Non-traditional instruction: examining the interaction effect between student characteristics and perceived sense of connectedness in an online learning environment.

Kendra M, Nolan

University of Louisville

Follow this and additional works at: https://ir.library.louisville.edu/etd

Part of the Educational Methods Commons, Online and Distance Education Commons, Social and Philosophical Foundations of Education Commons, and the Teacher Education and Professional Development Commons

Recommended Citation
https://doi.org/10.18297/etd/3726

This Doctoral Dissertation is brought to you for free and open access by ThinkIR: The University of Louisville's Institutional Repository. It has been accepted for inclusion in Electronic Theses and Dissertations by an authorized administrator of ThinkIR: The University of Louisville's Institutional Repository. This title appears here courtesy of the author, who has retained all other copyrights. For more information, please contact thinkir@louisville.edu.
NON-TRADITIONAL INSTRUCTION: EXAMINING THE INTERACTION EFFECT BETWEEN STUDENT CHARACTERISTICS AND PERCEIVED SENSE OF CONNECTEDNESS IN AN ONLINE LEARNING ENVIRONMENT

Kendra M. Nolan

B.S., Fisk University, 2010
M.B.A., University of Kentucky, 2011
M.A.T., University of Louisville, 2014

A Dissertation
Submitted to the Faculty of the
College of Education and Human Development of the
University of Louisville
in Partial Fulfillment of the Requirements
for Degree of

Doctor of Education in Educational Leadership and Organizational Development

Department of Educational Leadership, Evaluation, and Organizational Development
University of Louisville
Louisville, Kentucky

August 2021
NON-TRADITIONAL INSTRUCTION: EXAMINING THE INTERACTION EFFECT BETWEEN STUDENT CHARACTERISTICS AND PERCEIVED SENSE OF CONNECTEDNESS IN AN ONLINE LEARNING ENVIRONMENT

By

Kendra M. Nolan
B.S., Fisk University, 2010
M.B.A., University of Kentucky, 2011
M.A.T., University of Louisville, 2014

A Dissertation Approved on

July 9, 2021

by the following Dissertation Committee:

______________________________
Dissertation Chair
W. Kyle Ingle

______________________________
Dr. Keith Davis

______________________________
Dr. Ishwanzya Rivers

______________________________
Dr. R. Aaron Wisman
DEDICATION

This dissertation is first and foremost dedicated to my daughter, Jadyn. You are my shining light, my entire world, my greatest blessing. Every day, I am in awe of your intelligence, your blissful joy, and beautiful spirit. I am beyond grateful that God chose me to be your mother. I also dedicate this dissertation to my mother. Mom, you have always been my biggest supporter, the wisest problem solver, and the most graceful woman of God. I love you and thank God for you.
ACKNOWLEDGEMENTS

I must first acknowledge the One who allowed this all to be possible, my Lord, my God, my Father in Heaven. If it had not been for the Lord who was on my side every step of the way, where would I be? I give all glory, honor, and praise to God for allowing me to make it this far.

I would like to acknowledge my dissertation committee for all their wisdom, knowledge, patience, and support throughout this process. I am profoundly grateful to each of you for your guidance and encouragement during this journey. I would also like to acknowledge my Block 20 cohort. This cohort has provided me with an amazing support system, accountability partners, and friends for a lifetime. I am blessed to have been able to travel this journey with all of you.

Finally, I would like to express my deepest gratitude, appreciation, and love for my family. From my grandmother to my mother, aunts and uncles, cousins and nephews, my daughter, and my closest friends that have become family. You all have continuously encouraged me during difficult moments and celebrated every milestone with me. You help me to remain humble, but you also remind me to hold my head high. I love all of you. I want to especially acknowledge my sister Alicia and my Uncle Jimmy who have both been called to be with the Lord in Heaven. While your physical presence is deeply missed, your spiritual presence is constantly felt. I love and miss you both.
ABSTRACT

NON-TRADITIONAL INSTRUCTION: EXAMINING THE INTERACTION EFFECT BETWEEN STUDENT CHARACTERISTICS AND PERCEIVED SENSE OF CONNECTEDNESS IN AN ONLINE LEARNING ENVIRONMENT

Kendra M. Nolan

July 9, 2021

The school setting also has an influence on students' sense of connectedness. Because of the novel coronavirus pandemic, schools across the United States and the world were forced to close in March 2020. The sampled district began the 2020-2021 school year with non-traditional instruction (NTI). With NTI, teachers and students continued academic instruction through an online communication platform such as Zoom, Google Meet, or Microsoft Teams. Researchers and school leaders are uncertain how effective online learning was. Furthermore, minimal research explores the interaction effect between student characteristics (grade level, gender, and race/ethnicity) and their perceived sense of connectedness in a non-traditional online learning. A study analyzing this topic was necessary to understand students’ feelings of connectedness within non-traditional instruction. Accordingly, my research used an adapted version of the Online Student Connectedness Survey (OSCS) to measure student sense of connectedness (Bolliger & Inan, 2012). Additional student-level data were also collected, including student grade level, gender, and race/ethnicity. I used a quantitative design of a factorial
ANOVA to determine if there were any statistically significant interaction effects between student characteristics (grade level, gender, and race/ethnicity) and their sense of connectedness in a non-traditional online learning environment. My analysis concluded that grade level nor gender independently were associated with students perceived connectedness during online instruction. Students’ race/ethnicity, however, was associated with their perceived sense of connectedness in an online school setting. Furthermore, gender as a factor by itself did not influence student sense of connectedness. Although, gender associated with grade level or gender associated with race/ethnicity did have an interaction effect on feelings of connectedness.
TABLE OF CONTENTS

DEDICATION .................................................................................................................. iii
ACKNOWLEDGEMENTS .............................................................................................. iv
ABSTRACT .................................................................................................................... v
LIST OF TABLES ........................................................................................................... ix
LIST OF FIGURES ......................................................................................................... x
CHAPTER I: INTRODUCTION TO THE PROBLEM ........................................................ 1
  Background .................................................................................................................. 2
  Purpose of the Study ................................................................................................... 3
  Research Questions ..................................................................................................... 5
  Hypotheses .................................................................................................................. 6
  Research Design ......................................................................................................... 7
  Scope of the Study ....................................................................................................... 8
  Definition of Terms .................................................................................................... 8
  Data Sources .............................................................................................................. 9
  Limitations and Assumptions .................................................................................... 9
  Organization of the Study .......................................................................................... 10
CHAPTER II: LITERATURE REVIEW ............................................................................. 11
  Sense of Connectedness and Its Measures ............................................................... 11
  Measuring Connectedness in the Online Learning Environment ............................... 18
  Sense of Connectedness within the Online Learning Environment ............................ 26
  The Relationship Between Sense of Connectedness and Student Characteristics ...... 29
    Students’ Grade-Level ............................................................................................... 30
    Students’ Gender ..................................................................................................... 31
    Students’ Racial/Ethnic Group ............................................................................... 32
    Students’ Socioeconomic Status .......................................................................... 33
    Students’ Program Enrollment .............................................................................. 34
  Sense of Connectedness and Engagement in the Online Learning Environment ....... 35
  The Coronavirus and its Impact on Schools & Students ............................................. 38
  Conceptual Framework and Theoretical Underpinnings ............................................ 41

vii
LIST OF TABLES

Table 1. Sense of Connectedness Measurement Tools ...........................................15
Table 2. Online Sense of Connectedness Measurement Tools ................................21
Table 3. School District Demographics Data .........................................................52
Table 4. Middle School Demographic Data 2019-2020 School Year ......................53
Table 5. Variables in the Model with Their Grounding in the Literature .................57
Table 6. Means and Standard Deviations for Student Participants .......................66
Table 7. Comfort Mean Scores ............................................................................67
Table 8. Facilitation Mean Scores ........................................................................68
Table 9. Community Mean Scores .......................................................................69
Table 10. Interaction and Collaboration Mean Scores ............................................70
Table 11. Instructor Used Activities .....................................................................71
Table 12. Factorial ANOVA for Grade, Gender, and Race/Ethnicity on Student Sense of Connectedness ...............................................................74
LIST OF FIGURES

Figure 1. Community of Inquiry Framework .................................................................41
Figure 2. Normal Distribution Histogram of Connectedness .........................................73
Figure 3. Interaction Graph of Grade-Level and Gender on Connectedness .................75
Figure 4. Interaction Graph of Gender and Race/Ethnicity on Connectedness ..............77
CHAPTER I: INTRODUCTION TO THE PROBLEM

Carol Goodenow (1993), a leading scholar in student sense of connectedness, suggests that the desire to belong is imperative during adolescent years when children seek social support, community acceptance, and personal identity. Even Maslow (1962) included feelings of social connectedness in his theory of the hierarchy of needs. He argued how humans have a desire for feelings of connectedness and acceptance amongst groups, both large and small. If these feelings of connectedness are not satisfied during the adolescent years, adverse behavior may emerge and become evident in the school setting. Scholars have examined the relationship between student sense of connectedness and several student outcomes, including attendance, school preparation, task completion, student motivation, and graduation (Abimbola & Ugbede, 2018; Akar-Vural et al., 2013; St. Amand et al., 2017; Demanet & Van Houtte, 2012; Van Voorhis et al., 2013).

Additional research suggests that students with a meaningful sense of connectedness in school experience more efficacious emotions, thus contributing to their academic success (Lam et al., 2015). Researchers also suggest that students’ perception of connectedness within their school correlates to behavioral outcomes (Boyle et al., 2012; Freidenfelt Liljeberg et al., 2011). Inappropriate and disruptive behaviors from students may be their response to a lack of connectedness, thus creating a cycle of misbehavior and a low sense of connectedness (Black; 2016; Cagle, 2017; Cameron, 2006; Freidenfelt Liljeberg et al.,
Despite the extensive research conducted on student sense of connectedness (Booker, 2007; Boston & Warren, 2017; Bottiani et al., 2016; Clemens & Lemberger, 2012; Fernandes et al., 2017; Goodenow & Grady, 1993; Gray et al., 2018), educational institutions continue to grapple with creating and maintaining an online educational setting which promotes an environment conducive to student sense of connectedness. According to the National Center for Educational Statistics (2013), the leading causes of student attrition include a lack of engagement for learning and a lack of connection with peers and teachers. Alienation is the contrasting notion of school connectedness (Finn, 1989). Rubel and Schulz (2011) characterize alienation as a student’s academic and social disengagement. Behaviors reflective of student alienation consist of withdrawal, hostility, low quality of work, lack of involvement, suspension, expulsions, and ultimately non-completion. To counter the phenomenon of alienation, school leaders need to be mindful of the factors related to students’ sense of connectedness.

**Background**

Sense of connectedness is a relevant topic of discussion in various areas of research. Scholars of migration studies discuss sense of connectedness among immigrants in their new environment (Amit & Bar-Lev, 2015; Kwak, 2018; Podgorelec et al., 2019). Researchers in the business sector examines managers’ sense of connectedness and its influence on employees (Santos, 2015; Xue Zheng et al., 2018; Zhu, 2007). Furthermore, religious scholars analyze sense of connectedness and organizational spirituality (McCoy et al., 2016; Yaghoubi & Zhara, 2016). Although sense of connectedness has emerged as a topic of interest in diverse research fields, there are common constructs and instruments
used across domains. Regardless of the area of study, research reveals that sense of connectedness is positively associated with one’s psychological development. It is a basic need that enables people to create social connections (St. Amand et al., 2017). A greater understanding of factors associated with an increased sense of connectedness will allow current and future researchers to improve organizational and individual outcomes.

Using the various definitions as a foundation, scholars have identified specific attributes that embody a sense of connectedness. Baumeister and Leary (1995) begin by proposing that connectedness has two components. First, humans require frequent personal connections and interactions that are free from negative affect and dissension. Second, Baumeister and Leary note that people need feelings of intimate relationships that entail stability, concern, and longevity. St. Amand, Girard, & Smith (2017) focus on student connectedness and narrate four distinct elements of students’ sense of connectedness. The first specified attribute of connectedness is positive emotions; secondly, students need nurturing relationships with peers and teachers. St. Amand and colleagues' third element is that a person must be open and willing to become actively involved in a group. The fourth common attribute of sense of connectedness is harmonization. Goodenow (1993) summarizes the characteristics of students' sense of connectedness as the magnitude to which students possess feelings of acceptance, respect, inclusion, and support by peers and adults within the school community.

**Purpose of the Study**

Student sense of connectedness has various constructs, descriptions, interpretations, and characterizations in education. Booker (2007) expresses that the necessity to feel connected focuses on students’ feelings about themselves and their
relationship with others within the school setting. Clemons and Lemberger (2012) assert that students described feeling a sense of connectedness when they believed they are supported, safe, and involved. Moreover, Bouchard and Berg (2017) surmise that sense of connectedness is “a relationally derived psychological construct that has been used to describe the ‘sense of fit’ or ‘feelings of acceptance’ that an individual feels in one’s community” (p. 107). Despite the differing descriptions of student sense of connectedness from researchers, they all share common attributes, which describe sense of connectedness.

The school setting also has an influence on students' sense of connectedness. Because of the novel coronavirus pandemic, schools across the United States and the world were forced to close in March 2020 (Kaden, 2020). As state officials and school leaders began reopening plans for the 2020-2021 school year, they had to balance the benefits and risks of reopening schools or keeping them closed. In Kentucky, the governor recommended that schools remain closed and provide non-traditional instruction (NTI) to start the school year (Kobin, 2020). My study has evolved in response to the development of the coronavirus pandemic. Instead of analyzing students' sense of connectedness in the traditional school environment, I will examine students' sense of connectedness within the non-traditional online school setting.

For the purpose of my study, I will align student sense of connectedness with Goodenow’s (1993) research. I define it as the level to which students believe they are accepted, supported, and engaged within their school community (see Definition of Terms later in this chapter). With my research, I intend to determine if an interaction effect exists between student characteristics (grade-level, gender, and race/ethnicity) and
their perceived sense of connectedness in a non-traditional online learning environment. My examination will add to the existing body of literature because there is currently minimal research that explores the interaction effect between student characteristics and their perceived sense of connectedness in a non-traditional online learning environment (Borup et al., 2019; Kuhfeld et al., 2020). Kuhfeld et al. (2020) remark that “it remains unclear how effective remote learning was… extended time out of school will most certainly affect student[s]” (p. 549). Sense of connectedness is a social construct representing the need of humans to have personal relationships of respect and acceptance, unconditional support, and active engagement. Continued analysis of this topic is necessary to understand this human behavior within non-traditional instruction.

**Research Questions**

The following questions will guide my study:

**R1:** Is there a statistically significant interaction effect between students’ grade level and gender on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey?

**R2:** Is there a statistically significant interaction effect between students’ grade level and race on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey?

**R3:** Is there a statistically significant interaction effect between gender and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey?
**R4:** Is there a statistically significant interaction effect among grade level, gender, and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey?

**Hypotheses**

My hypotheses are as follows:

**H10:** There is no statistically significant interaction effect between students’ grade level and gender on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.

**H11:** There is a statistically significant interaction effect between students’ grade level and gender on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.

**H20:** There is no statistically significant interaction effect between students’ grade level and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.

**H21:** There is a statistically significant interaction effect between students’ grade level and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.

**H30:** There is no statistically significant interaction effect between gender and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.

**H31:** There is a statistically significant interaction effect between gender and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.
**H40:** There is no statistically significant interaction effect among grade level, gender, and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.

**H41:** There is a statistically significant interaction effect among grade level, gender, and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.

**Research Design**

Creswell (2014) describes quantitative research as a method for assessing objective theories by analyzing the relationship among variables. The numbered data is measured using an instrument and analyzed using statistical procedures. One of the various instruments that can be used in quantitative research is a survey. A survey design gives a “numeric description of trends, attitudes, or opinions of a population by studying a sample of that population” (Creswell, 2014, p. 155). The survey results allow the researcher to make generalizations or draw inferences about the population (Creswell, 2014). For my research, I will administer an existing survey Online Student Connectedness Survey (OSCS) (Bolliger & Inan, 2012), to middle school students from three suburban schools in a southeastern state. The OSCS was created using the Community of Inquiry framework. The framework and the survey focus on cognitive presence, social presence, and teaching presence. I will use this survey to measure students perceived feelings of connectedness in the online learning environment.

