IMPACT OF INTERNET CONNECTION ON GIFTED STUDENTS' PERCEPTIONS OF COURSE QUALITY AT AN ONLINE HIGH SCHOOL

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DEDICATION

This dissertation is dedicated to my family and students. First and foremost, to my husband and best friend, David. You've encouraged and supported me along this journey. I appreciate your words of encouragement and the extra household chores you took on to give me the space, both physically and mentally, to complete this dissertation. Your love is the thing that keeps me grounded and warm every day. To my children, Cassidy, Dakota, and Dalton, who have taught me more about life than any degree or title ever will. To my dad, I miss you every single day. You always believed in me and the saddest part of finishing this journey is not being able to call and tell you your little girl did it. To my mom who never gives up regardless of the hardship. You taught me to persevere and keep pushing until the job was done. And to the students that I have worked with throughout my career. You are never too old to learn and I hope that you will approach your entire life with that same zest for knowledge that you showed me every day in our classroom.

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One of the earliest childhood dreams I have is that of being a doctor. I started on that path when I was just a teenager by volunteering as a candy striper at Scottish Rite Children's Hospital in Atlanta. I passed out on the first week when I saw blood being drawn from a child. I remember thinking then that my dream was crushed. That all changed when Boise State University announced they were offering an EdD in Educational Technology. I knew then that this was my path to fulfilling that childhood dream and making a difference in the lives of children at the same time.

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ABSTRACT

Online learning is on the rise in K-12 education and, with the lockdowns and social distancing measures implemented as a result of COVID-19, has gained increased prominence. While the demand for online learning is on the rise, many U.S. students lack adequate Internet connectivity to have a successful online learning experience. Connectivity issues, particularly when they impact audio, can cause students to tune out or even drop out of online learning. This is problematic for online schools and course providers who often have no control over the speed of a student's home Internet connection. Online schools also have to balance student perceptions, which have been linked to their achievement. This mixed methods study examines the role of Internet connectivity on the perceptions of highly gifted students on the quality of their fully online English course on six domains: (a) appeal, (b) challenge, (c) choice, (d) meaningfulness, (e) self-efficacy, and (f) communication. In this study, highly gifted students who attended an online public school (N=19) that utilizes synchronous and asynchronous learning methods reported their perceptions on the six domains of online course quality and also their Internet downloads speed, which were used to divide them into two groups - low and high Internet download speeds. The results of the quantitative survey, a modified version of the Student Perceptions of Classroom Quality (Gentry & Owen, 2004; Gentry & Springer, 2002), were then analyzed based on the two independent groups. No statistically significant difference was found in student perceptions on any of the six domains based on the participant's Internet download speed.

This finding may be limited based on the small sample size available for data analysis in this study. Focus groups supported the findings of the statistical analysis. A total of 12 themes emerged from the focus groups to help explain the students' perceptions of their online courses. An additional two themes were identified as common technical issues caused by Internet connectivity in online learning and three themes related to troubleshooting technical issues. This study contributes knowledge to the fields of online education, gifted education, impact of student perceptions, and transactional distance in online learning.

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CHAPTER ONE: INTRODUCTION

Online learning is becoming ubiquitous in the field of K-12 education (Moore, 2019). The National Center for Education Statistics (2012) reported that over half of all public high schools had students taking online courses in 2010. By 2015-16, 58.9% of all public schools offered one or more fully online courses (National Center for Education Statistics, 2016). This includes 81.9% of primary schools, 78.3% of middle schools, and 53.8% of secondary schools, indicating that online learning is impacting all levels of K-12 education.

Not only is online learning on the rise, but it is also gaining respect as a mainstream educational option for K-12 students. This is evidenced by colleges and universities designing recruiting programs specifically aimed at recruiting online high school students to their campuses. Over half of all colleges and universities report specifically targeting online high school students in their recruitment efforts (Jaschik & Lederman, 2018). In 2016, 31% of all undergraduate students were taking at least one online course, making colleges value secondary students with online experience (Lederman, 2018). The percentage of undergraduate students taking online classes has been rising about 2% each year since 2012 (Lederman, 2018).

With the increased presence and continued growth in online learning, there is value in understanding how technology may help explain online students' perceptions of course quality. Studies have shown that the technical experience is the primary determinant of students' online classroom experience (Li et al., 2010). For example,

students have so little tolerance for technology issues that audio issues in online classes can actually discourage students from participating fully in synchronous online learning (Li et al., 2010). This understanding is important for the range of blended to online models, which includes everything from students using online learning resources to supplement traditional instruction in a brick and mortar school to fully online education where students access online curriculum and instruction from a remote location not under the control or supervision of the school (Graham, 2013). At the fully online end of the blended-online continuum, the online school or course provider has limited or no control over the type and speed of Internet connection that a student is using to access their online course(s).

Context of the Study

The researcher identified the online campus of a public school for highly gifted students that opened in the fall of 2017 as a suitable site for this study. This study took place from March to May of 2020. At the time of the study, there were 46 students from 21 different states enrolled in the online campus, which operates as a free public school for students eligible for public education in the southwestern state where the school has a physical presence. The population at the time of this study was 29 boys and 17 girls in the school with an average age of 14.4 years (range is 11-18).

