analysis. In total, 58 excerpts were tagged with the feedback code. However, only 11 of the excerpts coded with feedback were associated with motivation. The feedback code co-occurred with the motivation code on 11 instances by three participants. Within SDT, the fulfillment of the need for competence leads to autonomous motivation. As such, it was expected that motivation and feedback would co-occur.

It should be noted that feedback is not the only instructional aspect related to competence. However, it was the only instructional aspect related to competence that had a strong enough relationship that it appeared within the code network. The pathway between the code feedback and motivation suggests that the fulfillment of the need for competence leads to an increase in motivation. The competence pathway is represented in Figure 5.3 below. In the subsequent section, the code pathway representative of relatedness will be discussed.

Figure 5.3

Network segment representing the competence pathway.



5.2.3 Relatedness Need Fulfillment

Within SDT, a sense of relatedness is experienced by individuals who feel a sense of belonging or connectedness to other individuals (Filak, & Nicolini, 2018). As such, to highlight instances where learners are connected to other learners the code connection was used. Connection was by far the most prevalent code. In total, 99 excerpts were tagged with the connection code. Of these 99 codes, only ten of the excerpts coded with connection were associated with motivation. Within SDT, the fulfillment of the need for relatedness leads to autonomous motivation. As such, it was expected that motivation and connection would co-occur. In the instances where connection and motivation were co-coded, participants indicated that having a community of learners was motivating. An example of this is Darnell, who noted:

I've got a really good support group with friends, like we're constantly checking in with each other and like, what's due next? What do we need to be doing? And I got us all to be in the same classes at the same time so that way we're not miserable apart. So it's helpful to have like other people helping to motivate me just because like when I know they're working on it, then I start to work on things too. So it's having like the community around you supporting you.

Nicole echoed the same sentiment - that being a part of a community of learners, improved her motivation. She noted "I feel like I'm not just a number on your screen...the connection that I have made"

When coding for connection, the need arose to create a second code that highlighted collaborative interactions. It was observed that in many instances where learners were talking about a community of learners or a connection to other learners they also mentioned collaborative events. As such the code collaboration was created to highlight instances where

learners were able to collaboratively work with other learners. The collaboration code was also quite prevalent. The collaboration code was assigned to excerpts on 64 instances. Additionally, the relationship between connection and collaboration was one of the strongest code relationships. Connection and collaboration co-occurred on 14 instances by all four participants. Most participants noted that having opportunities to collaborate helped to foster a sense of connection to other learners. Nathan noted:

The instructors set up such an awesome space for that to occur. Whether it be through class discussion, through discussion posts, through breakout groups, through group projects, there are all these little instances that the teachers and the instructors really ensured that we would have the opportunity to collaborate. And I think collaboration is a big part of community.

These collaborative opportunities sometimes created a space where learners, like Nicole, felt safe, which helped her to build a connection with her peers. She noted

First thing she did is that she made us do PLNs...Personal learning networks that she made us form amongst our groups. So I had a sense of comfort where I knew that I was in a group of people that she said, literally, on the, from the get go, we're gonna form this PLN you make your groups yourself. So I was okay. I'm feel like I'm safe.

Such a strong relationship between the codes connection and collaboration prompted a deeper investigation. When exploring the code relationships between connection and collaboration I uncovered a feedback loop. Within this feedback loop, as learners are allowed to collaborate they build a connection with other learners. As learners build a connection with other learners they engage in more meaningful collaborative events. As a result of these more meaningful collaborative events, a greater sense of connection is achieved, and the cycle

continues. As such, both the code collaboration and the code connection highlight instances where a learner's need for relatedness is fulfilled. An example of this was noted by Darnel who found himself collaborating to a greater extent because he felt comfortable with his peers.

I found it very formative and very helpful and like, building those relationships in a way really helps accelerate my own learning. Because I found myself sharing to like even deeper levels in certain courses that we've shared in than I probably would have at the start if I didn't have that connection with people because if I didn't see how supportive people were, I wouldn't have shared as much.

From a different point of view, Nicole also noted that having a connection with learners is important for collaborative events. She found collaborating with individuals with whom she has no existing connection to be challenging. She noted:

It's weird to like, just like just to collaborate with people you don't know very well, I guess. Like you, you just you want to know them, but you don't know really how to approach it because you've never met this person before.

Relatedness was the only need whose codes (connection and collaboration) were directly linked to learning outcomes within the code network. The expected pathway outlined within SDT, states that as the need for relatedness is fulfilled the learner experiences autonomous motivation, which leads to improved learner outcomes. This pathway was observed within the code network, as a link exists between the codes connection/collaboration and motivation, and subsequently, motivation and learning outcomes. However, unexpectedly, a direct link also exists between the codes connection and learning outcomes as well as collaboration and learning outcomes. The code network segment representing the relatedness pathway is shown in Figure 5.4 below.

A possible explanation for why the relatedness codes were directly connected to learning outcomes code within the code network was discovered within the transcribed interviews. Within their interviews several of the participants noted that opportunities for meaningful collaboration built on their knowledge. For example, Nathan noted

If there were opportunities for me to collaborate with others and to really talk about what we're reading what we're learning what we think about it because I truly believe that that's one of the ways that people can learn best is to see what other people think of it. To rework your own opinions and thoughts on it.

Clarice shared a similar viewpoint as Nathan, noting:

The other classes when you could talk about ideas and just share, share thoughts, feelings, and I don't know, different teaching styles or methods. It was more like you could see oh, okay, that's it. That's a good idea. I'd probably do this. Oh, great that's, you know what I mean, you build off of each other.

In addition to being able to build ideas off of one another, the notion that collaboration slows down learning, thus improving absorption was also brought up. Nathan noted:

I think if there was opportunity for me to discuss with peers, I would have been able to slow down and to really absorb the information a lot more, as opposed to what I did, which was press next, next, next, next next over all the information do the quiz, listen to her lecture, call it a day. You know, I would skim as opposed to really in depthly read.

He went on to say:

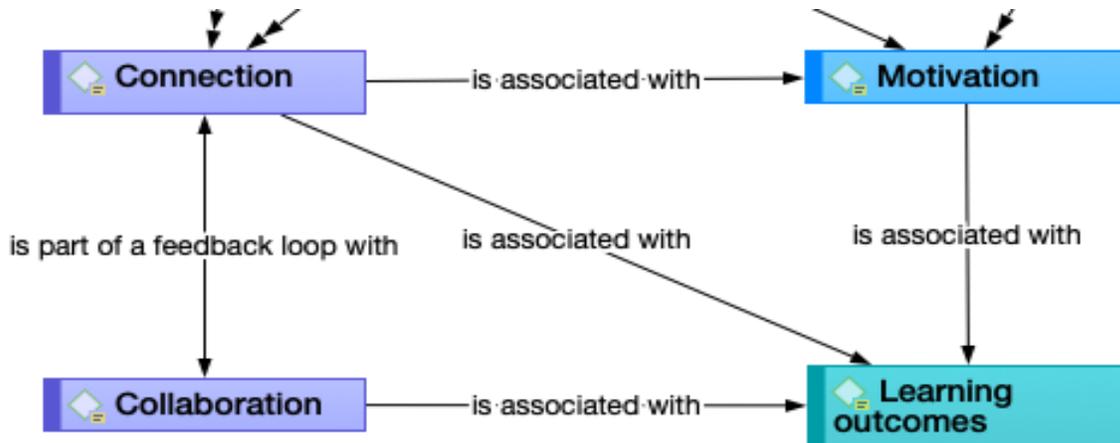
I think it would have really forced me to slow down and consider what we're learning.