My study will be a quantitative design, which explains or measures a phenomenon using a numerical quantity. I will use a factorial analysis of variance (ANOVA) to determine if there are any statistically significant interaction effects
between student characteristics and their perceived sense of connectedness in a non-traditional online learning environment (Field, 2012). A factorial ANOVA will allow me to compare means across several independent variables (Shavelson, 1996). I will use a 3 (grade-level: 6, 7, or 8) by 2 (gender: female or male) by 2 (race/ethnicity: white or non-white) factorial ANOVA design. One-way ANOVAs will be used to determine if there is a main effect for each of the three independent factors (grade level, gender, and race/ethnicity) on the dependent variable (perceived student sense of connectedness). In addition to determining if there are any main effects present, I will also perform statistical analysis for interaction effects between the independent variables on the dependent variable. To determine if any interactions are significant, a factorial ANOVA will be conducted.

**Scope of the Study**

During this study, I will use the student-level online student connectedness data from three middle schools from a suburban school district in a southeastern state in the United States. Student sense of connectedness will be measured using an adapted version of Bolliger and Inan’s (2012) Online Student Connectedness Survey (OSCS). The adapted version of the OSCS will be administered electronically in the spring of the 2020-2021 school year. Individual student responses will be connected to individual student demographic data, including grade level, gender, and race/ethnicity.

**Definition of Terms**

I will use the following terms in the context of this study:

**Non-traditional Instruction (NTI):** Academic instruction through an online communication platform such as Zoom, Google Meet, or Microsoft Teams.
**Online Learning Environment:** Distinctive instructional environment where the instructor and students are physically separated, requiring communication to be facilitated through online platforms.

**Online Student Connectedness Survey:** Instrument used to measure online learner perceptions of connectedness.

**Sense of Connectedness:** The level to which students believe they are accepted, supported, and engaged within their school community.

**Socioeconomic Status (SES):** Socioeconomic status (SES) is the social standing or class of an individual or group; measured as a combination of education and income.

### Data Sources

Three middle schools in a suburban school district in a southeastern state will provide the data necessary to complete my study. This small, suburban school district is located in the Commonwealth of Kentucky. The school district requires specific departments to maintain accurate and up-to-date student and school data. This requirement ensures that scholars and practitioners alike may access and analyze data to support the vision and mission of the district and its schools, to test the efficacy of an intervention, and to understand the condition in which students, parents, educators, and other relevant stakeholders operate. The school district’s dataset will include demographic data from three middle schools collected for the most recent school year 2020-2021.

### Limitations and Assumptions

My study will include critical limitations that I must acknowledge. Stevens (2007) notes that limitations for pre-experimental data include an inability to infer causality.
Therefore, the application of factorial analysis in pre-experimental research does not ascertain cause and effect relationships (Stevens, 2007). There are also assumptions of the factorial ANOVA procedure (Shavelson, 1996). These assumptions include the scores for each subject being independent of one another, a normal distribution of scores for the dependent variable, and homogeneity of variance. I will assume that each participant will complete their survey independently to meet the assumption of independence. Normality will be assessed using skewness and kurtosis statistics reflected on histograms. Homogeneity of variance will be assessed using Levene’s test. While these assumptions may be present during my study, it is still necessary to explore the connections associated with student sense of connectedness.

**Organization of the Study**

I will present this study as follows: Chapter I entails the introduction, background, purpose of the study, research questions and hypothesis, scope of the study, definition of terms, data sources, limitations, and organizational summary. Next, Chapter II narrates the literature of student sense of connectedness, instruments to measure connectedness both in the traditional and non-traditional setting, and how student sense of connectedness relates to online learning. Chapter II also includes a discussion on the relationship between sense of connectedness and student characteristics, as well as the coronavirus and its impact on schools. Chapter III describes the research methodology used, the data collection process, and the procedures of this study. Chapter IV discusses the descriptive statistics of the study’s results and analyzes the data. Additionally, Chapter V will encapsulate the significant findings from my research and provide recommendations for future research.
CHAPTER II: LITERATURE REVIEW

During this study, I will seek to determine if an interaction effect exists between student characteristics (grade-level, gender, and race/ethnicity) and their perceived sense of connectedness in a non-traditional online learning environment. As I examine the interaction effect between student characteristics and their perceived sense of connectedness, I will focus on students’ grade level, gender, race/ethnicity as the independent variables. Sense of connectedness scores at the student level will serve as the continuous dependent variable. I will measure sense of connectedness using an adapted version of the Online Student Connectedness Survey (Bolliger & Inan, 2012) (see Appendix A).

Sense of Connectedness and Its Measures

The school environment is the focal point for connection and feelings of relationship for many adolescents (Booker, 2007). A sense of connectedness emerges from a student’s experience in a specified educational setting (Murphy & Zirkel, 2015). A strong sense of connectedness and involvement among students promotes positive adolescent development, both academically and behaviorally (Hussain et al., 2018). Connections and relationships among peers, teachers, and administrators significantly affect students feeling accepted, respected, included, engaged, and supported. When students feel a sense of connectedness, they are more optimistic and passionate within the school environment. Pittman and Richmond (2007) assert:
Better perceived school relationships are likely to lead to a stronger sense of belonging in the school, which, in turn, is expected to lead to more positive beliefs and emotions about one's learning (e.g., academic self-efficacy, self-consciousness, school-related effect) which then relates to higher academic grades and lower levels of behavioral problems. (p. 272).

A sense of connectedness is an essential aspect of a student’s educational process and school outcomes. Studies conclude that having a sense of belonging to a school community improves students’ skill progression, perceived self-efficacy, determination, inspiration, and academic achievement (Fernandes et al., 2017; Murphy & Zirkel, 2015; Pittman & Richmond, 2007). Feelings of connectedness begin and continue to evolve within the school setting; sense of connectedness shapes the relationships with others in the school setting.

Rose and Shevlin (2017) note that creating a school environment where students believe they are accepted and included is crucial to developing students’ sense of connectedness. Gray, Hope, & Matthews (2018) propose that creating a school environment that fosters sense of connectedness, acts of cultural distinctiveness, and citizenship must be practiced within the school. They express cultural distinctiveness as an instructional opportunity that validates students by holding their norms, standards, and practices in high regard, promoting a sense of respect, acceptance, and support. Students have a stronger sense of connectedness to their school when the cultural values of the school are reflective of the cultural values students have of themselves. Regarding citizenship, Gray et al. (2018) assert that students involved in civic-related experiences within the school environment have a greater sense of connectedness. Capps (2004)
proclaims that students who perceive their school as an accepting and supportive environment “in which they actively participate and have opportunities to influence, will feel attached to the school community” (p. 4). For teachers and administrators to create a school environment for an increased sense of connectedness, they must determine students’ level of connectedness accurately.

While sense of connectedness is a social construct and believed to be ephemeral, scholars have developed instruments to measure feelings of connectedness. St. Amand, Girard, & Smith (2017) assert that one of the key responsibilities in identifying a concept is characterizing distinct attributes of that concept. If a measurement tool can successfully distinguish specific traits, it has the potential for use in future studies. St. Amand et al. (2017) highlight three quantitative research instruments that measure students’ sense of connectedness. These are the Psychological Sense of School Membership questionnaire, the Questionnaire sur l’environnement socioéducatif, and the Manual for Patterns of Adaptive Learning Scales.

One of the most frequently used instruments that measure students’ sense of connectedness is the Psychological Sense of School Membership (PSSM) questionnaire (St. Amand et al., 2017). Carol Goodenow (1993), a scholar of student sense of connectedness, created the PSSM. The survey consists of 18 items that are on a five-point Likert scale (1 = not all true; 5 = completely true) and includes questions regarding students’ perception of acceptance and inclusion, respect and encouragement, as well as relationships with peers. Table 1 contains statements from the PSSM. Some of the statements include: Most teachers at [name of school] are interested in me; People here notice when I’m good at something; Other students in this school take my opinions
seriously; I feel like a real part of [name of school]. The alpha coefficient for the PSSM is .87 (Goodenow, 1993), suggesting that the items have good internal consistency (Stevens 2007). The PSSM draws upon significant theoretical research and is utilized in multiple related studies (St. Amand et al., 2017; Capps, 2004).
Table 1. Sense of Connectedness Measurement Tools

<table>
<thead>
<tr>
<th>The Psychological Sense of School Membership Scale</th>
<th>Questionnaire sur l’environnement socioéducatif</th>
<th>Manual for Patterns of Adaptive Learning Scales</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel like a real part of (name of school).</td>
<td>I really feel a sense of place in this school.</td>
<td>I feel like I matter in this school.</td>
</tr>
<tr>
<td>People here notice when I’m good at something.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is hard for people like me to be accepted here. (reversed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other students in this school take my opinion seriously.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most teachers at (name of school) are interested in me.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sometimes I feel as if I don’t belong here. (reversed)</td>
<td></td>
<td>I do not feel important in this school.</td>
</tr>
<tr>
<td>There’s at least one teacher or other adult in this school I can talk to if I have a problem.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>People at this school are friendly to me.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers here are not interested in people like me. (reversed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am included in lots of activities at (name of school).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>I am treated with as much respect as other students.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel very different from most other students here. (reversed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can really be myself at this school.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The teachers here respect me.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>People here know I can do good work.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I wish I were in a different school. (reversed)</td>
<td>I would rather be in another school.</td>
<td></td>
</tr>
<tr>
<td>I feel proud of belonging to (name of school).</td>
<td>I am proud to be a student of this school. I feel like I belong in this school.</td>
<td></td>
</tr>
<tr>
<td>Other students here like me the way I am.</td>
<td>In this school I have a group of friends that are important to me.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I like my school. I feel like I am successful in this school.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This school is important to me.</td>
<td></td>
</tr>
</tbody>
</table>
Next, St. Amand et al. (2017) expound on another instrument used to measure connectedness, the Questionnaire sur l'environnement socioéducatif (QES). Janosz, Georges, and Parent developed this French-language measurement tool in 1998. When translated to English, it is the Questionnaire on the Socio-educational Environment. This measurement tool contains 166 items and is used to evaluate the school environment, which entails the school climate, social issues, and routines of the school (Janosz & Bouthillier, 2007). Of the 166 items, six statements accurately account for student sense of connectedness. The QES interment uses a six-point Likert scale (1 = totally disagree; 6 = totally agree) to account for the emotional facet of school connectedness (St. Amand et al., 2017). This measurement tool includes statements such as I am proud to be a student of this school; I like my school; I really feel at home in this school; I would rather be in another school; This school is important to me; In this school I have a group of friends that are important to me. The alpha coefficient for the six-item questionnaire is .80 (Janosz & Bouthillier, 2007), suggesting that the items have good internal consistency (Stevens 2007). While the QES considers students’ positive emotions and harmonization, it does not address students’ relationships or engagement (St. Amand et al., 2017).

Midgley and her colleagues (2000) created the Manual for Patterns of Adaptive Learning Scales (PALS). This sense of connectedness tool contains 94 items and analyzes the connection between aspects in the learning environment and students’ motivation, behavior, and emotions (St. Amand et al., 2017; Midgley et al., 2000). Only four of the items from PALS are used to determine student connectedness; these items are also measured on a Likert scale: 1 = not all true; 3 = somewhat true; 5 = very true (Midgley et al., 2000). Inquiries related to student sense of connectedness include I feel
like I belong in this school; I feel like I am successful in this school; I feel like I matter in this school; I do not feel I am important in this school (St. Amand et al., 2017; Roeser et al., 1996). The alpha coefficient for the four-item questionnaire is .76 (Roeser et al., 1996), suggesting that the items have an acceptable internal consistency (Stevens 2007). One of the limitations of the PALS is that it only addresses the emotional attributes of sense of connectedness (St. Amand et al., 2017). Student sense of connectedness to school reveals distinct elements for analysis.

Students with a strong sense of connectedness to their school community have a higher likelihood of positive outcomes (Bouchard & Berg, 2017). A greater sense of connectedness among students improves student engagement within their academic learning and school community (Capps, 2004). The ability to measure and analyze student sense of connectedness allows scholars and administrators to study and improve practices related to academic achievement. The following discussion will focus on measuring sense of connectedness in the non-traditional online environment.

**Measuring Connectedness in the Online Learning Environment**

Just as the school environment plays an essential role in fostering student connectedness, the online classroom environment plays an equally, if not more, important role in establishing student sense of connectedness. For more than a decade, enhancements in technology have allowed the use of mobile devices to become an intricate part of work activities and intertwined into our routines (Dobbins & Denton, 2017). This phenomenon is especially true for students as smartphones, tablets, and chrome books have become tools to promote student engagement within the school environment. While promoting student engagement, it is also necessary to examine
student connectedness in a non-traditional school setting. Several scholars have studied the interaction of students and teachers and reviewed the aspects of success within an online learning environment (Bolliger & Inan, 2012; Garrison et al., 2000; Rovai, 2002a; Rovai, 2002b; Slagter van Tyron & Bishop, 2009; Zimmerman & Nimon, 2017). Online student connectedness research has resulted in the development and application of three prominent sense of connectedness instruments. These measuring instruments were designed to appraise online learner classroom connectedness in the non-traditional setting (Zimmerman & Nimon, 2017). These three well-known instruments include the Classroom Community Scale (Rovai, 2002a; Rovai, 2002b), Community of Inquiry (Garrison et al., 2000), and the Online Student Connectedness Survey (Bolliger & Inan, 2012).

The Classroom Community Scale (CCS) was developed by researcher Rovai (2002a; 2002b) to measure connectedness and learning in higher education. Rovai (2002b) proposes that using a useful measuring tool to assess connectedness in the learning environment will improve instruction and promote community; thereby, enhancing online learner satisfaction and persistence. The CCS includes 20 items using a 5-point Likert-type scale, including strongly agree, agree, neutral, disagree, and strongly disagree. The survey consists of positively and negatively worded questions such as I feel students in this course care about each other; I feel that I am encouraged to ask questions; I do not feel a spirit of community; I feel isolated in this course; I feel that others in this course do not help me learn. A complete list of questions is recorded in Table 2. Estimates of reliability for the CCS were calculated to have a Cronbach’s coefficient of 0.93, indicating excellent reliability. While the reliability analysis suggests
a significant level of internal consistency (Rovai, 2002b), Burnard-Brak and Shiu (2010) surmise that the confirmatory analysis does not reflect evidence to support validity.
<table>
<thead>
<tr>
<th>Classroom Community Scale</th>
<th>Community of Inquiry Survey</th>
<th>Online Student Connectedness Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel that students in this course care about each other.</td>
<td>The instructor clearly communicated important course topics.</td>
<td>I feel comfortable in the online learning environment provided by my program.</td>
</tr>
<tr>
<td>I feel that I am encouraged to ask questions.</td>
<td>The instructor clearly communicated important course goals.</td>
<td>I feel my instructors have created a safe online environment in which I can freely express myself.</td>
</tr>
<tr>
<td>I feel connected to others in this course.</td>
<td>The instructor provided clear instructions on how to participate in course learning activities.</td>
<td>I feel comfortable asking other students in online courses for help.</td>
</tr>
<tr>
<td>I feel that it is hard to get help when I have a question.</td>
<td>The instructor clearly communicated important due dates/time frames for learning activities.</td>
<td>I feel comfortable expressing my opinions and feelings in online courses.</td>
</tr>
<tr>
<td>I do not feel a spirit of community.</td>
<td>The instructor was helpful in identifying areas of agreement and disagreement on course topics that helped me to learn.</td>
<td>I feel comfortable introducing myself in online courses.</td>
</tr>
<tr>
<td>I feel that I receive timely feedback.</td>
<td>The instructor was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking.</td>
<td>If I need to, I will ask for help from my classmates.</td>
</tr>
<tr>
<td>I feel that this course is like a family.</td>
<td>The instructor helped to keep course participants engaged and participating in productive dialogue.</td>
<td>I have no difficulties with expressing my thoughts in my online courses.</td>
</tr>
<tr>
<td>I feel uneasy exposing gaps in my understanding.</td>
<td>The instructor helped keep the course participants on task in a way that helped me to learn.</td>
<td>I can effectively communicate in online courses.</td>
</tr>
<tr>
<td>I feel isolated in this course.</td>
<td>The instructor encouraged course participants to explore new concepts in this course.</td>
<td>I have gotten to know some of the faculty members and classmates as well.</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>I feel reluctant to speak openly.</td>
<td>Instructor actions reinforced the development of a sense of community among course participants.</td>
<td>I feel emotionally attached to other students in my online courses.</td>
</tr>
<tr>
<td>I trust others in this course.</td>
<td>The instructor helped to focus discussion on relevant issues in a way that helped me to learn.</td>
<td>I can easily make acquaintances in my online course.</td>
</tr>
<tr>
<td>I feel that this course results in only modest learning.</td>
<td>The instructor provided feedback that helped me understand my strengths and weaknesses relative to the course’s goals and objectives.</td>
<td>I spend a lot of time with my online course peers.</td>
</tr>
<tr>
<td>I feel that I can rely on others in this course.</td>
<td>The instructor provided feedback in a timely fashion.</td>
<td>My peers have gotten to know me quite well in my online courses.</td>
</tr>
<tr>
<td>I feel that other students do not help me learn.</td>
<td>Getting to know other course participants gave me a sense of belonging in the course.</td>
<td>I feel that students in my online courses depend on me.</td>
</tr>
<tr>
<td>I feel that members of this course depend on me.</td>
<td>I was able to form distinct impressions of some course participants.</td>
<td>Instructors promote collaboration between students in my online courses.</td>
</tr>
<tr>
<td>I feel that I am given ample opportunities to learn.</td>
<td>Online or web-based communication is an excellent medium for social interaction.</td>
<td>Instructors integrate collaboration tools into online course activities.</td>
</tr>
<tr>
<td>I feel uncertain about others in this course.</td>
<td>I felt comfortable conversing through the online medium.</td>
<td>My online instructors are responsive to my questions.</td>
</tr>
<tr>
<td>I feel that my educational needs are not being met.</td>
<td>I felt comfortable participating in the course discussions.</td>
<td>I receive frequent feedback from my online instructors.</td>
</tr>
<tr>
<td>I feel confident that others will support me.</td>
<td>I felt comfortable interacting with other course participants.</td>
<td>My instructors participate in online discussions.</td>
</tr>
</tbody>
</table>
I feel that this course does not promote a desire to learn.