All core classes (English, mathematics, science, and social studies) and world languages at the school have two scheduled live sessions per week. The live sessions are mandatory synchronous sessions that last ninety minutes each. The instructor and students use Zoom video conferencing for the live sessions. All participants are required to have audio and video enabled throughout the live session. The goal of the live sessions

is to foster conversation among the participants about the course materials. The emphasis of live sessions is on rich discourse and collaboration between the different stakeholders and not on direct instruction. Most students access their live sessions from a location in their home. At no time do any of the students go to the school for instruction. In addition to the live sessions, students access asynchronous materials through a learning management system, Blackboard, daily.

Statement of the Problem

With growth in online education comes the need for more research in the field (Barbour, 2019; Corry & Stella, 2012; Rice, 2006). Empirical research is specifically lacking in K-12 online gifted education (Corry & Stella, 2012; Housand & Housand, 2012; Picciano et al., 2010) and in regards to the role that technology plays in online learning (KewalRamani et al., 2018). Despite the lack of research in the field, technology is becoming more prevalent in gifted education (Chen et al., 2013).

Knowing that the technical experience is a primary determinant of students' online classroom experience (Li et al., 2010), that online learning is on the rise in K-12 education (National Center for Education Statistics, 2016), and that schools often have limited or no control over the type of Internet connection used by online students (KewalRamani et al., 2018) formed the basis for this research. The researcher hopes this study is a resource to K-12 online course providers and schools who want to understand how an independent variable, speed of Internet connection, over which they have limited or no control, relates to gifted students’ perceptions of their online courses in English.

Theoretical Framework

The study of student perceptions was first seen in educational research in 1879 in

Leipzig, Germany (Schunk & Meece, 1992). Despite this early start to studying perceptions, student perceptions were scantly referenced directly until 1986 when they first appeared in the third edition of Wittrock's *Handbook of Research on Teaching* (Schunk & Meece, 1992). Before this time, researchers often looked at perceptions in the form of measures of individual differences or affective responses (Schunk & Meece, 1992). Schunk and Meece define student perceptions as "thoughts, beliefs, and feelings about … situations and events" (p. xi). They note that perceptions are complex processes influenced by a number of factors. Additionally, student "success and achievement have been tied to their perceptions about school" (Horak & Galluzzo, 2017, p. 33), thus, studying and understanding student perceptions has the potential to help educators provide students with increased opportunities for success and potentially improve their achievement.

Despite the acceptance of perceptions as a valid construct, there are numerous ways to define, assess, and report on student perceptions. A search in WorldCat using the terms "K-12, student perceptions, education" returns over 45,000 peer-reviewed articles with 36% of the articles published after 2015 and over 3,500 articles in 2019. With this diverse body of research, there is a wide range of frameworks being used to understand student perceptions.

One framework that is applicable to this study is the Student Perceptions of Classroom Quality (SPOCQ) by Gentry and Owen (2004). The SPOCQ is a survey that is designed to measure gifted students' perceptions of classroom quality on five constructs. Through the use of an online survey, the researcher will measure gifted student's perceptions on six constructs: (a) appeal, (b) challenge, (c) choice, (d) meaningfulness,

(e) academic self-efficacy, and (f) communication. Gentry and Owen (2004) identified the first five of these constructs in the SPOCQ as being central to the learning experience of gifted students. The sixth construct, communication, is added for this study and supported by Moore's (1993) theory of transactional distance.

The appeal dimension seeks to understand student perceptions related to general interest and enjoyment in their courses (Gentry & Owen, 2004). Engaging learning experiences are essential for gifted students (Csikszentmihalyi et al., 1993; Renzulli, 1994). Ensuring that gifted students are excited and joyful about their learning has been identified as a best practice in gifted education (Gallagher & Gallagher, 1994). Part of the joy of learning for gifted students comes from a place a curiosity about the unknown (Gentry & Springer, 2002). Enjoyment and interest are pivotal for gifted students as they lead to increased motivation in learning (Gallagher & Gallagher, 1994). Gifted students who are not motivated are more likely to underachieve (Marland, 1972). Courses that are appealing positively engage students and use instructional methods and learning activities that are reflective of their preferences.

Gentry & Owen describe challenge as "rigor, depth, and complexity" (2004, p. 21). Gifted students need an appropriate level of challenge that encourages them to strive for more knowledge, but are not so challenging that students are discouraged. Vygotsky (1962) called this the zone of proximal development. In this zone, the learning tasks should be just above the abilities of the students to encourage intellectual development. Gallagher and Gallagher (1994) identified course material that is appropriately challenging as a necessary best practice in educating gifted students. Appropriately challenging course content, similar to appealing course context, is a motivator for gifted

students (Gentry & Springer, 2002). Challenge is internal for each student and is positively associated with perceptions that encourage students to actively participate in their learning (Pintrich & Schrauben, 1992). Gifted students need an appropriate level of challenge in their courses (Biggs, 2019).