Consider what has been instructed to consider the readings consider other people's

viewpoints as opposed to just reading, internalizing or skimming, internalizing, doing the quizzes and moving on.

Figure 5.4

Network segment representing the relatedness pathway.



5.2.4 Motivation and Learning Outcomes

SDT stipulates that as a learner’s needs for autonomy, competence, and relatedness are fulfilled they will experience autonomous motivation. This theoretical pathway was observed within the code network. The codes representative of autonomy (agency and interest), competence (feedback), and relatedness (connection and collaboration) are all positively associated with motivation. These connections were discussed extensively above. SDT also stipulates that autonomous motivation is linked to improved learning outcomes. This theoretical pathway was also observed within the code network and is discussed in this section.

The motivation code was assigned to 49 excerpts within the transcribed interviews and the learning outcomes code was assigned to 39 excerpts. Of these instances, the motivation code and the learning outcomes code co-occurred on six instances by three participants.

Within these co-occurrences, participants noted that experiencing motivation improved their learning outcomes. For Clarice, experiencing motivation improved her learning outcomes through her grade performance and reduced how difficult she perceived academic tasks. Clarice noted feelings of motivation to complete work in which she was interested and had autonomy and noted that experiencing interest and autonomy resulted in an increase in grade performance.

There's a difference in performance in terms of grades and also motivation to complete those assignments. They were I just found them easier to do because I was more interested in the content and they had more choice and flexibility in terms of what you wanted to do with them.

For Nicole, experiencing motivation improved her learning outcomes through grades, level of engagement, and how well she felt she retained the information. Nicole commented on a nuanced relationship amongst motivation, learning outcomes, and achievement. She stated: "I feel like my grades are definitely higher in her class. Because I was more motivated also because I liked the topics and because I felt her feedback was good". In a separate excerpt, Nicole also commented on engagement and information retention. She stated:

I will be motivated to do it. I will put effort into it I won't like, just because I hate law I'm not gonna like just, you know, I'm not gonna like. I'm going to neglect it, but in terms of being more, I guess engaged in it being more like you know like absorbing the information more.

Conversely, a lack of motivation was also mentioned in reference to a lack of knowledge retention as exemplified in this exchange:

Andrew DiVito: Were you uh, are you motivated in Gavin's class?

Nicole: No, No No, I'm gonna be honest. No, we even to this day. We all are like, to be honest, I, my colleagues are all like, what did we learn? I don't know what we learned.

Darnel had a different take on the relationship between motivation and achievement, noting that he could still produce good quality work even when unmotivated. For Darnel, motivation was associated with a sense of desire. He noted: “desire was pretty down. Like, even though like the quality is still there, like I'm still working to get the grade. Like it was always the last thing I would do because I didn't want to do it”.

5.3 Codes impacting SDT Need Fulfillment

In addition to connection, collaboration, agency, interest, and feedback, other codes related to the synchronous online learning platform (structure, facilitator influence, online learning platform, and communication) appear within the code network (Figure 5.1). The inclusion of these codes provides valuable insight regarding how a synchronous online learning environment impacts need fulfillment. The code network reveals that the structure of a course, the quality of communication and feedback, the provision of choice, and the personability/commitment of the instructor are all linked to need fulfillment. The code for the structure of a course is linked to the codes agency and collaboration. The codes structure and agency co-occur six times and are associated by all four participants. The codes structure and collaboration co-occur ten times and are associated by all four participants. The most impactful code on the SDT pathway was by far the code representative of the facilitator influence. Facilitator influence impacts collaboration, connection and feedback, as well as collaboration and agency, through structure. Facilitator influence co-occurs with feedback 13 times, with connection 11 times, with collaboration six times, and with structure 11 times. Lastly, we see that the code representative of the online learning platform itself also impacts the SDT pathway

through communication. By impacting communication the online learning platform can affect feedback and connection. Communication and feedback co-occur ten times and are associated by three of four participants and communication and connection co-occur five times and are associated by all four participants. The online learning platform code and the communication code co-occur nine times and are associated by all four participants.

5.4 Conclusion

Within this chapter, I have provided an overview of my results. In the subsequent chapter, I will discuss the intricacies of the code relationships, the fulfillment of the SDT pathway, and the elements of synchronous online learning courses that have the greatest impact on the SDT need fulfillment pathway.

Chapter 6: Discussion

6.1 Overview

Although researchers have begun to explore the application of SDT and the SDT need fulfillment pathway to online learning, there are still clear gaps in the application of SDT to online learning environments (Chen et al, 2010). My objectives for this study were twofold. The primary objective was to construct a narrative exploring SDT need fulfillment within a synchronous online learning environment. I found that each of a learner's SDT needs, autonomy (section 6.2), competence (section 6.3), and relatedness (section 6.4), were fulfilled within a synchronous online learning environment. I also found that the fulfillment of all three SDT needs led learners within synchronous online learning environments to experience autonomous motivation, and in turn, they perceived improvement of their learning outcomes (section 6.5). Together, these findings indicated that the SDT need fulfillment pathway was observable within synchronous online learning environments.

This investigation's secondary objective was to explore which specific instructional aspects within fully synchronous online learning environments support students' SDT needs. I found that structure, facilitator influence, online learning platform, and communication are the aspects of synchronous online learning environments that have the most significant impact on SDT need fulfillment (section 6.6).

Within section 6.6, I discuss my findings that address the secondary objective. I first discuss how the course structure and facilitator impact the fulfillment of a learner's need for autonomy (section 6.6.1). Then, I discuss how the facilitator, type and quality of communication, and the online learning platform impact the fulfillment of a learner's need for competence (section 6.6.2). Afterward, I discuss how course structure, the facilitator, type and quality of

communication, and the online learning platform impact the fulfillment of a learner's need for relatedness (section 6.6.3).

6.2 Autonomy Need Fulfillment

To determine whether the SDT need fulfillment pathway is observable within a synchronous online learning environment, I first needed to determine whether all three SDT needs are satisfied within a synchronous online learning environment. Analysis of the code network revealed that a learner's need for autonomy was satisfied within a synchronous online learning environment. The code network also revealed that the satisfaction of a learner's need for autonomy within a synchronous online learning environment positively influenced their orientation towards autonomous motivation. These findings are in-line with the SDT need fulfillment pathway. To investigate the fulfillment of a learner's autonomy need, I needed to generate a code situated in SDT research, which highlighted instances where a participant's autonomy need was supported.

SDT research indicates that autonomy is experienced by individuals who feel as though they have control or an adequate understanding of why their control is reasonably limited (Filak & Nicolini, 2018). Researchers who have studied SDT in the context of education have found that teachers can provide students with a sense of autonomy by reducing assessment pressure, ensuring students have a voice within the classroom, and minimizing impositions (Niemi & Ryan, 2009). Reducing assessment pressure, ensuring students have a voice within the classroom, and minimizing impositions are autonomy-supportive because they provide learners with control through choice and voice. Within the transcriptions, participants mentioned the term choice 34 times and the term control 11 times. Within the transcriptions, when participants speak on their experiences with choice and control, they are speaking towards their autonomy. Tagging

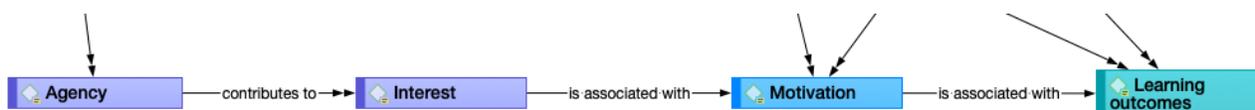
text excerpts where participants talk about choice and control provided me with information related to the participants' autonomy need satisfaction.