I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.

I felt that my point of view was acknowledged by other course participants.

Online discussions help me to develop a sense of collaboration.

Problems posed increased my interest in course issues.

Course activities piqued my curiosity.

I felt motivated to explore content-related questions.

I utilize a variety of information sources to explore problems posed in this course.

Brainstorming and finding relevant information helped me resolve content-related questions.

Online discussions were valuable in helping me appreciate different perspectives.

Combing new information helped me answer questions raised in course activities.

Learning activities helped me construct explanations/solutions.

In my online courses, instructors promote interaction between learners.

I work with others in my online courses.

I relate my work to others’ work in my online courses.

I share information with others students in my online courses.

I discuss my ideas with other students in my online courses.

I collaborate with other students in my online courses.
Reflection on course content and discussions helped me understand fundamental concepts in this class.

I can describe ways to test and apply the knowledge created in this course.

I have developed solutions to course problems that can be applied in practice.

I can apply the knowledge created in this course to my work or other non-class related activities.
Another commonly used tool for measuring online-student connectedness is the Community of Inquiry (CoI) instrument. Garrison et al. (2000) designed the Community of Inquiry conceptual framework identifying various elements and their interactions that promote a thriving online learning environment. The CoI framework encompasses three dominant aspects: (1) cognitive presence, (2) social presence, and (3) teaching presence. These three elements interact and initiate the process of critical thinking and learning through an online learning environment (Garrison et al., 2001). Using the CoI framework, Arbaugh et al. (2008) created a measuring tool to operationalize the framework and examine variable relationships through quantitative results. Arbaugh et al. (2008) designed a three-part, 34-item survey measuring cognitive, social, and teaching presence within the online learning environment. Survey items were measured on a 4-point Likert scale ranging from 0-Strongly Disagree to 4-Strongly Agree. Some items from the CoI survey read as follows: The instructor clearly communicated important course topics. The instructor provided feedback in a timely fashion. I felt comfortable participating in the course discussions. Online discussions help me develop a sense of collaboration. I can describe ways to test and apply the knowledge created in this course. I have developed solutions to course problems that can be applied in practice. Cronbach’s alpha revealed internal consistencies for each section: teaching presence was 0.94, social presence 0.91, and cognitive presence was 0.95. While the CoI framework has been used in various research (Bigatel & Edel-Malizia, 2017; Feng et al., 2017; Stenbom et al., 2012), Brevvik (2016) notes that there is a lack of standard measures when studying individual presence, therefore causing generalizability.
The final sense of connectedness tool I will examine is the Online Student Connectedness Survey (OSCS). This sense of connectedness instrument was created to assess feelings of connectedness among students who attend online degree and certification programs (Zimmerman & Nimon, 2017). The Community of Inquiry framework was influential in developing the OSCS. The OSCS explores four factors associated with the development of online student connectedness: comfort, community, facilitation, and interaction and collaboration (Bolliger & Inan, 2012; Zimmerman & Nimon, 2017). The OSCS includes 25 items based on the four previously mentioned elements using a 5-point Likert scale. Survey items include statements such as *I feel comfortable in the online learning environment provided by the program. I feel my instructors have created a safe online environment in which I can freely express myself. I spend a lot of time with my online course peers. Instructors promote collaboration between students in my online courses. I collaborate with students in my online course* (Bolliger & Inan, 2012). Alpha reliability was computed to be 0.91, confirming internal consistency and suggesting that the OSCS is suitable for measuring online student connectedness (Bolliger & Inan, 2012; Zimmerman & Nimon, 2017). I will now discuss the interaction of student connectedness and the online learning environment.

**Sense of Connectedness within the Online Learning Environment**

Connectedness entails a sense of belonging and acceptance from teachers and peers (Bolliger & Inan, 2012). Online student connectedness has a similar interpretation, referring to the interaction of participants in an online learning environment, which allows individuals to be actively involved in group communication while developing social relationships with others in the group (Bolliger & Inan, 2012; Galambos et al.,
1986; Rovai, 2002). Slagter van Tryon and Bishop (2009) describe feelings of online connectedness as “the social context of an online course that accounts for guiding the revision of social schema for achieving such perception” (p. 293) with other online participants. Scholars’ definitions of connectedness entail common elements of reciprocated interdependence, feeling of belonging, agreed-upon expectations, shared goals, and related histories (Rovai 2002). In other words, sense of connectedness is developed within the online community through the interconnection of cognitive presence, social presence, and teaching presence (Garrison et al., 2000).

The advancement of technology has significantly influenced traditional methods of teaching and learning at various education levels. The ubiquity and accessibility of mobile devices, Chromebooks, computers, and laptops offer educators the ability to create a meaningful online learning experience across content levels within K-12 education. Many researchers have found contrasting outcomes regarding the favorability of online education. Verschaffel et al. (2019) posit that online teaching and learning promote higher-order processes, including metacognition and self-regulation within mathematics. Choi et al. (2017), on the other hand, determined that online students displayed lower math performance skills than students in a traditional school setting. Brinson (2015) generalizes that online science students engaged in virtual laboratories resulted in equally well or better learning outcomes than students who were provided the conceptual theory of a scientific event. Contrasting research argues that online learning lacks longevity and will not replace teachers in a traditional school setting (Fan & Geelan, 2013). Further studies favor the non-traditional setting, citing increased student engagement, development in critical thinking skills, and advanced learning performance.
Opposing scholars note unfavorable online learning outcomes, including feelings of disconnection, isolation, and lack of student persistence (Rovai, 2002a). Additionally, researchers attest that student attendance and retention are lower in the online learning environment than in the traditional face-to-face environment (Bigatel & Edel-Malizia, 2017; Borup et al., 2019). Consequently, strategies focusing on student engagement and connectedness are essential when establishing and maintaining a thriving online learning environment.

Students in thriving online classroom communities have greater feelings of connectedness (Rovai, 2002b). Scholars concur that the physical separation of online learners harms their sense of connectedness (Bolliger & Inan, 2012; Rovai, 2002a). Developing and maintaining online students’ feelings of connectedness is critical to achieving a successful online learning community. Rovai (2002a) examined several elements thought to influence the online learning environment and foster student sense of connectedness. The factors being: transactional distance, social presence, social equality, small group activities, group facilitation, teaching style, and learning stage, as well as community size. Rovai theorized that educators who focus and build upon these factors inevitably promote online student connectedness and satisfaction. Additional research infers that the critical characteristics of a thriving online environment are social presence, cognitive presence, and teaching presence (Garrison et al., 2000). Garrison et al. (2000) identify these elements and their interaction as the Community of Inquiry framework, surmising that each component is essential to the quality of an online educational experience. Further research notes that online student connectedness is influenced through community, comfort, facilitation, and interaction and collaboration (Bolliger &
Inan, 2012). Bolliger and Inan (2012) conclude that these factors influence online learner connectedness. The following discussion will focus on sense of connectedness and student characteristics.

**The Relationship Between Sense of Connectedness and Student Characteristics**

Goodenow and Grady (1993) express sense of connectedness as the idea of students as individuals whose presence is respected and supported within the school environment. Instead of analyzing student sense of connectedness in the traditional school environment, I will examine student sense of connectedness within the non-traditional online school setting. My study will identify the relationship between student sense of connectedness in a non-traditional online learning environment and student characteristics. Student characteristics include students’ grade level, gender, and race/ethnicity.

Research supports the notion that varying student characteristics influence academic success, student behavior, and ultimately student sense of connectedness (Adekanye et al., 2015; Abimbola & Ugbede, 2018; Cholewa et al., 2018; Tomul & Savasci 2012; Witherspoon & Ennett, 2011). While it is challenging to determine academic success adequately and examine student behavior in the non-traditional online environment, it is still necessary to analyze student sense of connectedness through these lenses. Murphy and Zirkel (2015) suggest that sense of connectedness is associated with academic achievement. Lam et al. (2015) contend that students’ academic emotions influence the relationship between sense of connectedness and academic achievement. Literature also suggests that students’ perception of connectedness within their school correlates to behavioral outcomes (Boyle et al., 2012; Freidenfelt Liljeberg et al., 2011).
Demanet & Van Houtte (2012) argue that misbehavior from students is their response to a lack of connectedness, thus creating a cycle of misconduct and lack of connectedness. The following discussion details the impact of specific student characteristics on sense of connectedness.

**Students’ Grade-Level**

A surfeit of literature explores student transitions from elementary to middle school and middle school to high school and its relationship to academic success and sense of connectedness (Chase et al., 2014; Holas & Huston, 2012; McMillen, 2004; Stevenson, 2006; Witherspoon & Ennett, 2011). Witherspoon and Ennett (2011) affirm that school-level transitions, along with adolescent development, influence students’ academic outcomes. School-level transitions require students to meet higher academic expectations and adjust to the vicissitudes of a new school environment (Chase et al., 2014). These changes can cause challenges and negatively impact student academic success, thereby contributing to the gap in academic achievement. The achievement gap is theorized to commence in students’ early years of education (Friend et al., 2018). The gap continues to widen during students’ elementary matriculation and becomes a notable disparity during their middle and high school years of education (Paschall et al., 2018). Changes in school environments can be positive, resulting in increased student engagement in academic and extracurricular activities, or negative, causing a decline in students’ achievement and sense of connectedness (Witherspoon & Ennett, 2011).

There is a stark contrast in the success and engagement of students across school levels. Studies highlight the underperformance in achievement and the social isolation of middle school students compared to elementary students (Holas & Huston, 2012; Irvin et
al., 2011). Scholars speculate that this variation in attitude is due to changes in the classroom environment and instructional quality (Mann et al., 2013; Witherspoon & Ennett, 2011). Holas and Huston (2012) contend that as students shift from elementary to middle school, they must redefine their relationships with peers and adults. The authors continue their narrative by saying that during this transition, adolescents seek inclusion from peers, trust from teachers, and autonomy in the learning environment. Similar challenges arise as students matriculate from middle school to high school. Once more, students must adapt to a different social environment and academic standards (Chase et al., 2014). While many high school students can transition successfully, other students are unsuccessful both academically and socially. Researchers declare that during high school years, an increasing number of students possess feelings of disdain toward teachers, lack of interest in schoolwork, and disconnection from school (Abimbola & Ugbede, 2018; Loukas et al., 2009).

**Students’ Gender**

Researchers find that gender is a predominant variable for predicting academic success and sense of connectedness (Carney et al., 2020; Tomul & Savasci, 2012); however, the results of gender differences are inconclusive. Abimbola and Ugbede (2018) found no significant difference in male and female students and sense of connectedness. Contrarily, Lamport and Bartolo (2012) concede that males have a higher sense of connectedness. Alternative research found that females reported a more heightened sense of connectedness (Carney et al., 2020; Ja & Jose, 2017). Neihaus et al. (2012) assert that females have a stronger sense of connectedness at the beginning of the
school year than males. They posit that females’ more meaningful sense of connectedness led to increased academic success and fewer behavior issues.

We must also consider student gender when discussing discipline disparities and how these disparities influence feelings of connectedness. Male students are more likely to participate in violent behaviors than female students (Volungis, 2016), and they are also more apt to be perceived as a threat than their female counterparts (Friend et al., 2010). This notion is especially true for African American males. African American males are more likely than any other student group to be sent to the office, removed from the classroom, or referred to law enforcement (Gregory & Fergus, 2017). Compared to African American female students, African American male students are more than twice as likely to be removed from the school environment (Bottiani et al., 2016). However, additional studies find that African American female students in middle school are suspended at a significantly higher rate than middle school male students from different racial and ethnic groups combined (Losen & Martinez, 2013). These findings indicate that the increased occurrence of students being removed from the school environment, and the less their sense of connectedness.

**Students’ Racial/Ethnic Group**

One of the most notable student-level characteristics is race or ethnicity. Researchers agree that sense of connectedness within a school setting is correlated to academic outcomes for students, but most significantly for African American students (Adekanye et al., 2015; Booker, 2007; Clemens & Lemberger, 2012). Relationships and connections within the educational environment influence the academic outcomes of minority students. Feelings of connectedness to the school community are associated with
higher levels of intellectual engagement, motivation, and achievement. Student engagement increases when schools provide a welcoming learning environment, increasing academic success (Goings & Shi, 2018). African American students are increasingly responsive to the high expectations of teachers who are supportive, respectful, and caring (Konold et al., 2017).

Feelings of support are one of the social constructs of sense of connectedness (Capps, 2004). The literature suggests that minority students have fewer supportive interactions within schools, which results in a weakened sense of connectedness among students (Konold et al., 2017; Cornell & Shirley, 2011). Bottiani et al. (2016) propose that African American students have fewer supportive relationships with their teachers and diminished feelings of connectedness than their White peers. After their research, Bottiani et al. (2016) posit that in "schools with larger discipline disparities, Black students may perceive a more negative school climate than their white classmates within the same school" (p. 539). Bradshaw and Mendelson also conclude that increased racial gaps in the out-of-school discipline are associated with decreased levels of school connectedness among African American students. These findings indicate that the increased occurrence of minority students being removed from the school environment, the less their perception of a supportive climate, and the less their sense of connectedness.

**Students’ Socioeconomic Status**

While the racial gap is the most significant disparity in academic success and discipline disparities, additional gaps exist in students’ socioeconomic status. Socioeconomic status (SES), also identified as the income/poverty gap, is another factor considered to contribute to the growing achievement disparity (McMillen, 2004; Qian et
al., 2017; Paschall et al., 2018), which also contributes to the lowered feelings of connectedness. Tomul & Savasci (2012) note that financial perspective and sociocultural position are vital determinants of SES. They assert that the parents’ level of education both directly and indirectly influences the academic achievement level of a student. The results of various studies, however, have proven to be contradictory in identifying the critical variables of impact. Gutman, Sameroff, and Eccles (2002) conclude that the mothers’ level of education and income significantly affect students’ academic achievement. However, Demir (2009) contrarily found that the mother’s level of education has no significant influence on students’ success, but the father’s education level does. Regardless of the specific parental influence, researchers concede that socioeconomic status is a predictor of student achievement, impacting sense of connectedness (Gutman et al., 2002; Tomul & Savasci, 2012; Wodtke & Parbst, 2017). Researchers conclude that parents’ level of education is also correlated with students’ school removal rates (Cholewa et al., 2018). The less education a parent has, the higher the likelihood of a students’ being removed from the educational setting (Mizel et al., 2016; Monahan et al., 2014). Students being removed from the learning environment leads to negative feelings of connectedness.

**Students’ Program Enrollment**

We take into account additional student characteristics when examining sense of connectedness. Student program enrollments such as English language learners, gifted and talented, homeless, migrant, and special education can influence student sense of connectedness. English language learners (ELL) are a sub-group that must be considered when discussing student connectedness. Adoniou and Qing (2014) found a correlation
between language proficiency and achievement, thereby impacting connectedness; they surmise that underachievement and a lack of connectedness result from language barriers. Gifted and talented students also desire intellectual, social, and emotional connectedness (Riley & White, 2016). Riley & White (2016) conclude that when gifted students engage with like-minded peers, they have a stronger sense of connectedness. Homelessness can lead to feelings of alienation, the opposing construct of connectedness. The school environment serves as a community of relationships where individuals feel connected to a larger group (Lawson, 2018). Students with special education needs or learning differences have greater feelings of connectedness when they are respected and treated in similar ways as their peers (Rose & Shelvin, 2017). Rose and Selvin (2017) suggest students of a special education program seek full acceptance and participation in all aspects of the school environment. Various student characteristics have an impact on academic success, student behavior, and ultimately feelings of connectedness. In the next section, I will discuss the impact the coronavirus has had on education.