The choice dimension measures student perceptions about their ability to make decisions about their learning (Gentry & Owen, 2004). For over 100 years, student choice has been shown to be a motivational tool that encourages learning (Bloom, 1985; Dewey, 1916; Gardner, 1991; Goodlad, 1984). Providing opportunities for students to have input and choice in their learning provides intrinsic motivation for them to continue to learn and helps to deepen their level of engagement (Matsuko & Thomas, 2014). For gifted students, "talent development, self-expression, and creativity" are rooted in choice (Grant, 2002, p. 12). Students who perceive that they have meaningful choices in their education take a greater sense of ownership and feel more involved in their own education (Gentry & Owen, 2004).

Course content that is meaningful is perceived as being important and worth caring about by students (Gentry & Owen, 2004). "Meaningfulness refers to the degree to which an individual learner finds value in a task and is therefore motivated to engage in or accomplish it" (Little, 2012, p. 700). Like the appeal construct, meaningfulness can include elements of interest and enjoyment, but it goes farther as it implies that students have "a deeper sense of value" in the learning activities (Little, 2012, p. 700). When course content is meaningful, students care about what they are learning and can understand how their new knowledge contributes to their development and understanding of the world. Meaningful content is perceived by students as being relevant to their lives

(Gentry & Owen, 2004). Content that is meaningful helps students with personal, not just academic, growth (Little, 2012). Students learn best when the course content is meaningful and relevant (Bransford et al., 1990). Teachers who integrate real-life connections and applications into their teaching help to increase the level of meaningfulness that students perceive in their learning (Gentry et al., 2011). Student-centered choices also help to increase the level of meaningfulness to students (Gentry et al., 2011). Meaningful content helps learners connect their prior knowledge and experience to what they are currently learning to develop a new understanding (Piaget, 1970).

Academic self-efficacy measures "students' perceived confidence in performing important classroom learning behaviors" (Gentry & Owen, 2004, p. 21). Self-efficacy is a person's belief in their ability to do well on a specific task (Robinson Kurpius et al., 2009). Self-efficacy is domain specific and can vary across domains for individual students (e.g. academic self-efficacy, musical self-efficacy, career self-efficacy) (Robinson Kurpius et al., 2009). A student's level of self-efficacy can be a predictor of their ability to complete a task (Bandura, 1986). Self-efficacy, particularly for girls, can wane as students grow older (Robinson Kurpius et al., 2009). Self-efficacy, especially for gifted students, is important as "high self-efficacy is likely to promote stronger academic performances" (Pajares, 1996, p. 325). Academic self-efficacy is more than just scoring well on assessments as it also includes confidence in completing learning tasks. Student perceptions about their academic self-efficacy is an important predictor of their belief in what they can accomplish (Pajares, 1996).

In addition to the five constructs previously discussed, communication was added

to the SPOCQ as the sixth construct from which to measure student perceptions. Adding communication as a variable to frame student perceptions of online courses is supported by Moore's (1993, 2019) theory of transactional distance, which posits that transactional distance is not a fixed quantity but a variable. "The 'transaction' in distance education is the interplay of the behaviors of teachers and learners in environments in which they are in separate places and have to communicate through a technology" (Moore, 2019, p. 33). Transactional distance can be reduced through effective and frequent dialogue between the instructor and students, especially in high dialogic mediums such as synchronous video conferencing (Moore, 2019). Transactional distance in online courses is another area in which there has been a call for new empirical research (Moore, 2019).

Adding communication as a dimension from which to study gifted online student's perceptions of their course quality is also supported by other research. One of the distinct advantages of online learning for gifted students is the ability for them to interact and communicate with their academic peers (Adams & Cross, 1999; Mann, 1994). This is important in light of the unique social and emotional needs of gifted students (Housand & Housand, 2012). The need to communicate with students through the use of technology complicates the role of the online instructor (Wengrowicz & Offir, 2013). Communication media could impact student perceptions of the synchronous and asynchronous opportunities for interaction in online courses. Highly interactive online courses can minimize the feeling of separation (Moore, 1993). Finally, this additional construct is supported by research that identifies communicating and interacting with intellectual, same-age peers is a benefit of online learning for gifted students (Adams & Cross, 1999; Housand & Housand, 2012; Mann, 1994; Ng & Nicholas, 2007).

Purpose of Study

The purpose of this study was to examine the role of Internet connectivity on the perceptions of highly gifted students on the quality of their fully online English course on six domains: (a) appeal, (b) challenge, (c) choice, (d) meaningfulness, (e) self-efficacy, and (f) communication. This two-phase mixed methods study followed an explanatory sequential design where the quantitative data collection took place first and qualitative focus groups were used to further explain the quantitative data and better understand the problem under study. In the quantitative phase of the study, a modified version of the Student Perceptions of Classroom Quality (SPOCQ) survey was administered to fully online students who attend the online campus of a public school for highly gifted students to better understand the relationship between Internet speeds and their perceptions of course quality on the six domains. The qualitative phase, focus groups with three participants from each of the high and low Internet download speed groups, were conducted as a follow-up to the quantitative results. The goal of the exploratory follow-up was to help explain the participants' perceptions more fully and to better understand how students reacted and adapted to any Internet connectivity issues.