During the coding process, to highlight instances where a participant's autonomy need was supported, I created a code that highlighted instances within the transcribed interviews where participants experienced choice and voice. The code agency was developed and used to highlight excerpts within the transcriptions, where participants had a choice that impacts their learning or control over their learning. I expected that the autonomy and motivation codes, agency and motivation, would be linked through co-occurrences within the code network. I expected the codes agency and motivation to be connected through code occurrences because the SDT need fulfillment pathway stipulates that the satisfaction of a learner's need for autonomy (along with the other SDT needs) will result in that learner experiencing autonomous motivation (Deci and Ryan, 2008a). Interestingly, the link between the codes motivation and agency did not meet the criteria outlined in Chapter 4 to be classified as a strong relationship and was therefore omitted from the code network.

Instead, within the code network, I observed a code pathway (Figure 5.2) that linked agency, the code representative of autonomy, to motivation, through the interest code. During the coding process, I created the interest code to highlight situations where learners experienced an inherent interest in a topic they were learning about. At first, I was concerned that this finding contradicted SDT research, however, upon further exploration, it became clear that the pathway linking agency-interest-motivation is supported within the literature.

Figure 5.2

Network segment representing the autonomy pathway.



Within SDT literature, intrinsic motivation is classified as a form of autonomous motivation that occurs when learners have an inherent interest in a learning activity or the immediate satisfaction that the activity provides (Deci & Ryan, 2008a). Autonomous motivation is an umbrella term that encompasses intrinsic motivation and extrinsic motivation that is internally regulated. As such, when a learner is inherently interested in learning about a particular topic, they will be autonomously motivated. Furthermore, when a learner is afforded choice and control, it allows them to work in areas they are inherently interested in, and in-turn experience intrinsic motivation. The link between intrinsic motivation and SDT needs is discussed within a subtheory of SDT called Cognitive Evaluation Theory (CET).

CET, a subtheory of SDT, focuses specifically on the factors that affect intrinsic motivation. CET stipulates that factors that affect a students' sense of autonomy or competence will impact their intrinsic motivation (Ryan & Deci, 2000). Autonomy is experienced by individuals who feel as though they have control or an adequate understanding of why their control is reasonably limited (Filak & Nicolini, 2018). Thus, factors that affect a students' sense of autonomy, like choice and control, will impact their intrinsic motivation.

Although it initially appeared as though the lack of a strong relationship within the code network between the codes agency and motivation contradicts SDT, the discovery of an indirect link between motivation and agency through interest is in-line with the literature. The code pathway that links agency, interest, and motivation (Figure 5.2) is supported by CET and provides valuable insight on how the fulfillment of a learner's autonomy need leads to their orientation towards autonomous motivation by allowing them to work in areas that they are inherently interested.

The lack of a direct link between agency and motivation within the code network also suggests that merely providing students with autonomy is not sufficient for their orientation towards autonomous motivation. Instead, the appearance of the interest code suggests that autonomous students must also have the capacity to work in areas that they are inherently interested in. Providing learners with choice and control allows them to work in areas they are inherently interested in - their interest in their topic of study leads them to experience autonomous motivation.

Multiple participants recognized the pathway linking agency, interest, and motivation, as several of them noted that when they were able to work in areas of interest, they experienced improved motivation. This observation provides valuable insights regarding the design of online courses. In section 6.6, I discuss how the structure of an online course and the course's instructor can afford learners the autonomy to work in areas of interest, helping them to develop autonomous motivation.

6.3 Competence Need Fulfillment

Similar to autonomy, analysis of the code network revealed that a learner's need for competence is satisfied within a synchronous online learning environment. The code network also revealed that the satisfaction of a learner's need for competence within a synchronous online learning environment positively influenced their orientation towards autonomous motivation. These findings are in-line with the SDT need fulfillment pathway outlined in the literature. To investigate the fulfillment of a learner's competence need, I first coded my data to highlight instances where a participant's competence need was supported.

SDT research indicates that a sense of competence is experienced by individuals who seek out and develop expertise for tasks with meaningful outcomes (Filak & Nicolini, 2018). In

the context of online education, teachers can help students to establish a sense of competence by providing them with prompt, content-related feedback, level-appropriate tasks, technology support, and by assisting students to construct achievable goals (Giesbers et al., 2014; Niemiec & Ryan, 2009; Roca & Gagné, 2008). As such, I expected multiple codes related to competence to appear within the code network. However, although there are many instructional aspects related to competence, feedback was the only instructional aspect related to competence that appeared within the code network.

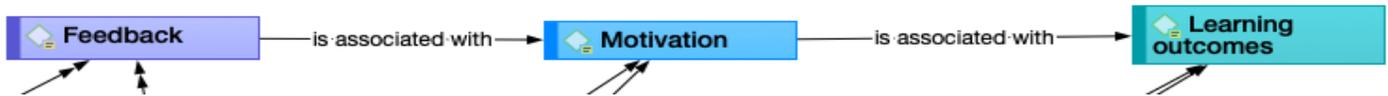
Feedback was by far the most prevalent instructional aspect related to competence. Within the transcriptions, feedback was mentioned almost 100 times, prompting me to create a feedback code, which highlighted instances where feedback, or a lack thereof, impacted learners. The feedback code was used during the coding process 58 times, thus, making it one of the most prevalent codes used in data analysis. In addition to being used 58 times, the feedback code also co-occurred with the motivation code on eleven instances. The prevalence of co-occurrences between the motivation and feedback codes is in-line with SDT literature.

The SDT need fulfillment pathway stipulates that the satisfaction of a learner's need for competence (along with the other SDT needs) will result in that learner experiencing autonomous motivation (Deci and Ryan, 2008). Competence is important for autonomous motivation because it helps learners to develop intrinsic motivation. CET, a subtheory of SDT that focuses specifically on the factors that affect intrinsic motivation stipulates that factors that affect a students' sense of autonomy or competence will impact their intrinsic motivation (Ryan & Deci, 2000). As such, I expected there to be a link between the feedback code and the motivation code within the code network. The pathway within the code network between the

feedback code and the motivation code (Figure 5.3) relates that the fulfillment of the competence need leads to autonomous motivation, in-line with SDT literature.

Figure 5.3

Network segment representing the competence pathway.



Although the relationship between the feedback code and the motivation code was expected, I was surprised to see that feedback was the only instruction aspect related to competence to appear within the code network (Figure 5.3). During coding, I expected to create competence codes related to goal-setting, technology support, and level-appropriate tasks. However, participants did not discuss goal-setting, technology support, and level-appropriate tasks enough to orient the creation of codes. I began to hypothesize why participants mainly discussed feedback in relation to their competence, and it became clear that the online learning environment impacted the importance of feedback.

Within a physical classroom setting, teachers and students rely on body language and facial cues for feedback. Within online learning environments lacking a synchronous component, the lack of visual communication eliminates this form of feedback. As such, the importance of written and verbal feedback within online learning environments may be amplified. The lack of social cues typically associated with online platforms fails to provide online instructors with adequate feedback to recognize that students may be experiencing challenges. For example, in an in-person environment, an instructor may pick up on looks of confusion, whereas in an online environment, a student would have to express their confusion actively. Within his interview,

Nathan addresses how regular check-ins, provide feedback and improve communication lost from the lack of visual feedback.