**Sense of Connectedness and Engagement in the Online Learning Environment**

Whether in person or electronically, human interaction an essential part of human nature. According to Maslow (1962), feelings of social connectedness are critical to his hierarchy of needs synopsis. He illustrates how humans desire feelings of connectedness and acceptance amongst groups, both large and small. If these feelings of connectedness are not satisfied during the adolescent years, adverse behavior will emerge and be evident in the school setting (Capps, 2004). Students who perceive acceptance, support, and engagement within the school environment will have a greater sense of connectedness. Students feel a sense of recognition when teachers and staff express respect and
communicate interest in their students; these feelings of acceptance improve sense of connectedness (Akar-Vural et al., 2013; Gizir & Uslu, 2017). When students believe that their ideas are not valued and perceive that their presence is unwelcome in a specific educational setting, their enjoyment and performance are diminished; therefore, adversely affecting their sense of acceptance. Students also report a stronger sense of connectedness when encountering teachers who take time to listen and talk with them about personal and social issues (Capps, 2004). This act initiates feelings of support. A lack of support, however, is easily recognizable by students from minority groups as they are more sensitive to impersonal encounters and uncaring schools (Gizir & Uslu, 2017). These negative experiences and lack of supportive relationships within the school prevent minority students from feeling a sense of connectedness to the school. A sense of connectedness also entails feelings of engagement. Akar-Vural et al. (2013) suggest a relationship between student sense of connectedness and student engagement. Students’ perception of acceptance, support, and engagement from the physical and virtual school community influences their sense of connectedness.

Research attests that feelings of connectedness to the learning environment increase student satisfaction, persistence, and retention (Delmas, 2017; Jamison & Bolliger, 2020; Trespalacios & Uribe-Florez, 2020). As with traditional feelings of connectedness, online connectedness entails relationships between peers and instructors, as well as the ability of students to meet learning goals (LaBarbera, 2013) successfully. Creating a sense of community and connectedness is necessary for distanced learning to be successful (Trespalacios & Uribe-Florez, 2020). The development and sustainability of student sense of connectedness are especially paramount within the online learning
community where students do not have the opportunity to meet and learn in the same physical space (Jamison & Bolliger, 2020; Trespalacios & Uribe-Florez, 2020). Taghizade et al. (2020) support this notion and emphasize the importance of student connectedness, saying meaningful interactions of student to student and student to teacher lead to improved understanding of the content. Conclusively, students that feel connected within the online learning community are better learners.

Trespalacios and Uribe-Florez (2020) present various interactions and activities for instructors who promote a sense of connectedness within the online learning community. These recommendations include establishing a warm and welcoming tone, encouraging student interaction and participation, collaborative learning, instructor modeling, and support, as well as consistency in course design (Trespalacios & Uribe-Florez, 2020). These activities can be applied simultaneously in the online classroom as a common theme for each of them involves the instructors’ communication and support. Instructor support is a necessary component of online learning to improve student engagement (Toulouse, 2020). Students must have meaningful interactions with their peers and instructors to feel a sense of connectedness in the online environment (Jamison & Bolliger, 2020). Researchers attest that online instructors must model their expectations, create a personalized experience, be responsive to student needs, provide supportive feedback, facilitate group discussions, promote student interaction and participation, and provide multiple modes of communication (Berry, 2017; Haythornthwaite et al., 2000; Shackelford & Maxwell, 2012). Instructors teaching methods and active engagement are crucial to establishing an online learning environment where students feel connected.
The Coronavirus and its Impact on Schools & Students

According to the World Health Organization’s (WHO) (2020) website, “COVID-19 is the infectious disease caused by the most recently discovered coronavirus.” The website further explains that the COVID-19 outbreak began in China in December of 2019. Since that time, the virus has made its way to the United States, causing chaos, confusion, tragedy, and loss. As of February 2021, the Centers for Disease Control and Prevention (CDC) (2021) report that the coronavirus has infected nearly 27,000,000 people and killed more than 464,000 and counting. Whites account for 60% of cases and 62% of deaths caused by COVID-19; Hispanics account for 21% of cases and 13% of deaths. African Americans’ have a case rate of 12% and a death rate of 15%. Asians (4%), American Indians (1%), and Native Hawaiians/other Pacific Islanders (0%) have the least percentage of cases. Asians (4%), American Indians (1%), and Native Hawaiians/other Pacific Islanders (0%) also have minimal death rates caused by the virus. While people age 18-29 (23%) and age 50-64 (21%) have the most significant percentage of cases, the older someone is, the greater their risk of death from COVID-19. The age range of 65-74 makes up 21% of fatalities, 75-84 accounts for 28% of deaths, and 85 and older, 32% of deaths. Males and females are equally likely to contact COVID-19 (males 48% and females 52%) and die from the virus (males 54% and females 46%) (CDC, 2021). This data provided by the CDC is reported daily from each state and territorial jurisdiction.

In March of 2020, the coronavirus pandemic forced small businesses, major companies, and schools to cease operations and close their doors to protect the health and well-being of society. This unprecedented disruption to businesses, the community, and
schools has caused people to socially distance themselves when in public, self-quarantine for possible exposure, and stay safe at home to prevent exposure. As state officials and school leaders began reopening plans for the 2020-2021 school year, they were responsible for considering students, teachers, and staff's health, safety, and well-being. Leaders were faced with the difficult decision of reopening schools or keeping them closed. Research and science present opposing views, however. Hoffman and Miller (2020) surmise that “prolonged school closures are one of the most disruptive forces in COVID-19 era” (p. 301). Contrastingly, Viner et al. (2020) propose that keeping schools closed contributes to minimizing the spread of COVID-19 and flattening the curve. Ultimately in Kentucky, the governor recommended that schools remain closed and provide non-traditional instruction (NTI) to start the school year (Kobin, 2020).

With NTI, teachers and students continue with academic instruction through an online communication platform such as Zoom, Google Meet, or Microsoft Teams. COVID-19 required a significant shift in the way teachers teach and students learn. With school buildings closed and classrooms shifting to the internet, the coronavirus presented many obstacles for the school community. Teachers were required to dramatically alter lesson plans and learn new technology (Kaden, 2020). School administrators and leaders were challenged with providing internet, technology, and resources to create an equitable online learning environment for students (Fagell, 2020). Not only has COVID-19 had an impact on how teachers and administrators operate, but it has also presented various challenges for students as well.

During this pandemic, students have been forced to develop new learning strategies while struggling with social isolation and loneliness (Brooks et al., 2020).
Furthermore, access to food (Davidson, 2020; Van Lancker & Parolin, 2020), mental health needs (Codd, 2020; Hoffman & Miller, 2020; Torres-Pagán & Terepka, 2020), and financial stress (Kaden, 2020; Phelps & Sperry, 2020) burden many students. Prior to the coronavirus pandemic, many students did not have access to nutritious meals when out of school (Davidson, 2020; Van Lancker & Parolin, 2020). During the pandemic, this issue has become even more significant. The World Food Program estimates that 370 million children worldwide are no longer receiving school meals (World Food Program, 2020). In response, school officials have restructured their meal programs to adapt to this unprecedented time and ensure the nutritional health of students (JCPS School Meals, 2020). Students’ mental health is also a growing concern during the COVID-19 pandemic. Codd et al. (2020) surmise that students will return to school with anxiety, depression, fear, and uncertainty developed during the pandemic. Researchers advocate that school-based services directly address the mental health needs of students. (Hoffman & Miller, 2020; Torres-Pagán & Terepka, 2020). School closures have significantly limited students’ accessibility to mental health resources. The coronavirus pandemic has additionally placed a tremendous financial strain on students and families. Scholars assert that school closures may exacerbate existing socioeconomic inequalities (Kaden, 2020; Van Lancker & Parolin, 2020). Students become perceptive to the family’s financial stress, thereby impacting their ability to adequately focus in the online school setting (Phelps & Sperry, 2020). The COVID-19 pandemic has influenced and transformed many aspects of students’ former way of life.
Conceptual Framework and Theoretical Underpinnings

To understand the interaction effect between students and their sense of connectedness in a non-traditional online learning environment, it is necessary to examine the influence of this interaction using the Community of Inquiry (CoI) framework (Garrison et al., 2000). Researchers of online education have cited the CoI framework extensively (Bigatel & Edel-Malizia, 2017; Feng et al., 2017; Stenbom et al., 2012). Additionally, the CoI framework was influential in developing the Online Student Connectedness Survey by Bolliger and Inan (2012). Garrison and his colleagues (2000) designed a conceptual framework identifying various elements and their interactions that support a successful online education experience. The Community of Inquiry framework recognizes that teachers and students are the key participants in the online educational process. The CoI framework also entails three dominant elements: (1) cognitive presence, (2) social presence, and (3) teaching presence. These three elements interact and initiate the process of critical thinking and learning through an online learning environment (Garrison et al., 2001). Figure 1 depicts the previously mentions elements of the CoI framework and their interaction.

Figure 1. Community of Inquiry Framework
According to the Community of Inquiry framework, learning occurs within the community through the interconnection of cognitive presence, social presence, and teaching presence. Scholars (Garrison et al., 2000) surmise that the key to a successful online learning experience is cognitive presence. The developers of the CoI framework define cognitive presence as “the extent to which the participants in any particular configuration of a community of inquiry can construct meaning through sustained communication” (Garrison et al., 2000, p. 4). Cognitive presence enables students in the online learning environment to acquire and apply higher-order knowledge, which is connected to critical thinking skills (Garrison et al., 2001). Social presence is the next core element of the CoI model. Social presence is described as the online participants’
ability to project their personal characteristics into the community, thus establishing a more relatable image to others within the online community (Garrison et al., 2000).

Social presence fosters the interaction amongst participants to share their individualism, communicate with a purpose to others, and engage in meaningful discussions (Stenbom et al., 2012). The final element of the framework is teaching presence, which entails two primary functions, organization and facilitation. The first function is the organization of the online educational experience; this involves the instructor’s development, composition, and presentation of the course content, activities, and assessments. The second function, facilitation, is thought to be a shared responsibility of the instructor and the student participants. These three components of the CoI framework interact by supporting and reinforcing one another to promote a successful online learning experience. (Garrison et al., 2000; Stenbom et al., 2012).

**Summary and Areas for Future Research**

During the exploration of literature, I discussed the concept of sense of connectedness, its significance, and its measurement. There are different characterizations for sense of connectedness (Faircloth & Hamm, 2005); however, a universal definition does not exist. Therefore, I reviewed the vast description of attributes of sense of connectedness and applied a specific characterization that I will continue to use throughout my research. Then, I examined how sense of connectedness develops and explored the most common instruments used to measure students’ sense of connectedness as well as sense of connectedness in the online learning environment. Additionally, I traversed the relationship between sense of connectedness and student characteristics, including students’ grade level, gender, racial group/ethnicity, socioeconomic status, and
program enrollment. Furthermore, I discussed the progression of the coronavirus and its impact on the educational environment.

The research about students’ sense of connectedness revealed a vast description of themes and attributes. The literature surmises that the necessity to belong focuses on students' feelings about themselves and their relationship with others within the school setting (Booker, 2007). Goodenow (1993) defined sense of connectedness as the scope of which students perceive they are accepted, respected, included, and supported by others in the school social environment. The review of the literature determined that schools are the central location where feelings of connectedness are developed (Murphy & Zirkel, 2015). Schools must create an environment where students believe they are accepted and included, as it is crucial to developing students’ sense of connectedness (Rose & Shevlin, 2017). Sense of connectedness is a social dimension; however, scholars have created instruments to appraise feelings of connectedness (St. Amand et al., 2017). The most notable sense of connectedness instrument is the PSSM. However, other measurement tools such as the QES and PALS have been used by scholars as well. Measuring instruments for student connectedness in the online learning environment include the Classroom Community Scale (Rovai, 2002a; Rovai, 2002b), Community of Inquiry (Garrison et al., 2000), and the Online Student Connectedness Survey (Bolliger & Inan, 2012). While researchers must identify, develop, and measure sense of connectedness, scholars must also recognize the relationship between students’ sense of connectedness on student characteristics.

Student characteristics impact student academic success, student behavior, and finally, student sense of connectedness (Adekanye et al., 2015; Abimbola & Ugbede,
It is essential to examine student sense of connectedness through the facets of academic success and behavior. However, it is challenging to adequately determine academic success and examine student behavior in a non-traditional online environment. Literature reviews student transitions through elementary, middle, and high school and their relationship to academic success and sense of connectedness (Chase et al., 2014; Holas & Huston, 2012; McMillen, 2004; Stevenson, 2006; Witherspoon & Ennett, 2011). Changes to the school setting can positively or negatively affect feelings of connectedness. Differences in gender and sense of connectedness have different research perspectives. Scholars concede that gender is a predominant variable for predicting academic success and sense of connectedness (Carney et al., 2020; Tomul & Savasci, 2012). Some surmise that males have a greater sense of connectedness (Lamport & Bartolo, 2012), while alternative research finds that females have stronger feelings of connectedness (Carney et al., 2020). Regarding race and sense of connectedness, research reports that African American students have fewer experiences of supportive relationships with their teachers and less feelings of connectedness than their White peers (Bottiani et al., 2016; Cornell & Shirley, 2011; Konold et al., 2017). Socioeconomic status is also a predictor of student achievement, which impacts students’ feelings of connectedness (Gutman et al., 2002; Tomul & Savasci, 2012; Wodtke & Parbst, 2017). Finally, student program enrollments such as English language learners, gifted and talented, homeless, migrant, and special education can all influence student sense of connectedness (Adoniou & Qing, 2014; Lawson, 2018; Riley & White, 2016; Rose & Selvin (2017).
In March of 2020, the coronavirus pandemic forced small businesses, major companies, and schools to cease operations and close their doors unexpectedly. The Governor of Kentucky recommended school leaders keep schools closed and provide non-traditional instruction (NTI) to start the school year (Kobin, 2020). With NTI, teachers and students continue with academic instruction through an online communication platform. As a result, students have been forced to develop new learning strategies while struggling with social isolation and loneliness (Brooks et al., 2020). Many students have faced additional challenges, such as access to food, mental health needs, and financial stress (Coddin et al., 2020; Davidson, 2020; Hoffman & Miller, 2020; Kaden, 2020; Phelps & Sperry, 2020; Torres-Pagán & Terepka, 2020; Van Lancker & Parolin, 2020). The unprecedented arrival of the coronavirus has significantly impacted student, their families, and the school environment.

This review of the literature has additional implications for school leaders and administrators. This review applied a limited scope into the significance of sense of connectedness for online learners. Further research could contribute to the discussion of cultural competence for educators in the online community. Training, professional developments, and best practices could be developed based on an in-depth analysis of connectedness in the traditional learning environment and the non-traditional learning environment. Furthermore, the research into sense of connectedness could offer a higher consciousness on cyclical community issues such as racial disparities, the poverty gap, and learning differences.

To better understand the interaction effect between student characteristics and their sense of connectedness in a non-traditional online learning environment, it is
necessary to examine the influence of these factors using the Community of Inquiry CoI framework (Garrison et al., 2000). This theory supports the notion that learning occurs within the online community by connecting cognitive presence, social presence, and teaching presence. These three components of the CoI framework interact and promote a successful online learning experience. (Garrison et al., 2000; Garrison et al., 2001).

For the purpose of my study, sense of connectedness will align with Goodenow’s research and be characterized as the level to which students believe they are accepted, supported, and engaged within their school community (Boyle et al., 2012; Goodenow, 1993; Goodenow & Grady, 1993; Ma, 2003). For my quantitative study, I will use a factorial ANOVA to determine if there are any statistically significant interaction effects between student characteristics and their perceived sense of connectedness in a non-traditional online learning environment. According to Field (2013), this statistical approach will allow me to compare means across several independent variables (grade level, gender, race/ethnicity). My research will add to the existing body of literature because there is currently minimal research that explores the interaction effect between student characteristics and their perceived sense of connectedness in a non-traditional online learning environment (Borup et al., 2019, Kuhfeld, 2020). Sense of connectedness is a social construct representing the need of humans to have personal relationships of respect and acceptance, unconditional support, and active engagement. Continued analysis of this topic is necessary to understand human behavior.
CHAPTER III: METHODOLOGY

The purpose of my research study was to determine if any interaction effects exist between student characteristics (grade-level, gender, and race/ethnicity) and their perceived sense of connectedness in a non-traditional online learning environment. The following chapter restates my research questions and hypotheses. This is followed by the context of my study, data sources, and data collection procedures. I then describe how I analyzed the data and my statistical procedures. Finally, I discuss the limitation of my study and summarize the chapter.