Overview of Research Methods

Previous research has established a correlation between student perceptions and achievement (Crawford et al., 1998; Horak & Galluzzo, 2017; Ramsden & Entwistle, 1981). Moreover, research has shown a relationship between technology and a student's online classroom experience (Li et al., 2010). In this study, the researcher connected student perceptions and technology to see if, and if so how, technology factors outside the control of online course providers and schools, specifically the speed of Internet

connection, helps to explain gifted students' perceptions of their fully online courses. The researcher explored the connection between Internet connectivity, as measured by download speed, and student's perceptions of online courses by using both quantitative and qualitative research.

The use of mixed method research has been on the rise for the past 25 years (Archibald et al., 2015). Mixed methods research is a methodology that combines the salient features of quantitative and qualitative research approaches "for the broad purposes of breadth and depth of understanding" (Johnson et al., 2007). Qualitative research begins with the basic understanding that an interpretive lens can help inform a study in which individuals or groups of individuals "ascribe to a social or human problem" (Creswell, 2013, p. 44). Quantitative research is used to help researchers understand how one attribute or variable explains another (Creswell, 2014). By combining these two methods in this study, the researcher was able to better understand and explain the problem under study from a statistical and human interpretive lens.

Tashakkori and Teddlie (2010, 2012) define several defining features of mixed methods research. First, mixed methods research has methodological eclecticism in which the researcher is able to select the appropriate techniques from quantitative and qualitative methodologies to complete their research. The second characteristic, paradigm pluralism, is the understanding that a variety of paradigms or frameworks are suitable for mixed methods and not the specific domain of quantitative or qualitative research. Third, mixed methods gives the researcher the opportunity to use an iterative, cyclical approach to research. The fourth feature of mixed methods research is the agreement among researchers that there is a basic set of research designs and analytical processes, such as

parallel or sequential designs. Fifth, mixed methods research focuses on the research questions in determining the methods employed within any given study. Sixth, mixed methods research emphasizes a continua of research methods rather than a dichotomy. The seventh characteristic of mixed methods research is an emphasis on diversity at all levels of the research enterprise. The tendency of mixed methods research toward balance and compromise is its eighth defining feature. Lastly, mixed methods research relies on visual representations and a common notational system (e.g. QUAN + qual, QUAL + quan, QUAN + QUAL) as a means to describe the salient features and emphasis of the methodology selected for specific studies.

Selecting a mixed methods approach was appropriate as the researcher sought to understand how one variable (technology) may explain another (perceptions) from a statistical and interpretative lens. Using the QUAN + qual methodology allowed for broader understanding of the research problem. Qualitative data was collected to help the researcher better explain the results of the quantitative survey, which was the primary data collection point. Combining statistical methods with a focus groups that reports on the lived experiences of the subjects in the study creates a broader understanding of the problem under study and increases validity (Johnson et al., 2007).

With the deliberate integration of quantitative and qualitative aspects where the qualitative data was used to better understand the quantitative data, the researcher adopted an explanatory sequential designed study (Creswell & Plano Clark, 2006, 2011, 2018). The specific benefits of this design for this study include improved design of the overall study and the ability for increased data collection over a shorter period of time (Creswell & Plano Clark, 2011).

Research Questions

As an explanatory sequential design mixed methods study, this research was guided by three primary questions - one for each phase of the research. The quantitative data collection was used to answer Q1. Q2 is the mixed methods question as the answer to Q2 helps to better understand the results from Q1. Q3 with sub-questions Q3a and Q3b are specific to the qualitative phase of the research.

Q1. Is there a significant difference in the perceptions of fully online, gifted students' on the quality of their online English course as measured by a modified version of the SPOCQ between students with high and low Internet download speeds?

Q2. In what ways does data from focus groups comprised of fully online, gifted students with high and low Internet download speeds help explain the results of the quantitative survey related to their perceptions of the quality of their English course as measured on modified SPOCQ constructs?

Q3. What themes emerge from focus group interviews with fully online, gifted students about their perceptions of the quality of their English course?

a. How do the participants perceive the quality of their English course by the constructs in the modified SPOCQ?

b. How do participants discuss the connectivity issues they may have encountered?

Sample

The study took place at an online campus of a public school for highly gifted students that opened in the fall of 2017. There were 46 students from 21 different states enrolled at the time of the study. The online campus operates as a free public school for students residing in the southwestern state where it has a physical presence. Students residing outside of the home state must pay out-of-district tuition that is capped at $15,000 per year.

There were 29 boys and 17 girls in the school population with an average age of 14.4 years (range is 11-18). Of the 46 students, 40 were full-time students taking a full course load, which typically includes English, social studies, mathematics, science, and at least one elective course. Four students were taking a single English course and two students were taking a single mathematics course.