As a teacher, you're always able to tell, like, who's there who isn't there, like you can tell by body language, like, what they're looking at what they're doing. And when you're online, you don't really get that, especially when the cameras are off. So like having those constant repeated check-ins really makes you as a teacher understand, like, where your students are at and who's paying attention who isn't. And if they're really grasping it

Within this quote, Nathan is applying his experiences as a learner in an online environment to how he perceives it would be as a teacher within an online environment. This perspective is why I explicitly chose pre-service teacher candidates as participants for this interview. The juxtaposition between teacher and student makes the participants of this study more cognizant of pedagogical practice and effective teaching.

Some other reasons why feedback was the only instructional aspect related to competence to appear in this study relate to the context of learning for the participants of this study. First, Bachelor of Education programs are a graduate degree, meaning students have already completed an undergraduate degree and achieved well to obtain admission. As such, many of the students may be familiar with goal-setting behaviours expected at the graduate level. In addition, three of the four participants already had experience with online learning at the university level, which may have negated their need for technology support. Together, these reasons are likely why feedback was the only instructional aspect related to competence to appear within the code network.

The link between competence and motivation presented within this study contrasts findings from Xie et al. (2006), who did not find an association between competence and

motivation. However, the competence measure used by Xie et al. (2006) involved rudimentary computer skills, which could have yielded inaccurate results (Chen & Jang, 2010). In fact, Xie et al. (2006) noted their competency measure was likely skewed since almost all the learners who participated in their study perceived themselves as competent. My study's findings are more in-line with the SDT need fulfillment pathway; however, this prompted me to conduct a deeper investigation into the text excerpts where the motivation and feedback codes co-occurred.

Within the text excerpts tagged with both feedback and motivation it became clear that the type of feedback a learner receives could not only directly impact their sense of competence, but also it can directly impact their sense of motivation. Specifically, feedback lacking next steps or clear direction does not inform learners of the requirements to achieve learning outcomes, nor does it promote confidence that those outcomes are attainable. One example of this comes from Darnel, who noted that feedback lacking sustenance, that was only a grade, was demotivating, especially if that grade was not what the learner expected. Instead, clear, written feedback, that provides the next steps, with no grade, did not take away from the learner's motivation. In fact, this exact situation was experienced by Nicole on one of her assignments. When this assignment was returned to Nicole, the only feedback that she received was checked-off boxes on a rubric. Nicole was frustrated by this feedback because she did not know how to improve. By not knowing how to improve, Nicole could not develop expertise within the task that she was working on, resulting in her competence being eroded. Nicole said: "it wasn't even just the mark. It was just the fact that I had nothing to go from because I didn't really know like what we did wrong".

The notion that inadequate feedback can erode competence and hinder motivation appears within the literature. Hara & Kling (2001) note that a lack of timely feedback has been

linked to feelings of anxiety, frustration, and confusion within online learners. Additionally, Dennen et al. (2007) found that learners identified instructor actions associated with feedback, such as providing examples and timely feedback, to be meaningful to their learning. Therefore, not all feedback is competence supportive; instead, instructors must consider the quality of the feedback that they are providing learners. In the subsequent section, I discuss how a learner's need for relatedness is satisfied within a synchronous online learning environment.

6.4 Relatedness Need Fulfillment

Similar to autonomy and competence, analysis of the code network revealed that a learner's need for relatedness is satisfied within a synchronous online learning environment. The code network also revealed that the satisfaction of a learner's need for relatedness within a synchronous online learning environment positively influenced their orientation towards autonomous motivation. These findings are in-line with the SDT need fulfillment pathway. To investigate the fulfillment of a learner's relatedness need, I first generated a code, situated in SDT research, highlighting instances where a participant's relatedness need was supported.

A sense of relatedness is experienced by individuals who feel a sense of belonging or connectedness to other individuals (Filak & Nicolini, 2018). Within the education domain, teachers can provide students with a sense of relatedness by making their students feel like their educator genuinely cares for them or by helping to foster connections amongst students (Niemic & Ryan, 2009). As such, I used the connection code to highlight instances within the interviews where participants felt connected to other learners. Since relatedness is experienced by learners who feel a sense of connection (Filak & Nicolini, 2018), the connection code represents relatedness.

Connection was the most prevalent code during the coding process; in total, I tagged 99 excerpts with the connection code. Of the 99 excerpts tagged with connection, ten of the excerpts were co-coded with the motivation code. The co-occurrence of motivation and connection is in line with SDT literature.

Within SDT literature, the satisfaction of the relatedness need is important for the development of autonomous motivation. Relatedness is an important construct to the development of autonomous motivation because it fosters intrinsic motivation (Pat-El et al., 2012; Ryan and Grolnick, 1986) and the internalization of extrinsic motivators (Deci & Ryan, 2000; Ryan et al., 1994). Teacher interpersonal behaviours positively impact intrinsic motivation (Pat-El et al., 2012), while a distant instructor can negatively impact intrinsic motivation (Ryan and Grolnick, 1986). Conversely, modelled or valued behaviours from respected teachers are the primary reason learners internalize an extrinsic motivator or desired behavioural outcome (Deci & Ryan, 2000; Ryan et al., 1994). Extrinsic motivation that is internally regulated is a form of autonomous motivation. As such, the co-occurrence of the relatedness and the motivation codes within the code network is in-line with SDT literature.

When coding for connection, I identified a need to create a second code that highlighted collaborative interactions. I observed that in many instances where learners talked about a community of learners or a connection to other learners, they also mentioned collaborative events. I created the collaboration code to highlight cases in which learners could collaboratively work with other learners. The collaboration code was also quite prevalent during the coding process. I assigned the collaboration code to 64 excerpts. I assumed that there would be a link between collaboration and motivation within the code network. I assumed this because of the

strong relationship between collaboration and connection, both within the literature and code network.

Interestingly, a strong relationship did not exist between the collaboration code and the code for motivation, and therefore no link is made between collaboration and motivation within the code network (Figure 5.4). One likely explanation for the absence of a direct link between collaboration and motivation is that collaborative events help build connection, which ultimately affects motivation by satisfying the learner's need for relatedness. In other words, collaboration builds a sense of connection, a sense of connection satisfies a learner's need for relatedness, which in-turn leads to autonomous motivation.

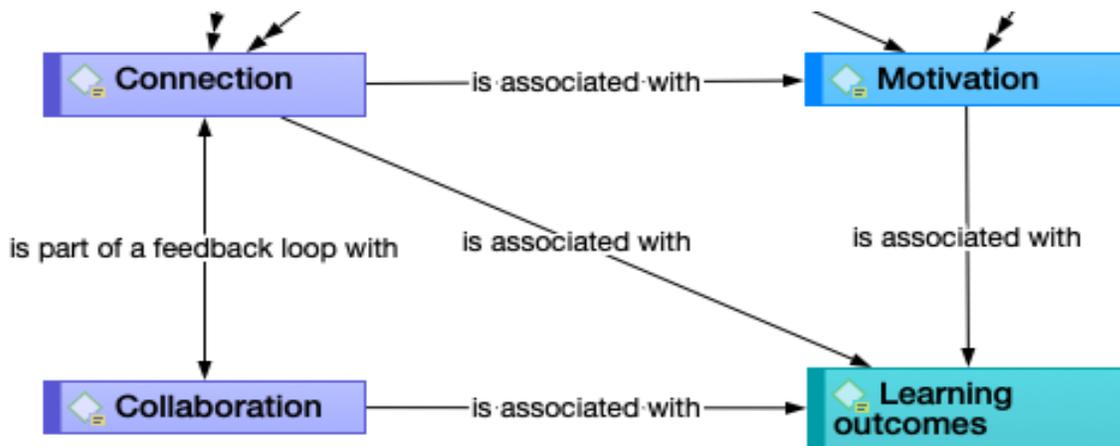
Within the code network, the relationship between connection and collaboration was one of the strongest code relationships. Connection and collaboration co-occurred in 14 instances by all four participants. Most participants noted that having opportunities to collaborate helped to foster a sense of connection to other learners. These collaborative opportunities sometimes created a space where learners, like Nicole, felt safe, which helped her to build a connection with her peers. Thus, within the code network, the pathway linking collaboration to motivation through connection is supported. Collaborative events help to foster a connection; a sense of connection satisfies a learner's need for relatedness, which fosters the development of autonomous motivation.