Research Questions

The following questions guided my study:

**R1:** Is there a statistically significant interaction effect between students’ grade level and gender on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey?

**R2:** Is there a statistically significant interaction effect between students’ grade level and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey?

**R3:** Is there a statistically significant interaction effect between gender and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey?
**R4:** Is there a statistically significant interaction effect among grade-level, gender, and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey?

**Hypotheses**

My hypotheses were as follows:

**H10:** There is no statistically significant interaction effect between students’ grade level and gender on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.

**H11:** There is a statistically significant interaction effect between students’ grade level and gender on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.

**H20:** There is no statistically significant interaction effect between students’ grade level and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.

**H21:** There is a statistically significant interaction effect between students’ grade level and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.

**H30:** There is no statistically significant interaction effect between gender and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.

**H31:** There is a statistically significant interaction effect between gender and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.
**H4₀**: There is no statistically significant interaction effect among grade-level, gender, and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.

**H4₁**: There is a statistically significant interaction effect among grade-level, gender, and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment as measured by the online connectedness survey.

**Context of the Study**

The selected school district currently has one kindergarten through eighth-grade school, six elementary, two middle schools, two high schools, and three milestone academies (District Profile, 2021). Since the 2017-2018 school year, the school district has had more than 8,000 students; that number has subsequently declined to approximately 7,500 students as of the 2019-2020 school year (School Report Card, 2021). Nearly 65% of the students enrolled in the selected school district are White, and 6% are African American. Almost 22% of the student population is Hispanic or Latino, and less than 0.7% is Asian. Approximately 0.2% of the students identify as American Indian or Alaska Native; also 0.03% of the students identify as Native Hawaiian or other Pacific Islander. Students of two or more races make up close to 5% of the students in the district. The male to female ratio is nearly one to one, with 47% of the student population identifying as female and 53% of the student population identifying as male. Approximately 53% of students in the district receive free or reduced lunch and classify as economically disadvantaged. Other groups in the district include English Language Learners (12%), gifted and talented (15%), homeless students (0.4%), migrant (0.8%), and special education students (16%). Table 3 details the demographic data of the
suburban school district for 2017-2018, 2018-2019, and 2019-2020 school years (School Report Card, 2019). The specific demographic data for each of the three middle schools from the district are detailed in Table 4 below (School Report Card, 2021).
Table 3. School District Demographics Data

<table>
<thead>
<tr>
<th>Enrollment</th>
<th>Total</th>
<th>Percent</th>
<th>Total</th>
<th>Percent</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade-Level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>581</td>
<td>7.2</td>
<td>613</td>
<td>8.0</td>
<td>547</td>
<td>7.3</td>
</tr>
<tr>
<td>7</td>
<td>560</td>
<td>6.9</td>
<td>553</td>
<td>7.2</td>
<td>589</td>
<td>7.8</td>
</tr>
<tr>
<td>8</td>
<td>572</td>
<td>7.1</td>
<td>542</td>
<td>7.1</td>
<td>557</td>
<td>7.4</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>3,858</td>
<td>47.8</td>
<td>3,671</td>
<td>47.9</td>
<td>3,556</td>
<td>47.3</td>
</tr>
<tr>
<td>Male</td>
<td>4,211</td>
<td>52.2</td>
<td>3,995</td>
<td>52.1</td>
<td>3,960</td>
<td>52.7</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>567</td>
<td>7.0</td>
<td>515</td>
<td>6.7</td>
<td>486</td>
<td>6.5</td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td>14</td>
<td>0.2</td>
<td>15</td>
<td>0.2</td>
<td>12</td>
<td>0.2</td>
</tr>
<tr>
<td>Asian</td>
<td>66</td>
<td>0.8</td>
<td>63</td>
<td>0.8</td>
<td>50</td>
<td>0.7</td>
</tr>
<tr>
<td>Hispanic/ Latino</td>
<td>1,616</td>
<td>20.0</td>
<td>1,690</td>
<td>22.0</td>
<td>1,681</td>
<td>22.4</td>
</tr>
<tr>
<td>Native Hawaiian/ Pacific Islander</td>
<td>4</td>
<td>0.0</td>
<td>3</td>
<td>0.0</td>
<td>3</td>
<td>0.0</td>
</tr>
<tr>
<td>Two or More Races</td>
<td>383</td>
<td>4.7</td>
<td>372</td>
<td>4.9</td>
<td>397</td>
<td>5.3</td>
</tr>
<tr>
<td>White</td>
<td>5,419</td>
<td>67.3</td>
<td>5,008</td>
<td>65.3</td>
<td>4,887</td>
<td>65.0</td>
</tr>
<tr>
<td>Lunch Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free/Reduced Lunch</td>
<td>4,228</td>
<td>52.4</td>
<td>4,064</td>
<td>53.0</td>
<td>4,006</td>
<td>53.3</td>
</tr>
<tr>
<td>Program Enrollment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English Learners</td>
<td>799</td>
<td>9.9</td>
<td>892</td>
<td>11.6</td>
<td>913</td>
<td>12.1</td>
</tr>
<tr>
<td>Gifted and Talented</td>
<td>1,374</td>
<td>17.0</td>
<td>1,229</td>
<td>16.0</td>
<td>1,097</td>
<td>14.6</td>
</tr>
<tr>
<td>Homeless</td>
<td>15</td>
<td>0.2</td>
<td>35</td>
<td>0.5</td>
<td>31</td>
<td>0.4</td>
</tr>
<tr>
<td>Enrollment</td>
<td>Total</td>
<td>Percent</td>
<td>Total</td>
<td>Percent</td>
<td>Total</td>
<td>Percent</td>
</tr>
<tr>
<td>------------</td>
<td>-------</td>
<td>---------</td>
<td>-------</td>
<td>---------</td>
<td>-------</td>
<td>---------</td>
</tr>
<tr>
<td>Migrant</td>
<td>64</td>
<td>0.8</td>
<td>69</td>
<td>0.9</td>
<td>63</td>
<td>0.8</td>
</tr>
<tr>
<td>Special Education</td>
<td>1,129</td>
<td>14.0</td>
<td>1,215</td>
<td>15.8</td>
<td>1,208</td>
<td>16.1</td>
</tr>
</tbody>
</table>

Table 4. Middle School Demographic Data 2019-2020 School Year

<table>
<thead>
<tr>
<th>Enrollment</th>
<th>School A</th>
<th>School B</th>
<th>School C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade-Level</td>
<td>Total</td>
<td>Percent</td>
<td>Total</td>
</tr>
<tr>
<td>6</td>
<td>191</td>
<td>30.3</td>
<td>218</td>
</tr>
<tr>
<td>7</td>
<td>227</td>
<td>36.0</td>
<td>249</td>
</tr>
<tr>
<td>8</td>
<td>212</td>
<td>33.7</td>
<td>236</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>28</td>
<td>4.4</td>
<td>50</td>
</tr>
<tr>
<td>Male</td>
<td>473</td>
<td>75.1</td>
<td>375</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>298</td>
<td>47.3</td>
<td>334</td>
</tr>
<tr>
<td>American Indian/ Alaska Native</td>
<td>332</td>
<td>52.7</td>
<td>369</td>
</tr>
<tr>
<td>Asian</td>
<td>23</td>
<td>3.7</td>
<td>66</td>
</tr>
<tr>
<td>Hispanic/ Latino</td>
<td>3</td>
<td>0.5</td>
<td>2</td>
</tr>
<tr>
<td>Native Hawaiian/ Pacific Islander</td>
<td>3</td>
<td>0.5</td>
<td>6</td>
</tr>
<tr>
<td>Two or More Races</td>
<td>99</td>
<td>15.7</td>
<td>204</td>
</tr>
<tr>
<td>White</td>
<td>1</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>Lunch Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free/Reduced Lunch</td>
<td>344</td>
<td>54.6</td>
<td>409</td>
</tr>
<tr>
<td>English Learners</td>
<td>32</td>
<td>5.1</td>
<td>90</td>
</tr>
<tr>
<td>Program Enrollment</td>
<td>Gifted and Talented</td>
<td>Homeless</td>
<td>Migrant</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------</td>
<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>92</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>14.6</td>
<td>0.0</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>89</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>12.7</td>
<td>0.9</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>61</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>15.8</td>
<td>0.0</td>
<td>1.3</td>
</tr>
</tbody>
</table>
Variables in the Model

The following details the dependent and independent variables in my study (summarized in Table 5).

**Dependent Variable**

I used student sense of connectedness as the dependent variable. This continuous variable was measured using the Online School Connectedness Survey (OSCS), an instrument used to measure online learner perceptions of connectedness. The Community of Inquiry framework was influential in developing the OSCS. The 25 Likert-type questions in the OSCS instrument used the standard coding scheme of 1- *strongly disagree* to 5- *strongly agree*. Participants’ scores were then be divided by 25 to calculate the average and reflect participants’ sense of connectedness measure (Jamison & Bolliger, 2020). Approximate scores of 1 indicated a low sense of connectedness within the online learning environment; scores nearing 3 suggested moderate connectedness. Scores closer to 5 revealed a strong sense of connectedness to the online school community. Once the data collection process was completed, I coded participant responses.

**Independent Variables**

The categorical variable grade-level identified participants in grades 6, 7, and 8, as this is the grade range for middle school students. Grade-level was coded with “6” for sixth grade, “7” for seventh, and “8” for eighth. The independent variable of gender was also categorical and differentiated female and male participants. Students were also offered the options of prefer not to say or other. Participants who chose prefer not to say or other for gender were not assessed for my study at this time. Gender was coded with
“0” for female participants and “1” for male participants. The following categorical variable, race/ethnicity, is a social construct in which people are grouped into categories based on physical and/or social characteristics (Clair & Denis, 2015). Students’ race/ethnicity options included African American, American Native/Alaskan Native, Asian, Hispanic/ Latino, Native Hawaiian/Pacific Islander, two or more races, or White. However, once I collected the student race/ethnicity data, I collapsed this categorical variable to a binomial variable and coded the data as White or non-White. Race/ethnicity was identified with the following codes: “0” for White and “1” for non-White (African American, American Native/Alaskan Native, Asian, Hispanic/ Latino, Native Hawaiian/Pacific Islander, and two or more races).
Table 5. Variables in the Model with Their Grounding in the Literature

<table>
<thead>
<tr>
<th>Category</th>
<th>Variable</th>
<th>Type</th>
<th>Measurement</th>
<th>Grounding in Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Data</td>
<td>Grade</td>
<td>Independent</td>
<td>Categorical (dummy-coded)</td>
<td>Abimbola &amp; Ugbede, 2018</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 6th grade (referent group)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 7th grade</td>
<td>Chase et al., 2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 8th grade</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>Independent</td>
<td>Categorical (0/1)</td>
<td>Ja &amp; Jose, 2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Female</td>
<td>Lamport &amp; Bartolo, 2012</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Male</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Racial Group</td>
<td>Independent</td>
<td>Categorical (0/1)</td>
<td>Bottiani et al., 2016</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• White</td>
<td>Konold et al., 2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Non-White</td>
<td></td>
</tr>
<tr>
<td>Sense of Connectedness</td>
<td>Online Student</td>
<td>Dependent</td>
<td>Continuous</td>
<td>Bolliger &amp; Inan, 2012</td>
</tr>
<tr>
<td></td>
<td>Connectedness Survey</td>
<td></td>
<td></td>
<td>Zimmerman &amp; Nimon, 2017</td>
</tr>
</tbody>
</table>
Data Sources

The purpose of this research study was to determine if an interaction effect exists between student characteristics and their perceived sense of connectedness in a non-traditional online learning environment. Sense of connectedness scores at the student level served as the continuous dependent variable. I measured sense of connectedness using an adapted version of the Online Student Connectedness Survey (Bolliger & Inan, 2012) (see Appendix A). The survey was developed using the OSCS will be administered to middle school students from the selected school district. The 25-item questionnaire, a self-reported survey, was constructed to assess students’ perception of connectedness while enrolled in a non-traditional online environment. Alpha reliability for the OSCS was assessed at 0.91, confirming internal consistency and suggesting that the survey is suitable for measuring online student connectedness (Bolliger & Inan, 2012; Zimmerman & Nimon, 2017). Survey items were answered using a five-point Likert-type scale: (1) strongly disagree, (2) disagree, (3) neither agree nor disagree, (4) agree, (5) strongly agree (Bolliger & Inan, 2012). None of the questions in the OSCS were modified. In addition to the OSCS questions, participants were asked to provide demographic data including self-identified grade-level (6, 7, or 8), gender (female, male, prefer not to say, or other), and race/ethnicity (African American, American Native/Alaskan Native, Asian, Hispanic/ Latino, Native Hawaiian/Pacific Islander, two or more races, or White). Participants were also asked the type of learning environment they were in (NTI, hybrid model, or in-person instruction) and how long they were in a full NTI model (1-2 months, 3-4 months, or 5-6 months). Finally, which activities their instructors used during NTI which may impact their perceived sense of connectedness.
Data Collection

The participants for this study were students from three suburban middle schools within a school district located in a southeastern state. The student connectedness data were collected from students individually. The adapted version of the OSCS was administered electronically in the spring of the 2020-2021 school year. Additional student-level data were collected, including student grade level, gender, and race/ethnicity. In response to the unprecedented COVID-19 pandemic and state leaders' recommendations, the district began the 2020-2021 school year with non-traditional instruction (NTI). With NTI, teachers and students continue with academic instruction through an online communication platform such as Zoom, Google Meet, or Microsoft Teams. Because of students being physically separated from the school environment, I could not assess sense of connectedness in the traditional school setting. Instead, I measured student sense of connectedness in the non-traditional setting with the OSCS. Furthermore, I administered the surveys electronically since school district leaders have restricted in-person contact with students for safety reasons.

The school district sent an email to all prospective participants and their parents/guardians on my behalf. I introduced myself as a University of Louisville doctoral candidate and invited them to participate in the study. The email also included the following: (a) the purpose of the study, (b) the procedures of the study, including anonymity and electronic completion, (c) the voluntary nature of the study, (d) sample survey questions, (e) the importance of the potential results of the study, (f) my dissertation chair’s contact information for questions, (g) as well as the session dates (see Appendix B). The survey was sent to parents/guardians with students in grades 6-8 via
email and Blackboard. Students completed the survey online using Survey Monkey (a link will be provided in the email) anytime within the specified 7-day window. Since the email with the survey link was only be sent to parents'/guardians’ emails, they granted permission/consent once they provided/shared the survey with their student. Parents/guardians who chose not to consent did not provide/share the survey with their student. Once the data collection process was complete, IBM Statistical Package for Social Sciences (SPSS, Version 27) was used to analyze the collected data.

Data Analysis and Statistical Procedures

Abbott and McKinney (2012) describe research designs as tools that assist social scientists in ascertaining what methods they will use to tests their hypotheses. Each research design is distinct in its data collection process and encompasses four standard methods for collecting and observing data: surveys, experiments, field research, and secondary sources. My study was a quantitative design, which explains or measures a phenomenon using a numerical quantity. With quantitative research, social scientists can use a statistical method to compare more than two or more groups, known as factorial analysis of variance (ANOVA) (Abbot & McKinney, 2012; Field, 2013). A factorial ANOVA was used to test multiple hypotheses concerning differences between means in the factorial design (Shavelson, 1996). I used a factorial ANOVA to determine any statistically significant interaction effects between student characteristics and their sense of connectedness in a non-traditional online learning environment. A factorial ANOVA allowed me to compare means across several independent variables (Field, 2013; Shavelson, 1996). The unit of analysis in my study was individual student participants from the three middle schools in the selected school district (N = 1700). Student
demographic data came directly from students (grade level, gender, race/ethnicity). Furthermore, I used students’ individual Online Student Connectedness Survey (OSCS) data.

I used Microsoft Excel to load all survey response data into an Excel spreadsheet. Then I examined participant responses for any missing data. All demographic information was coded based on the assigned dummy code previously detailed. After cleaning and coding data in an Excel spreadsheet, I imported the data into SPSS.