All core classes (English, mathematics, science, history) and world languages have two scheduled live sessions per week. The live sessions are mandatory synchronous sessions that last ninety minutes each. The instructor and students use Zoom video conferencing for the live sessions. All participants are required to have audio and video enabled throughout the live session. The goal of the live sessions is to foster conversation among the participants about the course materials. The emphasis is on rich discourse and collaboration between the different stakeholders and not on direct instruction.

Data Collection and Analysis

Data collection took place from March to May 2020. Quantitative data collection took place using an online survey administered through Google Forms. Questions related to the dependent variables (perceptions) were presented in a grid format to decrease the

visual length of the survey and improve simplicity and clarity for respondents (Ruel et al., 2016). A 5-point Likert scale was used where 1 was strongly disagree and 5 was strongly agree. Additionally, respondents were given the option of selecting "Unsure or Not Applicable." This option prevented respondents from being forced to answer a question for which they were not confident about their response. One open ended question was included on the survey to allow participants to leave any comments or explanations for the researcher. Respondents self-reported their Internet download speed by running multiple speed tests under different conditions. Speed tests were conducted using Speedtest (www.speedtest.net).

Qualitative data was collected after the quantitative data had been collected and analyzed. This allowed the researcher to use maximum variation sampling to identify participants from low and high Internet speed groups to invite to participate in focus groups where they were asked to discuss how their Internet download speed impacted their perceptions. Qualitative data was collected using focus groups with open-ended questions. Distinct focus groups were held for participants with low and high Internet download speeds.

Scholarly Significance

Online learning is a common feature in the United States educational landscape (Moore, 2019). This study was necessary as online schools and course providers often have no control over the Internet speed that students use to access their online courses, which may impact the student's perception of their experience in the course. Understanding how this independent variable (Internet speed) influences student perceptions enables course designers and online course providers to make adjustments to

improve the student learning experience. With this research, the author is contributing knowledge to the field of online gifted education, a subset of the field of technology in gifted education, which is a field currently lacking research (Housand & Housand, 2012; Periathiruvadi & Rinn, 2012). Specifically, through this study the researcher addresses research needs identified by the enable, enhance, and transform framework (Chen et al, 2013).

Assumptions

Assumptions of this study included (a) students responded honestly to the quantitative data survey, (b) students understood the questions in the quantitative data survey, (c) the survey questions accurately captured the students' perceptions of course quality, (d) students accurately reported their Internet speed, (e) the Internet speed was relatively consistent over the course of the academic year as students were asked to report on their perceptions of the course to date, (f) there was enough variation in the speed of the participant's Internet connections to form high and low speed focus groups, (g) students responded openly during the focus groups, (h) the questions asked during the focus groups were unbiased and sought to gain a deep understanding of the students lived experience, (i) there was pedagogical consistency across the various English courses, and (j) the data was accurately interpreted and presented to explain the experience of the research participants.

Delimitations

This study took place in public school for highly gifted students with an online campus for students residing anywhere in the United States. The researcher chose this delimitation because of her interest in the intersection of digital learning and gifted

education. The researcher is an educator and administrator in K-12 public education and chose a research site that aligns with her experience and expertise.

To control for variations in online courses, course perceptions were specifically studied in a single content area - English. This allowed the researcher to control for variations in perceptions across multiple content areas and over a controllable number of course instructors. These delimitations focused the study and controlled for some variations, but may be viewed as limitations by readers looking to use the findings and conclusions in contexts beyond online, gifted, and/or English education.

Definition of Terms

Definitions of terms essential to this study are provided to add clarity to the reader. Definitions that do not include a citation are defined by the author.

Appeal - general interest and enjoyment in courses; a concept that is central to the learning experience of gifted students (Gentry & Owen, 2004).

Asynchronous communication - communication with gaps in time between transactions (Allen et al., 2019).

Challenge - the level of rigor in a course; a concept that is central to the learning experience of gifted students (Gentry & Owen, 2004).

Choice - ability for students to make decisions about their learning; a concept that is central to the learning experience of gifted students (Gentry & Owen, 2004).

Communication - synchronous (live, real-time) and asynchronous (e.g. discussion boards, Teams) opportunities for interaction.

Dialogue - a constructive interpersonal interaction (Moore, 2019).

Distance education - “institution-based, formal education where the learning group is separated, and where interactive telecommunications systems are used to connect learners, resources, and instructors” (Schlosser & Simonson, 2002, p. 1).

Digital learning - “any instructional practice that effectively uses technology to strengthen a student's learning experience and encompasses a wide spectrum of tools and practices” (Every Student Succeeds Act, 2015, p. 1969).

Fully online - a program of distance education where the learners and instructors only interact through electronic communication media and never share a geographic space; interaction can be synchronous and/or asynchronous.

Highly gifted - those with IQs at least three standard deviations above the norm as measured on individually administered and nationally normed measures of intelligence (Gross, 2000).

Internet access - households with a subscription service that allows regular connectivity to the Internet (KewalRamani et al., 2018).

Meaningful - content that is seen as being relevant to students’ lives; a concept that is central to the learning experience of gifted students (Gentry & Owen, 2004).