While creating the code network, I also noticed two interesting phenomena related to relatedness. First, I discovered a feedback loop between connection and collaboration (Figure 5.4). As learners are allowed to collaborate, they build a connection with other learners. As learners build a connection with other learners, they engage in more meaningful collaborative events. As a result of these more meaningful collaborative events, a greater sense of connection

is achieved, and the cycle continues. This feedback loop further supports the claim that both the code collaboration and the code connection highlight instances where a learner's need for relatedness is fulfilled.

Figure 5.4

Network segment representing the relatedness pathway.



The second interesting observation is that the codes for connection and collaboration were the only two codes associated with SDT needs that were directly associated with improved learning outcomes (Figure 5.4). This finding is interesting because the SDT need fulfillment pathway stipulates that as a learner's need for autonomy, competence, and relatedness are fulfilled, a learner will experience autonomous motivation and as a result of experiencing autonomous motivation, the learner will experience improved learning outcomes. The code network that I generated shows a direct link between the relatedness need and improved learning outcomes. Within the code network, a direct link exists between the codes connection and learning outcomes, as well as between collaboration and learning outcomes.

A possible explanation for this was discovered within the transcribed interviews as several of the participants noted that opportunities for meaningful collaboration built on their knowledge. For example, Nathan noted

If there were opportunities for me to collaborate with others and to really talk about what we're reading what we're learning what we think about it because I truly believe that that's one of the ways that people can learn best is to see what other people think of it. To rework your own opinions and thoughts on it.

Clarice shared a similar viewpoint as Nathan, noting:

The other classes when you could talk about ideas and just share, share thoughts, feelings, and I don't know, different teaching styles or methods. It was more like you could see, oh, okay, that's it. That's a good idea. I'd probably do this. Oh, great, that's, you know what I mean, you build off of each other.

Within the literature, Song et al. (2004) note that online courses' flexible nature simplifies the collaboration process. The collaboration process is simplified because learners can interact online instead of arranging physical meeting times. The synchronous meetings within online courses improved the learner's connection to the instructor and other students thus helping to build a community of learners, and foster a sense of relatedness, within the online classroom. The flexible nature of online courses (Song et al., 2004) could explain why connection and collaboration were such key aspects of the code network. In the subsequent section, I discuss how fostering autonomous motivation through SDT need fulfillment leads learner's to perceive improved learning outcomes.

6.5 Motivation and Learning Outcomes

SDT stipulates that as a learner's needs for autonomy, competence, and relatedness are fulfilled, the learner will experience autonomous motivation. In the previous sections, I have shown that a learner's autonomy (section 6.2), competence (section 6.3), and relatedness (section 6.4) needs can be satisfied and will foster autonomous motivation within a synchronous online learning environment. The SDT need fulfillment pathway also stipulates that as a learner experiences autonomous motivation, they will also experience improved learning outcomes. In this section I discuss how motivation is connected to learning outcomes within the code network that I created.

Analysis of the code network revealed a direct link between the motivation code and the learning outcomes code. I assigned the motivation code to 49 excerpts within the transcribed interviews. Conversely, I assigned the learning outcomes code to 39 quotes. Of these instances, the motivation code and the learning outcomes code co-occurred on six instances by three participants. Within these co-occurrences, participants noted that experiencing motivation improved their learning outcomes. As discussed in section 5.2.4, participants who experienced motivation also experienced improved learning outcomes in the form of improved grades, an increased desire, increased engagement, and an increase in perceived information retention.

The connection between motivation and learning outcomes within the code network is the final component of the SDT need fulfillment pathway to appear within synchronous online learning environments. The mirroring of the theoretical SDT need fulfillment pathway, and the code network I generated indicates that the satisfaction of SDT needs are not only possible within synchronous learning online environments, but need fulfillment leads to autonomous motivation, and improved learning outcomes.

Within this investigation, I chose to use perceived learning as a measure of learning outcomes. This study's qualitative nature allowed learners to describe how they perceived their learning instead of rigid achievement variables most often used in quantitative SDT studies (e.g. Chen & Jang, 2010). Although several participants did note observable differences in their grades when motivated, perceived learning was the main measure used to indicate attained learning outcomes. Marks et al. (2005) note that perceived learning is an effective predictor of learning outcomes, as there can be inconsistencies amongst measured variables such as grades. The inconsistencies in measured variables like grades exist particularly in post-undergraduate programs (i.e., Bachelor or Education) because of the use of teaching assistants for marking and the inflation of grades (Marks et al., 2005). Additionally, there is the potential that participants actually obtain a high grade while their actual retention of learning will be low. Many participants in this study noted this exact phenomenon of high academic achievement with low content and learning retention.

The findings presented in this section, along with sections 6.2 to 6.4 address the primary objective, which was to construct a narrative exploring SDT need fulfillment within a synchronous online learning environment. Together, these findings indicate that the SDT need fulfillment pathway was observable within synchronous online learning environments. In the subsequent section, I discuss which specific instructional aspects within fully synchronous online learning environments support students' SDT needs. I first discuss how the course structure and facilitator impact the fulfillment of a learner's need for autonomy (6.6.1). Then, I discuss how course structure, the facilitator, type and quality of communication, and the online learning platform impact the fulfillment of a learner's need for relatedness (6.6.2). Finally, I discuss how

the facilitator, type and quality of communication, and the online learning platform impact the fulfillment of a learner's need for competence (6.6.3).

6.6 Codes impacting the SDT Need Fulfillment Pathway

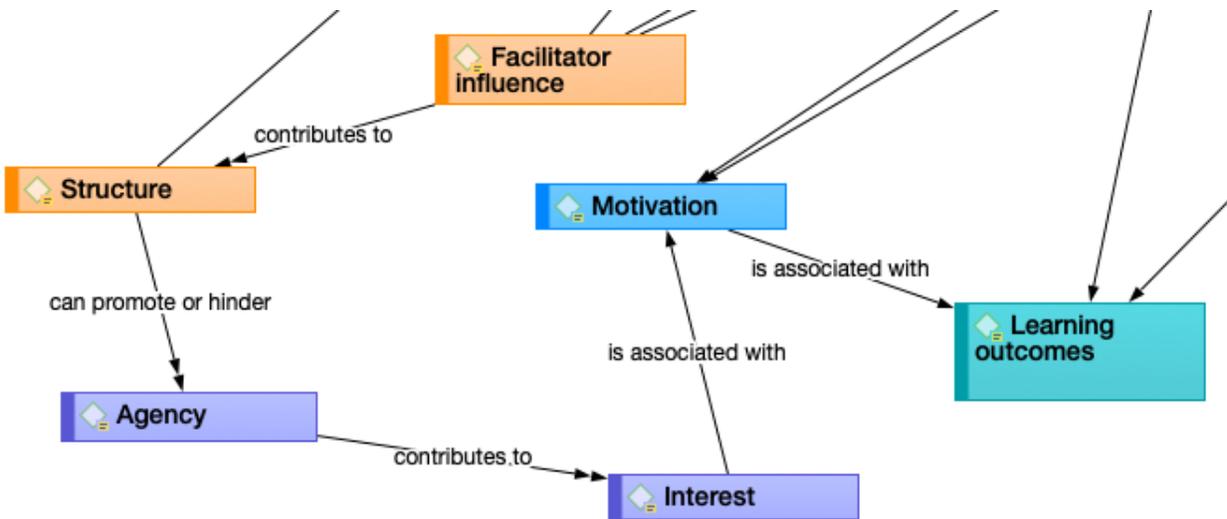
Within the code network, structure, facilitator influence, online learning platform, and communication appear as codes that impact the SDT need fulfillment pathway. The codes, structure, facilitator influence, online learning platform, and communication provide valuable insight regarding how SDT need fulfillment occurs within a synchronous online learning environment. The code network reveals that the structure of a course, the quality of communication and feedback, the provision of choice, and the instructor's personability and commitment are all linked to SDT need fulfillment. Below, I discuss how the course structure and facilitator impact the fulfillment of a learner's need for autonomy within an online learning environment.