Descriptive statistics were determined for survey items and demographic responses. Descriptive statistics were performed on the Online Student Connectedness Survey items and questions regarding what activities instructors use in their programs. The OSCS has 25 Likert-type items ranging from 1- strongly disagree to 5- strongly agree, therefore survey scores can range from 25 to 125. Participants’ scores were then divided by 25 to calculate the average and reflect participants’ sense of connectedness measure (Jamison & Bolliger, 2020). Approximate scores of 1 indicated a low sense of connectedness within the online learning environment; scores nearing 3 suggested moderate connectedness, and scores closer to 5 revealed a strong sense of connectedness to the online school community.

Descriptive statistics included frequency counts by level for each factor in the OSCS. Additional statistical analysis for student connectedness reflected center (mean), shape (histograms, kurtosis, and skewness), and spread (standard deviation). My quantitative research was a 3 (grade-level: 6, 7, or 8) by 2 (gender: female or male) by 2 (race/ethnicity: white or non-white) factorial ANOVA design. A factorial ANOVA indicated the degree of strength of association between each independent variable, as well
as the combination of independent variables and the dependent variable (Shavelson, 1996). Field (2013) describes the main effect as the effect of one of the independent variables on the dependent variable while ignoring the effects of the remaining independent variables. One-way ANOVAs were used to determine if there was a main effect for each of the three independent factors (grade level, gender, and race/ethnicity) on student sense of connectedness. In addition to determining if there was a main effect, I also performed statistical analysis for interactions between the independent variables. An interaction occurs when the effect of one independent variable on the dependent variable changes based on the level of another dependent variable (Field, 2013). If the differences in the values are statistically significant, then there is an interaction (Field, 2013). For my study, the independent variables analyzed for interactions were grade-level (6, 7, or 8), gender (female or male), and race/ethnicity (White or non-White). To determine if any interactions were significant, a factorial ANOVA was be conducted.

**Assumptions of Analysis of Variance**

Abbot and McKinney (2012) emphasize several key assumptions for analysis of variance. The first assumption of independence must be noted; another participant will not influence each participant's survey response. To meet the assumption of independence, I assumed that each participant completed their survey independently. The following assumption requires normality. The various independent variable groups must display normally distributed on the dependent variable. The assumption of normality was assessed using skewness and kurtosis statistics reflected on histograms. Field (2013) describes skewness as the lack of symmetry of the probability distribution. Kurtosis refers to the height and sharpness of the scores compared to a standard bell
curve. Distributions with skew or kurtosis values above or below 0 indicate a variation from normal (Field, 2013). Homogeneity of variance is a further assumption that was addressed. ANOVA assumes that the population variances are equal across the outcome variable. This assumption was assessed using Levene’s test. The group variances are not equal if this result is significant. The significance is compared to the significance value of .05. If the significance is greater than the .05 (p >.05), one concludes that the result is not significant and therefore does not reject the null hypothesis of homogeneity. (Abbot & McKinney, 2012; Shavelson, 1996).

**Limitations**

The application of factorial analysis in this study is correlational rather than experimental or quasi-experimental. As such, I am unable to determine cause and effect (Stevens, 2007). I used data from the 2020-2021 school year. As such, my findings were only generalizble to that school year and to the three middle schools in the selected school district that served as the context of my study. Assumptions associated with analysis of variance include normality, independence, and equality of variance (Shavelson, 1996). I assumed that all participants completed their survey independent of one another to meet the assumption of independence. The assumption of normality was assessed using skewness and kurtosis statistics reflected on histograms. Furthermore, I used Levene’s test to assess homogeneity of variance. While these assumptions were present during my study, it is still necessary to explore the connections associated with student sense of connectedness.
Chapter Summary

For my study, I examined the interaction effect between student characteristics (grade-level, gender, and race/ethnicity) and their sense of connectedness in a non-traditional online learning environment. The Online Student Connectedness Survey was administered to middle school students from the selected school district. The 25-item questionnaire, a self-reported survey, was constructed to assess students’ perception of connectedness while enrolled in a non-traditional online environment. Calculated sense of connectedness scores served as the dependent variable. Independent variables included student-level data on grade level, gender, and race/ethnicity. A factorial analysis of variance assessed the interaction effect among and between variables, including students’ sense of connectedness, grade level, gender, and race/ethnicity. Furthermore, assumptions of independence, normality, and homogeneity of variances were be assessed. This concludes the methodology portion of my research; the following chapter will discuss the results of my analysis.
CHAPTER IV: DATA ANALYSIS AND RESULTS

My study aimed to determine if any interaction effects exist between student characteristics (grade-level, gender, and race/ethnicity) and their perceived sense of connectedness in a non-traditional online learning environment. I used a quantitative design of a factorial ANOVA to determine if there were any statistically significant interaction effects between student characteristics and their sense of connectedness in a non-traditional online learning environment. The following chapter includes descriptive statistics, OSCS results, and inferential analysis based on the data provided by the student participants.

Descriptive Statistics

Student participants were recruited via email and Blackboard. Students completed the survey online using Survey Monkey during a specified 7-day window. While 437 students participated in the online survey, 100 participants had incomplete responses. These were excluded from my analysis leaving 337 out of 1,700 students from across the three participating middle schools. Therefore, the response rate for my study was 20%. After the survey window closed and incomplete responses were excluded, I analyzed the sample descriptively. Table 6 reflects the descriptive data of student participants.
Table 6. Means and Standard Deviations for Student Participants

<table>
<thead>
<tr>
<th>Grade</th>
<th>Gender</th>
<th>Race/Ethnicity</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>6th grade</td>
<td>Female</td>
<td>White</td>
<td>3.23</td>
<td>.73</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-White</td>
<td>3.15</td>
<td>.49</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>White</td>
<td>3.41</td>
<td>.66</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-White</td>
<td>3.03</td>
<td>.67</td>
<td>24</td>
</tr>
<tr>
<td>7th grade</td>
<td>Female</td>
<td>White</td>
<td>2.91</td>
<td>.69</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-White</td>
<td>3.24</td>
<td>.97</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>White</td>
<td>3.41</td>
<td>.91</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-White</td>
<td>3.12</td>
<td>1.15</td>
<td>15</td>
</tr>
<tr>
<td>8th grade</td>
<td>Female</td>
<td>White</td>
<td>3.58</td>
<td>.64</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-White</td>
<td>3.21</td>
<td>.69</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>White</td>
<td>3.28</td>
<td>.77</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-White</td>
<td>2.79</td>
<td>.74</td>
<td>32</td>
</tr>
</tbody>
</table>

**Online Student Connectedness Survey Results**

Because the OSCS has 25 Likert-type questions using the standard coding scheme of 1- *strongly disagree* to 5- *strongly agree*, total scale scores ranged from 25 to 125. Participants’ scores were then be divided by 25 to calculate the average and reflect participants’ sense of connectedness measure (Jamison & Bolliger, 2020). The mean score for the instrument was 3.20 (*SD* = 0.76). These results indicate students felt a moderately low connection to the online learning environment during non-traditional instruction. The final question on the survey instrument asked student participants to describe any concerns they had with non-traditional instruction. While several students chose not to respond to the last question, many others expressed feelings of frustration from unstable internet connections, overwhelmed with heavy workloads, the stress of missing assignments, and becoming disheartened by a lack of direct teaching and learning, as well as overall disengagement.
Regarding students’ comfort related to online connectedness, nearly 30% of students chose neutral for each survey item. The exception being item 6, on which 32% of student participants agreed to ask for help from a classmate when necessary. More than 50% of students agreed or strongly agreed with being comfortable asking classmates for help. However, 34% expressed disagreement or strong disagreement with feeling comfortable expressing their opinions and feelings in the online environment. This subscale has a mean score of 3.18, implying that students are moderately comfortable in the online learning environment and are relatively able to communicate with their peers and instructors in non-traditional instruction (See Table 7).

Table 7. Comfort Mean Scores

<table>
<thead>
<tr>
<th>Item</th>
<th>1 Strongly Disagree</th>
<th>2 Disagree</th>
<th>3 Neutral</th>
<th>4 Agree</th>
<th>5 Strongly Agree</th>
<th>Total</th>
<th>Weighted Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I feel comfortable in the online learning environment provided by school.</td>
<td>47 (13.95%)</td>
<td>52 (15.43%)</td>
<td>99 (29.38%)</td>
<td>85 (25.22%)</td>
<td>54 (16.02%)</td>
<td>337</td>
<td>3.14/5</td>
</tr>
<tr>
<td>2. I feel my instructors have created a safe online environment in which I can freely express myself.</td>
<td>20 (5.93%)</td>
<td>35 (10.39%)</td>
<td>119 (35.31%)</td>
<td>114 (33.83%)</td>
<td>49 (14.54%)</td>
<td>337</td>
<td>3.41/5</td>
</tr>
<tr>
<td>3. I feel comfortable asking other students in my online course for help.</td>
<td>32 (9.50%)</td>
<td>58 (17.21%)</td>
<td>107 (31.75%)</td>
<td>92 (27.30%)</td>
<td>48 (14.24%)</td>
<td>337</td>
<td>3.20/5</td>
</tr>
<tr>
<td>4. I feel comfortable expressing my opinions and feelings in my online course.</td>
<td>49 (14.54%)</td>
<td>67 (19.88%)</td>
<td>108 (32.05%)</td>
<td>79 (23.44%)</td>
<td>34 (10.09%)</td>
<td>337</td>
<td>2.95/5</td>
</tr>
<tr>
<td>5. I feel comfortable introducing myself in my online course.</td>
<td>44 (13.06%)</td>
<td>60 (17.80%)</td>
<td>107 (31.75%)</td>
<td>87 (25.82%)</td>
<td>39 (11.57%)</td>
<td>337</td>
<td>3.05/5</td>
</tr>
<tr>
<td>6. If I need to, I will ask for help from my classmates.</td>
<td>27 (8.01%)</td>
<td>51 (15.13%)</td>
<td>88 (26.11%)</td>
<td>108 (32.05%)</td>
<td>63 (18.69%)</td>
<td>337</td>
<td>3.38/5</td>
</tr>
<tr>
<td>7. I have no difficulties with expressing my thoughts in my online course.</td>
<td>38 (11.28%)</td>
<td>70 (20.77%)</td>
<td>116 (34.42%)</td>
<td>69 (20.47%)</td>
<td>44 (13.06%)</td>
<td>337</td>
<td>3.03/5</td>
</tr>
<tr>
<td>8. I can effectively communicate in my online course.</td>
<td>27 (8.01%)</td>
<td>51 (15.13%)</td>
<td>106 (31.45%)</td>
<td>92 (27.30%)</td>
<td>61 (18.10%)</td>
<td>337</td>
<td>3.32/5</td>
</tr>
</tbody>
</table>
More than 50% of students agreed or strongly agreed with three items on the facilitation subscale, survey items 10, 11, and 13. Many student participants expressed agreement or strong agreement to their instructors incorporating collaboration tools (58%), instructors being responsive to student questions (55%), and instructors participating in online discussion (63%). Few students felt that instructors did not promote collaboration between students, with only 16% disagreeing or strongly disagreeing. Also, only 15% of students disagreed or strongly disagreed with instructors promoting interaction between learners, while nearly 50% agreed or strongly agreed. The facilitation subscale had the highest mean of the four subscales ($M = 3.54$), indicating that students reasonably felt that their instructors promoted collaboration, were responsive, and participated in class discussions (See Table 8).

Table 8. Facilitation Mean Scores

<table>
<thead>
<tr>
<th>Item</th>
<th>1: Strongly Disagree</th>
<th>2: Disagree</th>
<th>3: Neutral</th>
<th>4: Agree</th>
<th>5: Strongly Agree</th>
<th>Total</th>
<th>Weighted Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Instructors promote collaboration between students in my online course.</td>
<td>17 (5.04%)</td>
<td>36 (10.68%)</td>
<td>142 (42.14%)</td>
<td>102 (30.27%)</td>
<td>40 (11.87%)</td>
<td>337</td>
<td>3.33/5</td>
</tr>
<tr>
<td>10. Instructors integrate collaboration tools (e.g., chat rooms, groups, etc.) into online course activities.</td>
<td>18 (5.34%)</td>
<td>26 (7.72%)</td>
<td>99 (29.38%)</td>
<td>128 (37.98%)</td>
<td>66 (19.58%)</td>
<td>337</td>
<td>3.59/5</td>
</tr>
<tr>
<td>11. My online instructors are responsive to my questions.</td>
<td>12 (3.47%)</td>
<td>26 (7.72%)</td>
<td>115 (34.12%)</td>
<td>112 (33.23%)</td>
<td>72 (21.36%)</td>
<td>337</td>
<td>3.61/5</td>
</tr>
<tr>
<td>12. I receive frequent feedback from my online instructors.</td>
<td>11 (3.26%)</td>
<td>35 (10.39%)</td>
<td>120 (35.61%)</td>
<td>118 (35.01%)</td>
<td>53 (15.73%)</td>
<td>337</td>
<td>3.50/5</td>
</tr>
<tr>
<td>13. My instructors participate in online discussions.</td>
<td>10 (2.97%)</td>
<td>21 (6.23%)</td>
<td>94 (27.89%)</td>
<td>128 (37.98%)</td>
<td>84 (24.93%)</td>
<td>337</td>
<td>3.76/5</td>
</tr>
</tbody>
</table>
14. In my online course, instructors promote interaction between learners.

Overall

Table 9. Community Mean Scores

<table>
<thead>
<tr>
<th></th>
<th>1 Strongly Disagree</th>
<th>2 Disagree</th>
<th>3 Neutral</th>
<th>4 Agree</th>
<th>5 Strongly Agree</th>
<th>Total</th>
<th>Weighted Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. I have gotten to know some of the faculty member and classmates well.</td>
<td>14 (4.15%)</td>
<td>28 (8.31%)</td>
<td>83 (24.63%)</td>
<td>125 (37.09%)</td>
<td>87 (25.82%)</td>
<td>337</td>
<td>3.72/5</td>
</tr>
<tr>
<td>16. I feel emotionally attached to other students in my online course.</td>
<td>58 (17.21%)</td>
<td>83 (24.63%)</td>
<td>116 (34.42%)</td>
<td>49 (14.54%)</td>
<td>31 (9.20%)</td>
<td>337</td>
<td>2.74/5</td>
</tr>
<tr>
<td>17. I can easily make acquaintances in my online course.</td>
<td>36 (10.68%)</td>
<td>55 (16.32%)</td>
<td>142 (42.14%)</td>
<td>69 (20.47%)</td>
<td>35 (10.39%)</td>
<td>337</td>
<td>3.04/5</td>
</tr>
<tr>
<td>18. I spend a lot of time online with my online course peers.</td>
<td>49 (14.54%)</td>
<td>83 (24.63%)</td>
<td>121 (35.91%)</td>
<td>54 (16.02%)</td>
<td>30 (8.90%)</td>
<td>337</td>
<td>2.80/5</td>
</tr>
<tr>
<td>19. My peers have gotten to know me quite well in my online course.</td>
<td>45 (13.35%)</td>
<td>72 (21.36%)</td>
<td>115 (34.12%)</td>
<td>70 (20.77%)</td>
<td>35 (10.39%)</td>
<td>337</td>
<td>2.93/5</td>
</tr>
<tr>
<td>20. I feel that students in my online course depend on me.</td>
<td>76 (22.55%)</td>
<td>102 (30.27%)</td>
<td>95 (28.19%)</td>
<td>41 (12.17%)</td>
<td>23 (6.82%)</td>
<td>337</td>
<td>2.50/5</td>
</tr>
</tbody>
</table>

Overall 2.96/5
Approximately 40% of student participants agreed or strongly agreed with items 21 and 24. These students felt that they worked well with others in their online course and discussed their ideas with other students in their online class. Nearly a third of the student participants disagreed or strongly disagreed with relating their work to others’ work in their online class. Almost a third of the student participants chose neutral for each of the survey items on the interaction and collaboration subscale. The average score for this subscale was 3.12 and was the second-lowest subscale average (Table 10).