Online learning - learning that happens as a result of a program of distance education.

Perception - a way something is understood or interpreted (Lexico, n.d.).

Self-efficacy - ability for students to perform well on assessments and their confidence in completing learning tasks; a concept that is central to the learning experience of gifted students (Gentry & Owen, 2004).

Synchronous communication - communication that happens in real time (Allen et al., 2019).

Transaction - "the interplay of the behaviors of teachers and learners in environments in which they are in separate places and have to communicate through a technology" (Moore, 2019, p. 33).

Summary and Overview of Remaining Chapters

The author designed this study to help provide insight to practitioners and researchers on the impact of Internet connectivity and student's perceptions of online course quality. The next chapter focuses on a review of the relevant literature, including models of online learning, history of gifted education, technology in gifted education, U.S. Internet connectivity, and student perceptions. Chapter three details the research methods, including the quantitative research collection tool, qualitative focus group questions, and data analysis tools. Chapter four discusses the results of the data collection. Chapter five concludes this study with a discussion of the findings, implications for practice, and suggestions for future research.

CHAPTER TWO: REVIEW OF THE LITERATURE

Online learning is a common fixture in K-12 education (Moore, 2019). Technology, including online learning, is prevalent in K-12 gifted education (Chen et al., 2013). Student perceptions are linked to their achievement (Crawford et al., 1998; Horak & Galluzzo, 2017; Ramsden & Entwistle, 1981). This study combines these three knowns and addresses an unknown by seeking to answer three research questions:

Q1. Is there a significant difference in the perceptions of fully online, gifted students' on the quality of their online English course as measured by a modified version of the SPOCQ between students with high and low Internet download speeds?

Q2. In what ways does data from focus groups comprised of fully online, gifted students with high and low Internet download speeds help explain the results of the quantitative survey related to their perceptions of the quality of their English course as measured on modified SPOCQ constructs?

Q3. What themes emerge from focus group interviews with fully online, gifted students about their perceptions of the quality of their English course?

   a. How do the participants perceive the quality of their English course by the constructs in the modified SPOCQ?

b. How do participants discuss the connectivity issues they may have encountered?

The literature review that follows covers salient research on models of online learning, history of gifted education, technology in gifted education, U.S. Internet connectivity, and student perceptions. This literature is foundational to understanding the problem that this study seeks to addresses.

Online Learning

The first K-12 fully online learning program in the United States started with a private school for gifted students in 1991 (Barbour, 2011). Within twenty years, online learning was taking place at the K-12 level in almost all 50 states (Watson et al., 2011). During the 2016-17 school year there were between two and eight million K-12 students taking online courses in the United States (Barbour, 2019).

Classifying Online Learning

Online learning is a subset of digital learning, which includes "any instructional practice that effectively uses technology to strengthen a student's learning experience and encompasses a wide spectrum of tools and practices" (Every Student Succeeds Act, 2015, p. 1969). K-12 online learning in the United States is constantly evolving (Clark, 2013), which makes defining it into specific categories difficult (Barbour, 2019). While digital learning can be viewed on a continuum with blended learning, where students are using elements of online instruction in a traditional classroom, on one end to fully online learning, where students may never interact with the instructor in person, on the other end (Horn & Staker, 2014), it is difficult to find the exact moment where blended learning morphs into online learning. Virtual schooling has been used to describe the scenario

where students take one or more online courses in a supplemental manner and the term "cyber school" has been used when students engage in fully online learning with minimal or no access to a physical school building, in-person instructors, or instruction (Barbour, 2019). However, neither of these terms helps to fully classify or distinguish the various models of online learning.

Rather than classify online learning in terms of the percentage of time spent online versus in person, Watson et al. (2009) posit that K-12 online learning is best viewed as a matrix of nine dimensions. Each of the dimensions can be viewed on a sliding scale where institutions have the ability to alter the dimensions to create the optimal online learning experience for their unique case. The nine dimensions include (a) comprehensiveness, (b) type, (c) location, (d) delivery, (e) operational control, (f) type of instruction, (g) grade level, (h) teacher-student interaction, and (i) student-student interaction. Comprehensiveness addresses the scale of the online program and includes district-level on one end and global at the other. Type refers to the formal structure of the program (e.g. district, charter, private, contract). Location is where the actual online learning takes place, such as a physical school, a home, or some other location. Delivery is a continuum ranging from asynchronous to synchronous delivery of course materials and instruction. Operational control refers to the governing body of the online program and includes a variety of different options including local school boards, consortiums, regional authorities, universities, state governments, and independent, often for-profit, vendors. Type of instruction refers to the degree to which the instruction takes place online versus face-to-face. Teacher-student and student-student interaction both range from low to high.