6.6.1 *Autonomy*

Within the code network, course structure and facilitator influence both impacted the autonomy need fulfillment pathway (Figure 6.1). The code for course structure is directly linked to the agency code. Conversely, the facilitator influence code is indirectly linked to the agency code through the structure code. This pathway suggests that a course facilitator can influence a course structure and the course structure impacts how much autonomy is experienced by the learners.

Figure 6.1

Network segment demonstrating how aspects of online learning impact autonomy.



The structure of a course impacts learner autonomy by affecting the amount of choice and voice afforded to learners within that course. When a course is structured so that it overtly prescribes course facets (i.e., groups, topics, expectations), it limits a learner's agency. In contrast, a course that is structured in a way where control and choice are afforded to learners would not limit a learner's agency. An instructor who is familiar with online learning platforms can organize a course more effectively and have a more seamless experience online compared to an instructor who hasn't.

The instructor impacts the course structure in many ways. For instance, an instructor can influence how peers interact (PLNs), what topics are covered, and whether there is choice integrated into assignment topics or if assignment topics are prescribed. Within the literature, learners have identified course structures such as upfront information, concrete examples, and timely responses to inquiries and tasks as positive course structures (Dennen et al., 2007). Learners have also identified clear assignment directions and course organization as instructor

behaviours that impact the structure of an online course (Marks et al., 2005). Instructor actions that support clear assignment directions and course organization are identified as positive course aspects because they support learners' autonomy.

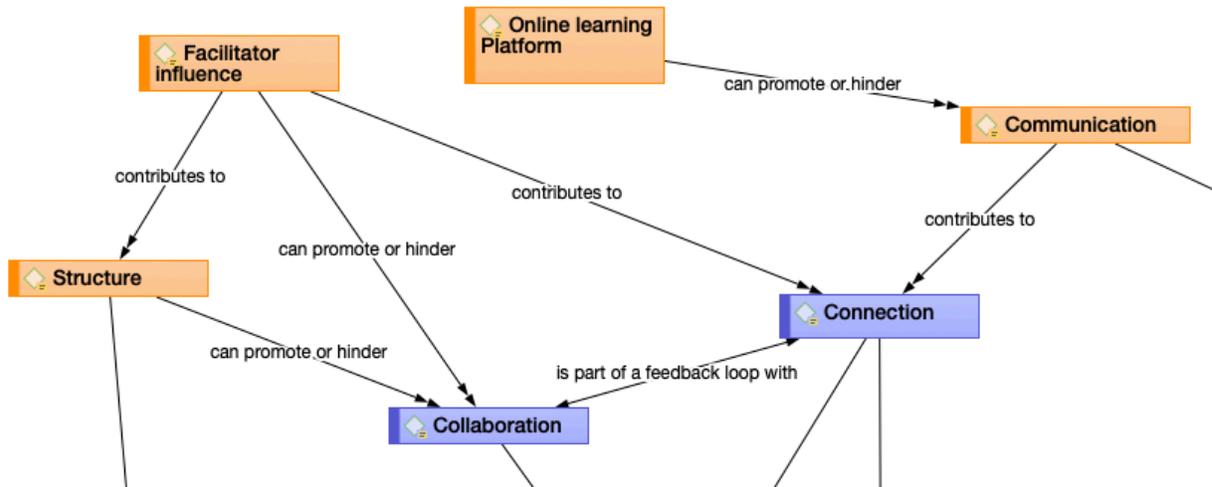
Within the context of in-person instruction, instructor behaviours that: (i) promote learner choice and voice, (ii) remove external participation pressures, and (iii) encourage independence, are all autonomy-supportive (Reeve & Jang, 2006; Shroff & Vogel, 2009). Within the transcribed interviews, participants mentioned choice regarding learning content, control over the pace of learning in asynchronous activities, meaningful feedback, independent/small group work, and being heard as instructor behaviours that improved their autonomy. As such, it is clear that the instructor behaviours that promote autonomy within face-to-face classes can also promote autonomy within synchronous online learning environments. In fact, the nature of online learning environments is autonomy-supportive in itself as it provides flexibility to learners to participate on their own accord (Chen et al., 2010). The increased flexibility within online learning environments may make them the ideal learning environment to fulfill a learner's need for autonomy.

6.6.2 Relatedness

The relatedness need of participants, represented by the codes communication and collaboration, was impacted by all four aspects of online learning explored in this investigation - structure, facilitator influence, communication, and the online learning platform (Figure 6.2).

Figure 6.2

Network segment demonstrating how aspects of online learning impact relatedness.



Structure and collaboration co-occur ten times, and facilitator influence and collaboration co-occur six times. Overtly structured courses can hinder collaborative opportunities by limiting relationships (fixed groups) and controlling discourse (prescribed conversation). The online course structure has a significant impact on interactivity (Marks et al., 2005), and therefore connection. A rigid online course structure negates the usual benefits of collaboration, including exposure to various perspectives. Instead, encouraging students to establish PLNs is how a course's instructor can establish a course structure that can lead to collaboration.

The second element of synchronous online learning that impacts relatedness is communication and facilitator influence (Figure 6.2). Connection is directly associated with the codes facilitator influence and communication and indirectly associated with the code online learning platform through communication. Participants noted that instructors should use technology within online learning environments to their advantage to build connections amongst learners. Having opportunities for personal conversation and encouraging friendly dialogue can

help to foster connections. How much time the instructor invests into getting to know the students can also impact connection. Within Dennen et al. (2007), instructor actions associated with communication, such as frequently checking emails, posting on discussion boards, and responding to questions, were rated most important by online learners. Students place great value on instructor actions associated with interpersonal communication demonstrating the importance of connection in online learning environments (Dennen et al., 2007).