Table 10. Interaction and Collaboration Mean Scores

<table>
<thead>
<tr>
<th>Item</th>
<th>1 Strongly Disagree</th>
<th>2 Disagree</th>
<th>3 Neutral</th>
<th>4 Agree</th>
<th>5 Strongly Agree</th>
<th>Total</th>
<th>Weighted Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. I work with others in my online course.</td>
<td>33 (9.79%)</td>
<td>45 (13.35%)</td>
<td>124 (36.80%)</td>
<td>93 (27.60%)</td>
<td>42 (12.46%)</td>
<td>337</td>
<td>3.20/5</td>
</tr>
<tr>
<td>22. I relate my work to others’ work in my online course.</td>
<td>34 (10.09%)</td>
<td>69 (20.47%)</td>
<td>129 (38.28%)</td>
<td>74 (21.96%)</td>
<td>31 (9.20%)</td>
<td>337</td>
<td>3/5</td>
</tr>
<tr>
<td>23. I share information with other students in my online course.</td>
<td>34 (10.09%)</td>
<td>63 (18.69%)</td>
<td>117 (34.72%)</td>
<td>86 (25.52%)</td>
<td>37 (10.98%)</td>
<td>337</td>
<td>3.09/5</td>
</tr>
<tr>
<td>24. I discuss my ideas with other students in my online course.</td>
<td>32 (9.50%)</td>
<td>62 (18.40%)</td>
<td>111 (32.94%)</td>
<td>96 (28.49%)</td>
<td>36 (10.68%)</td>
<td>337</td>
<td>3.12/5</td>
</tr>
<tr>
<td>25. I collaborate with other students in my online course.</td>
<td>35 (10.39%)</td>
<td>48 (14.24%)</td>
<td>134 (39.76%)</td>
<td>79 (23.44%)</td>
<td>41 (12.17%)</td>
<td>337</td>
<td>3.13/5</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>337</td>
<td>3.12/5</td>
</tr>
</tbody>
</table>

Finally, when asked what activities instructors use during non-traditional instruction, more than 58% of students stated that their instructor sent course announcements often. Also, 58% of students noted that their instructors divide students into smaller groups for discussion purposes. However, less than 12% of student participants said that their instructors assigned discussion leaders. Also, only 25% of
students suggested that their instructors use icebreakers or introductions, and only 26% said that instructors use social media such as Twitter or Facebook (Table 11).

Table 11. Instructor Used Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send frequent course announcements (e.g., daily)</td>
<td>229</td>
<td>58.27</td>
</tr>
<tr>
<td>Use icebreakers (e.g., introductions)</td>
<td>98</td>
<td>24.94</td>
</tr>
<tr>
<td>Use discussion forums</td>
<td>117</td>
<td>29.77</td>
</tr>
<tr>
<td>Break students into smaller discussion groups</td>
<td>230</td>
<td>58.52</td>
</tr>
<tr>
<td>Assign discussion leaders</td>
<td>47</td>
<td>11.96</td>
</tr>
<tr>
<td>Require group activities (e.g., weekly activities)</td>
<td>141</td>
<td>35.88</td>
</tr>
<tr>
<td>Require collaborative group projects (e.g., major writing assignments)</td>
<td>133</td>
<td>33.84</td>
</tr>
<tr>
<td>Require students to share resources</td>
<td>141</td>
<td>35.88</td>
</tr>
<tr>
<td>Incorporate chat sessions</td>
<td>169</td>
<td>43.00</td>
</tr>
<tr>
<td>Provide online office hours</td>
<td>179</td>
<td>45.55</td>
</tr>
<tr>
<td>Use social media (e.g., Twitter, Facebook)</td>
<td>103</td>
<td>26.21</td>
</tr>
<tr>
<td>Other</td>
<td>152</td>
<td>38.68</td>
</tr>
</tbody>
</table>

**Inferential Analysis**

The data on 337 student participants were used to perform the 3 x 2 x 2 factorial analysis of the variance. The independent variables were student grade level, gender, and race/ethnicity. Grade-level will be coded with “6” for sixth grade, “7” for seventh, and “8” for eighth. Gender will be coded with “0” for female participants and “1” for male participants. Students were also offered the options of prefer not to say or other. Participants who chose prefer not to say or other for gender were not assessed for my study at this time. Race/ethnicity was identified with the following codes: “0” for White and “1” for non-White (African American, American Native/Alaskan Native, Asian, Hispanic/ Latino, Native Hawaiian/Pacific Islander, and two or more races). Each of the independent variables was categorical. The dependent variable was student sense of connectedness and was a continuous variable. The 25 Likert-type questions in the Online
Student Connectedness Survey instrument used a standard coding scheme of 1- strongly disagree to 5- strongly agree. Participants’ scores were then divided by 25 to calculate the average and reflect participants’ sense of connectedness measure (Jamison & Bolliger, 2020).

**Factorial ANOVA Assumptions**

According to Abbot and McKinney (2012), three important assumptions must be met for a factorial ANOVA. These assumptions include independence, normality, and homogeneity of variance. For the assumption of independence, I assume that each student participant completed their survey independently and was not influenced by another participant. The assumption of normality requires the various independent variable groups must display normally distributed on the dependent variable. The assumption was tested using skewness and kurtosis statistics reflected on a histogram. As shown in Figure 2, the histogram of connectedness has a normal distribution. After descriptive statistics of student connectedness were calculated, scores of -0.024 and .159 indicated appropriate levels of skewness and kurtosis, respectively. Therefore, the assumption of normality was met. Homogeneity of variance is another assumption that must be addressed. This assumption was assessed using Levene’s test. It was determined that for student sense of connectedness, the variances were unequal, $F(11, 325) = 2.07, p = .02$. The result is significant, and therefore the null hypothesis of homogeneity was rejected. These results indicate that one should proceed with caution due to this assumption violation (Abbot & McKinney, 2012; Shavelson, 1996).
Main Effect of Grade-Level, Gender, Race/Ethnicity

ANOVAAs were conducted to determine any statistically significant differences in student grade level, gender, and race/ethnicity on students’ perceived sense of connectedness in a non-traditional setting. Table 12 presents the results of this analysis. There was no statistically significant difference in student connectedness during non-traditional instruction based on grade level, \( F(2, 325) = .088, p = 0.91 \). The observed power for grade level was .06 and practical significance was .00. Regarding gender, there was no statistically significant difference in student connectedness during online instruction between male and female students, \( F(1, 325) = .317, p = 0.57 \). Gender had an observed power of .09 and practical significance of .00. There was, however, a statistically significant difference in student connectedness within the online environment based on race/ethnicity, \( F(1, 325) = 6.256, p = 0.01 \). Furthermore, race/ethnicity had an
observed power of .70 and a statistical significance of .02. My analysis suggests that
grade level and gender is not associated with students perceived connectedness during
online instruction. However, students’ race/ethnicity is associated with their sense of
connectedness in a non-traditional online environment.

Table 12. Factorial ANOVA for Grade, Gender, and Race/Ethnicity on Student Sense of Connectedness

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Observed Power</th>
<th>ηp²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>16.349</td>
<td>11</td>
<td>1.486</td>
<td>2.683</td>
<td>.974</td>
<td>.083</td>
</tr>
<tr>
<td>Intercept</td>
<td>3142.226</td>
<td>1</td>
<td>3142.226</td>
<td>5672.398</td>
<td>1.000</td>
<td>.946</td>
</tr>
<tr>
<td>Grade</td>
<td>.098</td>
<td>2</td>
<td>.049</td>
<td>.088</td>
<td>.063</td>
<td>.001</td>
</tr>
<tr>
<td>Gender</td>
<td>.175</td>
<td>1</td>
<td>.175</td>
<td>.317</td>
<td>.087</td>
<td>.001</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td>3.466</td>
<td>1</td>
<td>3.466</td>
<td>6.256</td>
<td>.703</td>
<td>.019</td>
</tr>
<tr>
<td>Grade*Gender</td>
<td>4.007</td>
<td>2</td>
<td>2.003</td>
<td>3.617</td>
<td>.666</td>
<td>.022</td>
</tr>
<tr>
<td>Grade*Race/Ethnicity</td>
<td>2.362</td>
<td>2</td>
<td>1.181</td>
<td>2.132</td>
<td>.436</td>
<td>.013</td>
</tr>
<tr>
<td>Gender*Race/Ethnicity</td>
<td>2.239</td>
<td>1</td>
<td>2.239</td>
<td>4.041</td>
<td>.518</td>
<td>.012</td>
</tr>
<tr>
<td>Grade<em>Gender</em>Race/Ethnicity</td>
<td>.731</td>
<td>2</td>
<td>.336</td>
<td>.660</td>
<td>.161</td>
<td>.004</td>
</tr>
<tr>
<td>Error</td>
<td>180.034</td>
<td>325</td>
<td>.554</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3639.460</td>
<td>337</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>196.383</td>
<td>336</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R Squared = .083 (Adjusted R Squared = .052)

*p < .05

**Interaction Effects Between Grade-Level, Gender, and Race/Ethnicity**

Factorial ANOVAs were conducted to determine if any interaction effects exist
between student grade level, gender, race/ethnicity, and students’ perceived sense of
connectedness in a non-traditional online learning environment. As shown in Table 12,
there was a statistically significant interaction effect between students’ grade level and
gender on students’ perceived connectedness in the non-traditional learning environment,

\[ F(2, 325) = 3.617, p = 0.03. \]

The observed power was .67 and a practical significance of

.02. Based on the aforementioned results, the null hypothesis, which stated there was no
statistically significant interaction effect between students’ grade level and gender on students’ perceived connectedness is rejected. Accordingly, participants' grade level and gender interact in a way that is associated with students’ sense of connectedness in the online learning environment. Figure 3 shows a vast difference in male and female students' perceived connectedness within grades seven and eight. Female students appear to have a lower sense of connectedness in the 7th grade and increases in the 8th grade. Alternatively, male students have a greater sense of connectedness in the 7th grade, which decreases in the 8th grade.

Figure 3. Interaction Graph of Grade-Level and Gender on Connectedness

![Interaction Graph of Grade-Level and Gender on Connectedness](image)

The results of the factorial ANOVA also indicated that for grade-level and race/ethnicity, there was no statistically significant interaction effect on student sense of connectedness during non-traditional instruction, $F(2, 325) = 2.132, p = 0.12$. The observed power for was .44 with a practical significance of .01. The null hypothesis that no statistically significant interaction effect between students’ grade level and
race/ethnicity on students’ perceived connectedness in the non-traditional learning environment failed to be rejected. In other words, students’ grade level and race/ethnicity are not associated with their perceived sense of connectedness during online instruction.

Furthermore, there was a statistically significant interaction effect between gender and race/ethnicity on students’ perceived connectedness in non-traditional instruction. \( F(1, 325) = 2.239, p = 0.05 \). There was an observed power of .52 and a practical significance of .01. Predicated from these results, the null hypothesis, which stated there was no statistically significant interaction effect between students’ gender and race/ethnicity on students’ perceived connectedness is rejected. Thus, participants’ gender and race/ethnicity are associated with student sense of connectedness in the online setting. Figure 4 shows the interaction effect between students’ gender and race/ethnicity on students’ perceived connectedness graphically. The graph reflects a minimal difference in sense of connectedness for white and non-white female students. There is a large difference, however, in connectedness between white and non-white male participants.
Finally, the results of the factorial ANOVA for perceived sense of connectedness indicated no statistically significant interaction effect among grade level, gender, and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment, $F(2, 325) = .336, p = 0.52$. The observed power was .16 and the practical significance was .00. The null hypothesis which stated that there is no statistically significant interaction effect among grade-level, gender, and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment failed to be rejected. Therefore, student participants’ grade level, gender, and race/ethnicity are associated with their perceived sense of connectedness in the online learning environment.

**Chapter Summary**

I sought to determine if any interaction effects exist between students’ grade level, gender, race/ethnicity, and perceived sense of connectedness in an online learning
setting. I analyzed data using a factorial ANOVA to determine if there were any statistically significant interaction effects between student characteristics and their sense of connectedness in a non-traditional online learning environment. The assumption of independence and normality was met. However, the assumption of homogeneity of variance was not met, and therefore one should proceed with caution in their interpretation of these results and findings. The result of ANOVAs indicated that grade level and gender, independently, is not associated with students perceived connectedness during online instruction. However, students’ race/ethnicity is associated with their sense of connectedness in a non-traditional online environment. Data from the factorial ANOVA found a statistically significant interaction effect for grade level and gender as well as gender and race/ethnicity. The factorial ANOVA also determined that there was no statistically significant interaction effect for grade level and race/ethnicity on perceived sense of connectedness. Furthermore, there was no statistically significant interaction effect between grade level, gender, and race/ethnicity on students’ perceived connectedness in the non-traditional learning environment. The following chapter includes a discussion and implications for future research based on previously discussed analysis and outcomes.
CHAPTER V: DISCUSSION AND IMPLICATIONS OF RESEARCH

I sought to determine if any interaction effects existed between student characteristics (grade-level, gender, and race/ethnicity) and their perceived sense of connectedness in a non-traditional online learning environment. Sense of connectedness is a social construct representing the need of humans to have personal relationships of respect and acceptance, unconditional support, and active engagement. Scholars note that creating a school environment where students believe they are accepted and included is crucial to developing students’ sense of connectedness (Rose & Shevlin, 2017). Due to the coronavirus pandemic, schools across the United States and the world were forced to close in March of 2020. As a result of the unprecedented pandemic, my study was reimagined to reflect students' sense of connectedness during non-traditional online learning. Just as the physical school setting plays an essential role in fostering student connectedness, the online classroom environment plays an equally, if not more, important role in establishing student sense of connectedness.

Summary of the Study

In response to the coronavirus pandemic and state leaders' recommendations, the sampled district began the 2020-2021 school year with non-traditional instruction (NTI). With NTI, teachers and students continued academic instruction through an online communication platform such as Zoom, Google Meet, or Microsoft Teams. Researchers and school leaders are uncertain how effective online learning was and noted that the extensive time out of school would likely impact students (Kuhfeld et al., 2020).
Furthermore, minimal research explores the interaction effect between student characteristics and their perceived sense of connectedness in a non-traditional online learning environment (Borup et al., 2019; Kuhfeld et al., 2020). A study analyzing this topic was necessary to understand students’ feelings of connectedness within non-traditional instruction. Accordingly, my research used an adapted version of the Online Student Connectedness Survey (OSCS) to measure student sense of connectedness (Bolliger & Inan, 2012). The OSCS explores four factors associated with the development of online student connectedness: comfort, community, facilitation, as well as interaction and collaboration (Bolliger & Inan, 2012; Zimmerman & Nimon, 2017). Additional student-level data were also collected, including student grade level, gender, and race/ethnicity. I used a quantitative design of a factorial ANOVA to determine if there were any statistically significant interaction effects between student characteristics and their sense of connectedness in a non-traditional online learning environment.

**Discussion of Findings**

My data analysis revealed that grade level is not associated with students’ perceived connectedness during online instruction. Results of an ANOVA determined that there was no statistically significant difference in student connectedness during non-traditional instruction based on grade level. These results contradict the research of various scholars (Chase et al., 2014; Holas & Huston, 2012; McMillen, 2004; Stevenson, 2006). Witherspoon and Ennett (2011) note that school-level transitions impact student engagement and academic outcomes. They propose that changes in a school environment can be positive, thereby increasing student engagement in academic and extracurricular activities; or negative, leading to a decline in students’ achievement and sense of
connectedness. A potential cause for this difference in research could be that my study solely focused on students in middle school. There was no significant transition in grade-level groups, such as elementary school to middle school or middle school to high school. Therefore, my analysis indicated that grade level does not influence students’ feelings of connectedness during online instruction.

My analysis also suggests that gender does not play a role in students’ perceived sense of connectedness. There was no statistically significant difference in student connectedness during online instruction between male and female students. This conclusion is consistent with researchers Abimbola and Ugbede (2018). They also found no significant difference in male and female students and sense of connectedness. However, this research does not support prior studies that revealed males have a higher sense of connectedness (Lamport & Bartolo, 2012) or studies that proposed that females have a greater sense of connectedness (Carney et al., 2020). Varying research analysis on gender differences have been inconclusive (Ja & Jose, 2017; Neihaus et al., 2012; Tomul & Savasci, 2012). The question remains whether or not gender is a valid factor in assessing student sense of connectedness.

However, students’ race/ethnicity is associated with their perceived sense of connectedness in an online school setting according to the ANOVA results. There was a statistically significant difference in student connectedness within the online environment based on race/ethnicity. My findings determined that White students had a greater sense of connectedness than non-white students. There is a consensus among scholars that relationships and connections within the school setting influence the academic outcomes of minority students (Adekanye et al., 2015; Booker, 2007; Clemens & Lemberger,
Boston and Warren (2017) suggest that African American students, specifically, feel a sense of belonging when schools create a culture of acceptance for all races. Further analysis found that participants' grade level and gender interact in a way that is associated with student sense of connectedness in the online learning environment. Female students appear to have a lower sense of connectedness in the 7th grade and increases in the 8th grade. Alternatively, male students have a greater sense of connectedness in the 7th grade, which decreases in the 8th grade. Factorial ANOVAs determined that students’ grade level and race/ethnicity are not associated with their perceived sense of connectedness during online instruction. However, participants' gender and race/ethnicity have an are associated on student sense of connectedness in the online setting. There is a minimal difference in connectedness between white and non-white female students, but there is a significant difference in connectedness between white and non-white male participants. The analysis also concluded that student participants’ grade level, gender, and race/ethnicity are not associated with their perceived sense of connectedness in the online learning environment. It is interesting to note that gender as a factor by itself was not associated with student sense of connectedness. However, gender along with grade level or gender along with race/ethnicity did have an interaction effect on feelings of connectedness.