Student Success in Online Learning

Innovation and adoption of online learning had its genesis at the college level where, in 2008, 25% of college and university students were enrolled in at least one fully online course (Picciano et al., 2010). By 2016, over 32% of college students were taking at least one online course (Clinefelter et al., 2019) and 72% of all U.S. public colleges and universities were offering fully online programs (Xu & Xu, 2019). Online learning is also on the rise in K-12 education where it has grown from "an experiment to a movement" (Schroeder, 2019). In 2019, over 2.7 million K-12 students were taking part in some form of digital learning, including full-time online public schools (Schroeder, 2019). This rise means that younger students are increasingly accessing online learning. While motivation has been shown to be a factor for success in online learning (Housand & Housand, 2012; Ng & Nicholas, 2007), there are also a variety of other success factors that are important, especially for younger students.

Roblyer and Marshall (2003) and Roblyer et al. (2008) identified four factors that contribute to student success in online learning. The first factor, achievement beliefs, refers to the degree to which the student feels in control of their own success. The second factor, responsibility and risk-taking, is also supported by Loomis (2000), who defines responsibility as the degree to which the student accepts ownership of their learning. Responsibility is a determining factor in motivation and time management (Loomis, 2000). Risk-taking refers to the degree to which the student is willing to engage in academic challenges (Roblyer et al., 2008). The third factor, organization and self-regulation is also supported by Waschull (2005) and Whipp and Chiarelli (2004). Waschull (2005) aligns self-regulation with self-discipline and posits that it is one of the

most important predictive factors for student success in online learning. Careful time management, goal setting, and using planners are all examples of organization (Whipp & Chiarelli, 2004). Autonomy and responsibility, which align with the first three factors identified by Robyler and Marshall (2003), have also been identified as characteristics of successful online students (Rice, 2006). Technology skills and access to technology is the last factor that contributes to student success in online learning (Roblyer et al., 2008; Roblyer and Marshall, 2003).

Potts and Potts (2017) identify ten characteristics of successful online gifted students, several of which align with previously identified factors of online success. First, students should have enough time available in their schedule to succeed in online learning. Good online learning is time consuming and K-12 gifted students should have enough time and parental support, especially younger and first-time online students, available to be successful. Second, students should have a basic set of technological skills which will enable them to navigate their online course (Robyler et al., 2003; Robyler & Marshall, 2008). Third, students should have patience and flexibility to adapt to inevitable challenges and frustrations. Fourth, students should have an appropriate reading level to follow online instructions and text. In some cases, gifted students may be highly interested in a complex topic (i.e. quantum mechanics or neuropsychology) but may not have the reading level necessary to understand texts on the topic. Fifth, students should have the ability to effectively communicate with classmates and instructors verbally and in a variety of writing mediums. Some, particularly younger, gifted students may not be accustomed to having online conversations, yet they need to be able to express and advocate for themselves in their online courses. Sixth, students should be

able to track and manage deadlines (Whipp & Chiarelli, 2004). Seventh, students should be able to work independently, which aligns with Loomis' (2000) definition of responsibility. Online gifted students need a supporting home environment to succeed in online classes, but they should be the ones doing the work. Eighth, students should be able to minimize distractions. This can be difficult with online learning since distractions are only a click away. Ninth, students should be mature enough to engage in online discussions. Online courses specifically designed for gifted students often have more mature discussions than students experience in a heterogeneous classroom. Lastly, students should be interested in online learning and be included in the decision to become an online student. Electing to take online classes is not a decision parents should make without including their student.

Transactional Distance in Digital Learning

Student success in online learning has been related to their sense of connectedness (Lammars & Gillaspy, 2013; Skelcher, 2019), which is the foundation of transactional distance theory (Shearer & Park, 2019). Additionally, Watson et al. (2009) identified teacher-student and student-student interaction as two dimensions of online learning. These dimensions are effectively transactions or dialogue, deliberate and meaningful interactions between the instructor and students (Moore & Kearsley, 1996). The transaction in distance education is the dialogue and interaction between instructors and students, which has to take place over some form of digital medium (Moore, 2019). It is the physical distance between the instructors and students that forces new patterns of delivering content and fostering dialogue (Moore, 2019).

Transactional distance was first discussed in print in 1980 (Moore, 1980). Moore

(2019) defines transactional distance as “the gap between the understanding of a teacher (or teaching team) and that of a learner, and distance education is the methodology of structuring courses and managing dialogue between teacher and learner to bridge that gap through communications technology” (p. 61). Moore’s (1993) theory of transactional distance recognizes the role that the psychological (sense of satisfaction), pedagogical (understanding), and communication (relation and closeness) distances between the student and the teacher can impact distance learning. Transactional distance provides a broad framework and theory from which to define and study variables in online learning (Moore, 2019; Wengrowicz & Offir, 2013).

Transactional distance is relative and not absolute. Transactional distance is a theory with flexibility and a significant body of research support that has been studied from a variety of contexts (Wengrowicz & Offir, 2013). Reducing transactional distance though dialogue has been studied by multiple researchers (Stein et al., 2005; Wengrowicz & Offir, 2013). Nwankwo (2015) found that students value interaction with the online course content and their instructor. Machtemes and Asher (2000) found that effective interaction significantly influenced achievement. “Dialogue in the form of in-class discussion was the only factor found to lessen transactional distance between instructors and learners in a videoconferencing environment” (Chen & Willits, 1998, p. 107). The higher the level of discussion and the higher the frequency of interaction, the less transactional distance is perceived by students (Chen, 2001). Saba and Shearer (1994) identified ten categories of teacher-learner interaction that can impact transactional distance.