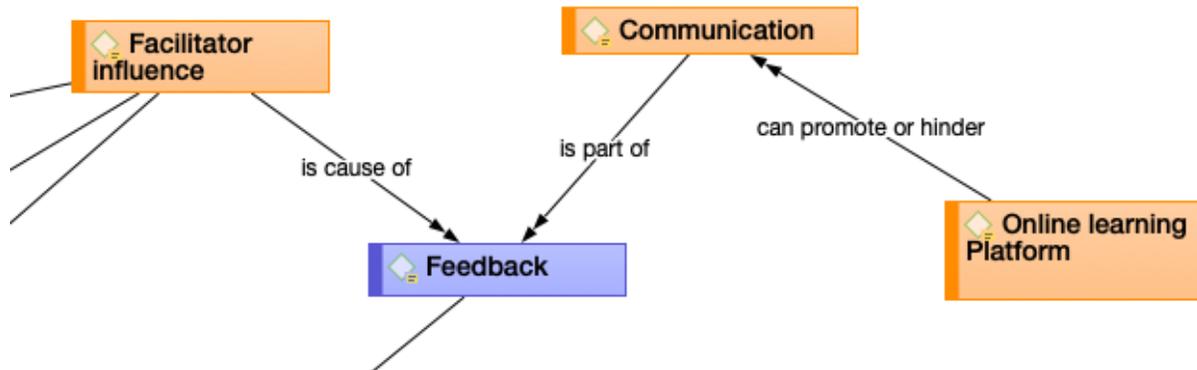
Unfortunately, the intricacies of communication within online learning environments may negatively impact the connectivity experienced by digital learners. Some of the challenges of online communication relate to the sanitized nature of academic writing, lack of context, for example, sarcasm through tone, and an absence of non-verbal communication (Rienties et al., 2009). Instructors of online courses must overcome these challenges to foster peer-to-peer and peer-to-facilitator connectivity to fulfill students' need for relatedness. Within this investigation, participants noted challenges with communication associated with the online learning platform itself. For example, delays caused by typing in a live chatbox can create confusion and hinder effective communication.

6.6.3 Competence

Participants' competence need, represented by the code feedback, was directly impacted by two aspects of online learning explored in this investigation - facilitator influence and communication, and indirectly impacted by the online learning platform through communication (Figure 6.3).

Figure 6.3

Network segment demonstrating how aspects of online learning impact competence.



The benefit of communication is noted within the literature - Dennen et al. (2007) found instructor actions associated with feedback to be a significant predictor of learning within online environments. Additionally, Hara & Kling (2001) note that a lack of timely feedback is linked to feelings of anxiety, frustration, and confusion within online learners. Hara & Kling's (2001) finding is likely explained by the influence that effective feedback has on a sense of competence. When teachers fail to provide adequate feedback in synchronous online learning environments, it erodes competence and fosters anxiety and confusion. One of the challenges in delivering feedback within online learning environments relates to communication challenges within online learning environments.

Issues with communication in online learning environments can negatively impact how feedback is delivered. Teachers rely on their students' feedback to see how the lesson is going - teachers typically receive this feedback through non-verbal cues like facial expressions. Receiving non-verbal cues is more challenging online, especially in asynchronous environments; therefore, the feedback needs to be communicated differently. Lack of body language cues and facial expressions makes communication more challenging in online learning environments.

Having to type out communication is more challenging and can lead to a delay in response times. Additionally, the typed-out content is academic and therefore sanitized; this takes the personality out of communication when typing to peers. With that said, if used correctly, technology afforded by online learning can be used to enhance communication, for example, personalized feedback videos or conferencing features.

Students benefit from personalized feedback and timely feedback, and it is up to the instructor to overcome challenges with communication to deliver useful feedback within synchronous online learning environments. Instructors can give poor feedback, not enough feedback, or late feedback - all of which can negatively affect learning.

6.7 Summary

Within this chapter, I have constructed a narrative exploring SDT need fulfillment within a synchronous online learning environment. I demonstrated that each of a learner's SDT needs, were fulfilled within a synchronous online learning environment. That the fulfillment of all three SDT needs led learners within synchronous online learning environments to experience autonomous motivation, and in turn, they perceived their learning outcomes to improve. Together, these findings indicate that the SDT need fulfillment pathway is observable within synchronous online learning environments.

I have also presented an overview of the specific instructional aspects within fully synchronous online learning environments support students' SDT needs. I provided an overview of how course structure, the facilitator, the online learning platform, and communication within the online environment impact the fulfillment of a learner's SDT needs within a synchronous online learning environment. In the subsequent chapter I discuss my conclusions and the implications of my study.

Chapter 7: Conclusions and Implications

7.1 Conclusions

The primary objective of my investigation was to construct a narrative exploring SDT need fulfillment within a synchronous online learning environment. I satisfied this objective by first generating a code network based on code relationships that I observed within the coded data, as discussed in Chapter 4, and then, by analyzing the code network and discovering a series of connected codes that mirror the need fulfillment pathway outlined within SDT, as discussed in Chapter 5 and Chapter 6. The code network that I generated parallels the SDT need fulfillment pathway in three distinct ways.

- IV. all three SDT needs (autonomy, competence and relatedness) are represented through codes within the code network;
- V. all of the codes representing SDT needs are linked to motivation within the code network;
- VI. the motivation code is connected to the learning outcomes code within the code network

My research contributes evidence that shows SDT need fulfillment is possible within synchronous online learning environments, a significant finding that gives credence to this theory. The overlap between the theoretical SDT need fulfillment pathway and the code network that I generated within this thesis demonstrates that SDT need fulfillment is possible within synchronous online learning environments. The codes and their respective excerpts that I used to generate the code network provide a unique narrative that addresses how the SDT need fulfillment pathway is observable within a fully synchronous online learning environment. My research takes the first step to meeting the calls for holistic studies that explores the entirety of

the SDT need fulfillment pathway in an online learning environment. In addition, the code network that I have generated makes a novel methodological contribution for further research into capturing and articulating SDT need fulfillment pathways.

The secondary objective of my investigation was to explore which specific instructional aspects within fully synchronous online learning environments support students' SDT needs. The aspects of fully synchronous online learning environments that impact SDT need fulfillment are important to the SDT need fulfillment narrative. Of the factors that impacted SDT need fulfillment, I found that facilitator influence was the most prominent, impacting learners' need for autonomy, relatedness, and competence. Course structure was also a key factor, impacting learner's need for autonomy and relatedness. The online learning platform and type/quality of communication were observed to impact learners' need for relatedness and competence. These findings contribute new knowledge towards course design within synchronous online learning environments.

The first key finding of my research is that the most impactful external factor on the SDT pathway is by far the facilitator. The facilitator influence code was connected to all three SDT needs. The facilitator directly impacts relatedness and competence by influencing collaboration, connection, and feedback. The facilitator also indirectly impacts autonomy, by influencing the course structure, which has implications for learner agency. My research contributes evidence that shows the facilitator greatly influences the satisfaction of the SDT need fulfillment pathway within synchronous online learning environments.

The second key finding of my research is that the most impactful SDT need is relatedness. Within the code network, relatedness, represented by connection and collaboration were the only SDT needs that were directly associated with improved learning outcomes. This is

a key contribution of my work because the SDT need fulfillment pathway stipulates that as a learner's need for autonomy, competence, and relatedness are fulfilled, a learner will experience autonomous motivation and as a result of experiencing autonomous motivation, the learner will experience improved learning outcomes. My research contributes empirical evidence that shows a direct link between the relatedness need and improved learning outcomes. Within the code network, a direct link exists between the codes connection and learning outcomes, as well as between collaboration and learning outcomes. The direct connection between the relatedness codes and learning outcomes emphasizes the importance of collaborative opportunities within synchronous online learning environments.