Implications for Practice

My analysis suggests that students’ race/ethnicity is associated with their sense of connectedness in the non-traditional online school environment. These findings have implications for classroom and school leaders. Based on my study, non-White male students had the lowest sense of connectedness scores. This result aligns with previous
research that notes that minority students have a lower sense of connectedness than their White peers (Bottiani et al., 2016). Further studies conclude that non-White male students, specifically African American males are more likely to be removed from the classroom, thereby diminishing their feelings of connectedness. Educators in the online classroom setting can enhance student sense of belonging by creating an online classroom environment that honors students’ lived experiences and racial identity. Muhammad (2010) proposes that the curriculum should reflect students’ multifaceted identities. Green (2016) further supports this notion, asserting that the curriculum should affirm students’ race and cultural identities. Moreover, online instructors can increase student sense of connectedness of non-white students by simply being supportive, respectful, and caring. The more positive interactions students have with responsive instructors, the greater their sense of connectedness (Cornell & Shirley, 2011; Konold et al., 2017;).

My analysis revealed that the community subscale had the lowest average of all the subscales. Student participants do not feel that other students in their online class rely on them. Nor do they feel emotionally attached to their peers. These responses reflect a lack of community and relationship during non-traditional instruction. To improve student sense of connectedness in this aspect, online educators should strategically plan activities that allow students to get to know their peers and develop a social presence (Louwrens & Hartnett, 2015). Bolliger and Inan (2012) assert that building supportive relationships among peer groups increases student sense of connectedness. I also found that nearly 60% of student participants reported that their instructor sent frequent course announcements. Also, 60% of student responses noted that instructors utilize small discussion groups during online learning. These interactions and activities by instructors
promote a sense of connectedness within the online learning community (Trespalacios & Uribe-Florez, 2020). These exchanges also initiate meaningful interactions with peers and instructors (Jamison & Bolliger, 2020). These positive interactions between instructors and peers should continue and develop so that student sense of connectedness may be strengthened as well.

The increased implementation of online teaching and learning provides opportunities for policies which promote student sense of connectedness. As educator programs, professional learning communities, and educational consulting groups prepare for the upcoming school year, it would be relevant for them to include strategies for fostering student connectedness in the online learning environment. School leaders and administrators may find it necessary to include elements of student sense of belonging within teacher evaluations during online instruction. The Framework for Remote Teaching (2020) is a tool that can be used by teacher education programs and school administrators to formally assess teachers’ participation of creating online environments of acceptance, support, and engagement. The Framework is an instructional resource that provides a foundation and guidance during in-person and online instruction. Online classroom educators may be encouraged to have virtual morning meetings to build classroom community and sense of connectedness. Another norm for fostering connectedness may involve the instructor sending morning messages to help prepare students for online engagement. Nurturing student connectedness could also include the teacher modeling student-created norms of respect (The Framework, 2020). Such practices and policies allow for the positive development of student sense of connectedness during non-traditional instruction.
**Recommendations for Future Research**

While my research begins to shed light on interaction effects between student characteristics such as grade level, gender, and race/ethnicity and students’ perceived sense of connectedness in a non-traditional online learning environment, there is still a need to continue this research. For example, while my study included student grade-level, I focused on middle school grade levels. Therefore, elementary to middle school and middle school to high school grade levels should be considered when conducting future research. Also, I analyzed student gender concerning sense of connectedness; however, my study did not include students who identify as transgender, non-binary, gender non-conforming, or other gender identities. As the school system develops more inclusive recording tools that better capture gender non-conforming individuals, this topic will need to be revisited. Furthermore, due to the geographical limitation and small sample size in my study, researchers may find it necessary to replicate this study in the future.

Given the novel, disruptive, and deadly nature of the COVID-19 virus, educational researchers will continue to explore the influence of the virus on the provision of students’ mental health, physical well-being, and the education system as a whole. While the consequences for each of the previously mentioned situations is unknown, there is some potential impact on student sense of connectedness. The coronavirus pandemic potentially caused trauma and increased stress levels of students during shelter-in-place mandates (Campbell et al., 2021; Chafouleas & Iovino, 2021). Trauma and stress could lead to a decreased sense of connectedness to the school environment. As schools continue to re-open and students return to school, student safety and well-being is a priority. Formosinho (2021) describes the ‘new normal’ regarding
sanitary policies within schools and classrooms. These newly focused policies include frequent hand washing, diligent cleaning of common spaces, face coverings, and social distancing. The continued social distancing in the classroom may impact students’ feelings of connectedness as their relationships and interactions are limited due to the distance. Sut and Oznacar (2021) note that the corona virus has significantly impacted the education structure as operational activities ceased and academic progress was hindered. They go on to claim that schools will be challenged with managing learning activities, re-engaging students, and re-connecting with students. Future researchers will want to consider the long-term mental, physical, and educational effects caused by the coronavirus pandemic and their association to student sense of connectedness.

Early virtual schools in the United States were run independently by a state government or run by independent organizations based on specified charter law (Taylor & McNair, 2018). Virtual learning began in the mid-1990s and continued to grow in popularity since that time (Barbour & Reeves, 2009; Molnar and Boninger, 2021). Online schools have a greater advantage than traditional, physical schools due to their ability to create holistic school organizations and there are no physical boundaries or restrictions (Taylor & McNair, 2018). During the global coronavirus pandemic, virtual school, or distance learning, became the prevalent method for teaching and learning. Molnar and Boninger (2021) recognize the pros and cons of distance learning; they describe how students struggled with “mixed success- to adjust to the virtual education technologies” (p. 3). Even so, an increasing number of families and organizations have become more attracted to distance learning citing individualized curriculum and increased student achievement. However, researchers Molnar and Boninger (2021) suggests contradicting
outcomes of student success. They also express concern of putting schools’ curriculum programs, student assessments, and identifiable data in a comprisable online environment. Given the growing trend and situational circumstances of the pandemic, the exploration of student connectedness in the distance learning environment will continue to be relevant.

**Conclusion**

I sought to determine if any interaction effects existed between student characteristics (grade-level, gender, and race/ethnicity) and their perceived sense of connectedness in a non-traditional online learning environment. My research used an adapted version of the Online Student Connectedness Survey (OSCS) to measure student sense of connectedness (Bolliger & Inan, 2012). Additional student-level data were also collected, including student grade level, gender, and race/ethnicity. I used a quantitative design of a factorial ANOVA to determine if there were any statistically significant interaction effects between student characteristics and their sense of connectedness in a non-traditional online learning environment. My data analysis indicated that grade level nor gender independently are associated with students perceived connectedness during online instruction. Although, students’ race/ethnicity is associated with their perceived sense of connectedness in an online school setting. It was interesting to note that gender as a factor by itself did not influence student sense of connectedness. However, gender associated with grade level or gender associated with race/ethnicity did have an interaction effect on feelings of connectedness. Implications for future research included a curriculum that supports students’ racial and ethnic identities and more positive peer
and instructor interactions. Finally, there were recommendations based on the limitations of my research.

The development and spread of the coronavirus disrupted businesses, communities, and schools. Students were forced to develop new learning strategies during school closures and state-mandated quarantine while struggling with social isolation and loneliness (Brooks et al., 2020). The last fifteen months in an online educational setting presented students with physical, mental, and social challenges with non-traditional instruction. While this pandemic was unexpected and school leaders were unprepared, educators—teachers, counselors, and educational leaders—must be proactive about protecting our students’ mental well-being. School leaders and classroom instructors must ensure that students have a feeling of connectedness to the school community. Whether in the physical classroom setting or the online learning environment, students must always feel accepted, supported, and engaged within their school community (Boyle et al., 2012; Goodenow, 1993; Goodenow & Grady, 1993; Ma, 2003).

This study is timely, relevant, and significant given the evolving nature of the coronavirus and its impact on school communities worldwide. The Center for Disease Control and Prevention recently provided information on the Delta variant of the coronavirus (2021). The CDC described the Delta variant as currently being the most prevalent strain of the virus in the United States. They went on to say that this variant is twice as contagious as previous variants. With the rise of a COVID-19 variant, that has the potential to be more deadly than its predecessor, school district leaders may be forced to once again close schools and return to non-traditional online instruction. Also, online
education is becoming an increasingly popular trend (Molnar and Boninger, 2021) even without a global pandemic. More and more educators are thinking outside of the traditional school walls. There are virtual classrooms, e-learning sites, and online schools. Encouraging and fostering students’ feelings of connectedness is necessary in order to promote an academically successful and emotionally healthy distanced learning environment.
REFERENCES


98


Relationship of school context in rural youth’s educational achievement and aspirations. *Journal of Youth and Adolescence, 40*(9), 1225-1242.


Louwrens, N., & Hartnett, M (2015). Student and teacher perceptions of online student engagement in an online middle school. *Journal of Open, Flexible and Distance Learning, 19*(1), 27–43.


Stenbom, S., Jansson, M., & Hulkko, A. (2016). Revising the community of inquiry framework for the analysis of one-to-one online learning relationships.


schools against the clear harms associated with prolonged closure. *Archives of Disease in Childhood.*


APPENDIX A: REVISED ONLINE STUDENT CONNECTEDNESS SURVEY (OSCS)

(Bolliger & Inan, 2012)

I have been told about this study and know why it is being done and what I have to do. My parent(s) have agreed to let me be in the study. By answering the survey questions, I agree to participate in the study. If I have any questions, I can ask Professor W. Kyle Ingle and Ms. Nolan. He/ She will answer my questions. If I do not want to be in this study or want to quit after I am already in this study, I can tell the researcher and she will discuss this with my parents.

Please provide the following information.

**Student Information**

What type of instruction are you currently participating in?

- Non-Traditional Instruction (NTI) Remote Learning ______
- In-person Instructions ______
- Hybrid Model (Both NTI and In-Person Instruction) ______

If you are participating in in-person instruction, how long since you began?

- I am still participating in NTI/remote learning ______
- 1-2 months ago ______
- 3-4 months ago ______
- 5-6 months ago ______

Grade: 6th ______ 7th ______ 8th ______

Gender: Male ______ Female ______ Prefer not to say ______ Other ______

Race/ Ethnicity:

- African American ______
- Native American / Alaska Native ______
Asian _______        Hispanic/ Latino _______
Native Hawaiian/ Pacific Islander _______        Two or more races _______
White _______

Please answer each question with a 1, 2, 3, 4, or 5.

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

**Comfort**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I feel comfortable in the online learning environment provided by school.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>I feel my instructors have created a safe online environment in which I can freely express myself.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>I feel comfortable asking other students in my online course for help.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>I feel comfortable expressing my opinions and feelings in my online course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>I feel comfortable introducing myself in my online course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>If I need to, I will ask for help from my classmates.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>I have no difficulties with expressing my thoughts in my online course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>I can effectively communicate in my online course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Facilitation**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td>Instructors promote collaboration between students in my online course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Instructors integrate collaboration tools (e.g. chat rooms, groups, etc.) into online course activities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>My online instructors are responsive to my questions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>I receive frequent feedback from my online instructors.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>My instructors participate in online discussions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>In my online course, instructors promote interaction between learners.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Community

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>15.</td>
<td>I have gotten to know some of the faculty member and classmates well.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16.</td>
<td>I feel emotionally attached to other students in my online course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>I can easily make acquaintances in my online course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>I spend a lot of time online with my online course peers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>My peers have gotten to know me quite well in my online course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>I feel that students in my online course depend on me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Interaction and Collaboration

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>21.</td>
<td>I work with others in my online course.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>22.</td>
<td>I relate my work to others’ work in my online course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>I share information with other students in my online course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>I discuss my ideas with other students in my online course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>I collaborate with other students in my online course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>What activities do your instructors use during non-traditional instruction? Check all that apply.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Send frequent course announcements (e.g., daily)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Use icebreakers (e.g., introductions)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Use discussion forums</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Break students into smaller discussion groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Assign discussion leaders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Require group activities (e.g., weekly activities)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Require collaborative group projects (e.g., major writing assignments)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Require students to share resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Incorporate chat sessions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provide online office hours</td>
<td></td>
<td>Use social media (e.g., Twitter, Facebook)</td>
<td></td>
<td>Other</td>
</tr>
<tr>
<td>---</td>
<td>----------------------------</td>
<td>---</td>
<td>------------------------------------------</td>
<td>---</td>
<td>-------</td>
</tr>
<tr>
<td>27.</td>
<td>What other concerns do you have with non-traditional instruction?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dear Parents and Guardians,

My name is Kendra Nolan, and I am a middle school math teacher in Kentucky. I am also a doctoral student at the University of Louisville. I am a student investigator, working under the supervision of W. Kyle Ingle. I am writing to invite your child to participate in a research study on students’ perceived sense of connectedness (accepted, supported, engaged) within an online learning environment. The purpose of this research study is to gain information about the relationship between student characteristics and their sense of connectedness during non-traditional instruction (NTI).

Participants in this study will complete a 31-question, online survey via Survey Monkey. The survey will take approximately 25-35 minutes. This is completely voluntary so you can choose to have your child participate in the study or not. If you would like your child to participate in this study, please review the consent document, then the assent document with your child. After you have reviewed the consent and assent documents, please share the link in this email with your child. By sharing the link with your child, you are granting consent for him/her to complete the Online Student Connectedness Survey.

If you have any questions about the research study, please contact W. Kyle Ingle via email at william.ingle@louisville.edu or by phone at 502-852-6097. If you have questions, complaints, or concerns or believe you may have developed an issue related to this research, contact me at kendra.nolan@louisville.edu.

Respectfully,

Kendra M. Nolan
CURRICULUM VITA

Kendra M. Nolan, Ed.D.
8100 Arbor Meadow Way
Louisville, KY 40228
Home 317-361-3668
Work 502-776-5236

SUMMARY
Dedicated teacher, leader, and mentor with exceptional communication and interpersonal skills. Utilizes research-based classroom management strategies and educational leadership strategies as well as data-driven instructional methods while still focusing on the specific needs of each scholar.

EDUCATION
UNIVERSITY OF LOUISVILLE, Louisville, KY
Ed.D. Educational Leadership and Organizational Development August 2021

UNIVERSITY OF LOUISVILLE, Louisville, KY
Master of Arts in Teaching May 2014; GPA 3.4/4.0

UNIVERSITY OF KENTUCKY, Lexington, KY
Master of Business Administration May 2011; GPA 3.6/4.0

FISK UNIVERSITY, Nashville, TN
Bachelor of Science in Business Administration May 2010; GPA 3.6/4.0

UNIVERSITY OF GHANA, Accra, Ghana
Study Abroad- African Studies

PROFESSIONAL EXPERIENCE
12/2017 – present
WEST END SCHOOL
*Middle School Math Teacher*
Create and present engaging and interactive math lessons based on Kentucky Common Core Standards. Establish collaborative community partnerships for mentoring programs. Plan and organize team meetings, class fundraisers, and whole-school activities.

08/2011 – 12/2017
RAMSEY MIDDLE SCHOOL
7th Grade Math Teacher
Conduct small group and individual lessons and activities based on differentiated learning needs. Organize and analyze formative and summative assessment data to improve instruction. Develop and maintain relationships with students and parents to ensure student achievement.

LEADERSHIP EXPERIENCE
02/2021 – present DECODE PROJECT, INC BOARD OF DIRECTORS
Board Chair
Ensures that the board develops an annual strategic plan and works with board members to achieve shared goals.
11/2018 – 07/2021 Treasurer
Assist in preparation and presentation of financial statements, annual budget, and fiscal policies.

11/2016 – 12/2017 INSTRUCTIONAL LEADERSHIP TEAM
Mathematics Department Chair
Collaborate vertically and horizontally with staff and administration to enhance curriculum and achievement.

01/2016 – 10/2017 RAMSEY BLACK HISTORY MONTH PRODUCTION
Producer and Director
Design and coordinate the annual school-wide presentation of African American history.

09/2013 – 10/2017 MATH PROFESSIONAL LEARNING COMMUNITY
7th Grade PLC Lead
Create common learning targets, pacing schedules, and formative assessments for lesson planning purposes.

09/2012 – 10/2017 LADIES GROUP OF RAMSEY
Afterschool Club Sponsor
Mentor ladies, 6th-8th grade, in areas of personal relationships, character building, and leadership skills.

REFERENCES Available upon request.