7.2 Implications

The findings from this study provide valuable insight for the design of online courses moving forward. In terms of design for synchronous online courses, my research indicates that course developers should pay particular attention to the course structure, the facilitator they select, as well as the online learning platform and method of communication that they use. For a synchronous online course to be successful, the facilitator should be approachable, personable, knowledgeable, supportive, flexible, and invested. These traits will allow the instructor to build connections with and amongst students to provide learners with choice and voice, and ensure learners have the skills to develop competency. Based on my research findings, the structure of the course should be flexible in nature, have opportunities for collaboration, and be scaffolded in such a way that supports student success. The online learning platform should be intuitive, autonomous, and supportive of collaborative interactions and peer connections. Finally, the method of communication utilized within the synchronous online course should provide opportunity for face-to-face discourse, as well as asynchronous interactions. If a course

developer implements the aforementioned suggestions, learners within that course will experience autonomy, competence, and relatedness, resulting in autonomous motivation, and in turn, improved learning outcomes. To assist practitioners I offer the following recommendations:

1. Offer learners the flexibility to select their own topics of study
2. Encourage students to work collaboratively when possible
3. Provide timely, personable, and meaningful feedback
4. Establish a safe learning environment where learners feel comfortable
5. Model connection and positive relationships
6. Be personable with students
7. Respond to inquires promptly
8. Foster communication within the learning environment
9. Help learners establish professional learning networks
10. Offer flexibility on academic tasks
11. Structure feedback in a way that it offers areas of improvement and growth

My findings also have implications for further research. This study established a link amongst relatedness and learning outcomes that could be further explored with larger groups of participants. It also provides an opportunity for future research to revisit Chen and Jang's (2010) model of SDT, which omitted relatedness support in favour of perceived relatedness and did not predict learning outcomes. My research also provides a narrative that addresses how the SDT need fulfillment pathway is satisfied within synchronous online learning environments. It would be interesting to explore this narrative to see if the satisfaction of the SDT need fulfillment pathway changes over a longer learning period. Additionally, prior studies mostly focus on asynchronous online learning environments so it would be interesting for future research to compare the satisfaction of the SDT need fulfillment pathway in an asynchronous online learning environment to the one that I generated in a synchronous online learning environment. Finally, in this study all participants were selected from the same area and level of study. In order to understand how SDT is fulfilled across multiple platforms and disciplines, future studies should consider selecting participants from multiple disciplines across various academic levels.

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Appendices

Appendix A: Pre-Interview Guide

Introduction:

Hi, I'm Andrew nice to meet you. How are you doing today? How are you holding up?

How has COVID-19 affected your course schedule?

Before we begin, I just want to say thank you so much for agreeing to participate in this study, I really do appreciate your time commitment.

To start off here I just want to talk a little bit about my research question and how I came to be interested in the topic to begin with. I want to understand how online learning environments impact growth and desire to learn and how growth and desire evolve in pre-service teacher candidates. I'm interested in your experiences in online learning and your thoughts about it. The reason I am interested in this is because as teachers there are all these things that affect how we do our job. There is education policy, curriculum documents, standardized testing, and now there is all this talk about online learning. Online learning has become popular in pre-service teacher education and now it's being integrated into the education system in Ontario. Which got me thinking about how online learning will affect how we teach. Do you have any questions for me about this?

I am a grade 5 teacher with the SMCDSB. I have been working as a teacher for 2 years now. I have been doing my masters part-time, while working, which has led to some sleepless nights! Before this, I went to teacher's college at Trent University in Peterborough. It was only the second year of the two-year program so that was interesting! I think they were still trying to work out some kinks at that point. Before that, I went to York University where I studied biomedical sciences, which is not something I use much of as a grade 5 teacher, but you never know where life will take you!

Icebreaker:

Simple follow up/ice-breaker questions, for example:

- So where did you do your undergrad? Have you always been an Ontario TechU student? What did you take in your undergrad? If you had to compare your undergrad to the B.Ed program which did you enjoy more?

Online learning (Pre-online learning):

Did you happen to take any online courses in your undergrad? How many courses have you taken online? What was your favourite? Why was it your favourite? How did you like the online courses? How would you compare them to in-person courses? Do you have a preference?

- What is the one thing about online courses you enjoy/dislike the most? What is the one thing about physical courses you enjoy/dislike the most?
- Would you say one style of course is easier than the other?

Were all of your experiences with online learning the same? Were all of the courses delivered through the same online platform, how do you think the platform itself impacted you as a learner (your autonomy and motivation)

Framing (Pre-online learning):

Because of everything that is going on you are about to begin a semester that is different, how are you feeling going into it? Are you looking forward to anything in particular? Are you nervous about anything?

Motivation:

| Pre-online learning |
|--|
| What is your interpretation of the term intrinsic motivation? How does motivation play a role in your learning? How would you describe the reason why you complete your coursework? What are you looking to get out of this program and the courses that you take? Does your sense of motivation change within courses? How does your learning change as your motivation changes? Do you think all learners are motivated to learn? How does it play in your need and want to be a teacher? |

Desire:

| Pre-online learning |
|--|
| Can you outline some of your desires as a learner in this program? Can you outline some of your desires as a future teacher? Do you have a desire to learn novel information about teaching? Do you have a desire to better your skills as a teacher? |

Individuality and connectedness:

I'm also quite interested in pre-service teachers' feelings about their own individuality and connectedness.

| Pre-online learning |
|--|
| Would you be able to talk to me about your own sense of individuality (distinguished or a cog in the wheel)? Was there any time you can specifically remember where you felt like an individual learner? In your program so far have you felt a general sense of connectedness to the students in your cohort, to your professors? Do you think that a lack of individuality impacted your sense of connectedness to the course |

Agency:

Pre-online learning

What can you tell me about your agency (and by that, I mean your ability to control your own learning path)?

Do you benefit as a learner from having agency?

Can you give me an example of a time you experienced agency?

Appendix B: Post-Interview Guide

Follow Up Questions

- Is there a course that you enjoyed the most within the online semester, can you tell me what about that course made you enjoy it the most?
- Is there a course that you disliked the most within the online semester, can you tell me what about that course made you dislike it the most?
- Which course do you feel like you had the strongest learning - what do you think facilitated that for you?
- Which course do you feel you got the least out of - why do you think that is the case?
- In the first interview you spoke a lot about _____, how has that changed. Have your feelings around that changed?
- Pick your favourite course from this online semester, the one that was most conducive to your learning and describe it to me
- Pick your least favourite course from the online semester and describe it to me, what aspects did you dislike the most.

Online learning (Post-online learning):

How would you compare your experiences with online learning at OntarioTechU with your previous experiences with online learning? Was the delivery method utilized similar, did it change your experience as a learner? What aspects of the courses did you enjoy, what aspects did you dislike?

Framing (Post-online learning):

How do you feel about online learning now, has your general perceptions changed?

Motivation:

| Post-online learning |
|--|
| How did motivation play out in your experiences with online learning? Was there any time within your online learning experiences that decreased or increased your intrinsic motivation? What aspect of the online courses you have taken impacted your sense of motivation the most? How would you describe the reason why you complete your coursework in online learning? Did your sense of motivation change within courses? Has these experiences changed your need and want to be a teacher? |

Desire:

| Post-online learning |
|--|
| Has there been any change to your desires as a learner in this program? Has there been any change to your desires as a future teacher? Do you have a desire to learn novel information about teaching? Do you have a desire to better your skills as a teacher? |

Individuality and connectedness:

| Post-online learning |
|--|
| How was your sense of individuality affected within online learning? Did you feel connected to the teacher? Did you feel connected to the other students in your class? Is there any time within your online learning experiences that decreased or increased your sense of individuality? What aspect of the different online courses you have taken impacted your sense of individuality the most? |

Agency:

| Post-online learning |
|---|
| How did your sense of agency change within online courses, do you feel like you had more control of your own learning path? Can you give me an example of when you had agency in an online course? Is there any time within your online learning experiences that decreased or increased your sense of agency? <ul style="list-style-type: none">• What aspect of the different online courses you have taken impacted your sense of agency the most? |

Change (follow up only):

Tell me about how you changed overall as a learner through the online courses within the program?

- Can you speak on your individuality, agency, and intrinsic motivation?

How do you place online courses in the context of the rest of your education journey?