Transactional distance has also been measured in terms of student and teacher

perceptions (Wengrowicz & Offir 2013). Anderson and Garrison (1995) concluded the "instructional design upon which the interactive sessions were planned and orchestrated significantly influenced student's perception of this learning" (p. 42) in regards to online learning. Sherry et al. (1998) designed an instrument to assess learner perceptions of interactions between teacher-student and student-student in video-based courses.

The physical distance created by online learning necessitates that technology is employed to decrease the distance between the instructor and learners (Gibson, 2003). As dialogue increases, transactional distance decreases (Moore, 2019). Thus, communication is an essential component in online courses, especially for gifted students where communicating with similarly-aged intellectual peers is a benefit of online education (Adams & Cross, 1999; Mann, 1994).

Gifted Education

Students with intelligence and/or achievement test scores significantly above the norm are considered gifted (National Association for Gifted Children, 2019). Students can be identified as gifted in a number of ways, including intelligence, mathematics, English, science, social studies, creativity, art, and/or leadership (National Association for Gifted Children, 2019). Homogeneously grouped gifted students outperform their peers in heterogeneous groups (Davidson et al., 2004; Gentry, 1999; Kulik & Kulik, 1984, 1992; Rogers, 1998; Webb et al., 2007). However, homogeneously grouping gifted students is often difficult for schools based on limited funding and/or the small number of gifted students in a school or course (Potts & Potts, 2017). Thus, online learning creates an opportunity for gifted students who cannot find an appropriate gifted class placement in a local school (Potts & Potts, 2017).

Brief History of US K-12 Gifted Education

Gifted education in the US began over 150 years ago when the superintendent of instruction for the St. Louis public schools began offering students the opportunity to advance through their coursework every five weeks based on their academic achievement (Jolly, 2009). Gifted education was formalized in 1907 when the National Education Association (NEA) recommended that gifted students be grouped together and taught with advanced curriculum from teachers who "possessed the disposition to work with gifted students" (Jolly, 2009, p. 427). It was also in the early 1900s when intelligence tests gained prominence as a tool to identify gifted students.

In 1920, grouping gifted students based on grades, intelligence testing, and work habits was commonplace. Specialty schools dedicated to gifted students, known as laboratory schools, began to appear in the 1920s and 1930s (Jolly, 2009). These schools were fertile testing grounds that allowed for research into best practices in gifted education. The first public school for gifted students opened in New York in 1922.

As the United States entered World War II, the field of gifted education was overshadowed by the need to support the war effort (Jolly, 2009). It was not until the Soviet Union launched *Sputnik* in 1957 that the United States became focused on gifted education again. By this time, U.S. leaders were calling for the identification of gifted students and education that pushed them "to the limits of their potential" (Jolly, 2009, p. 428). During this time, the view of gifted education expanded to include students who were gifted creatively and not just intellectually.

The rise of the Civil Rights Movement brought about another bleak period in United States gifted education (Jolly, 2009). Intelligence tests, which were the bedrock of

identifying gifted students, were recognized for overwhelmingly identifying white students. This caused many urban districts to abandon intelligence testing in favor of alternative identification methods. While the focus on gifted education waned during the Civil Rights Movement, the realization that giftedness was not limited to white students and that intelligence tests were not the sole measure of giftedness was a long-term gain in the field.

The Marland Report (1972) created a formal, national definition for giftedness which included intelligence, creativity, leadership, and/or artistic ability. The Marland Report also advocated for Congress to fund gifted programming. This lead to the development of the U.S. Office of the Gifted and Talented. As is typical in gifted education, this step forward was short lived as the 1980s saw the closure of the Office of the Gifted and Talented and federal funding for gifted education merged with funding for 21 other federal programs, effectively cutting gifted education funding by over 40% (Jolly, 2009).

The National Excellence Report: A Case for Developing America's Talent in 1993 brought about another resurgence in gifted education (Jolly, 2009). The report noted that "adequacy had replaced excellence as the measure of school success" (Jolly, 2009, p. 429). As a result of this report, the Jacob K. Javits Gifted and Talented Students Education Act of 1994 authorized the US Department of Education to begin offering grants for gifted education research and programming. The No Child Left Behind Act of 2002 limited funding for gifted education as resources were pooled to support struggling students. The Every Student Succeeds Act of 2015 does include provisions to support gifted students (National Association of Gifted Children, 2018). Despite evidence that

points to academic, social, and emotional benefits for gifted students who receive education tailored to their academic needs, there are still significant challenges in the field.

Challenges in Gifted Education

Gifted education has faced a number of challenges over the years. Unfortunately, the political and social climates have created a series of ebbs and flows in the field of gifted education. Giftedness has been perceived as being the domain of the white majority through narrow definitions of giftedness in the past. The lack of diversity in gifted populations combined with "apathy toward high-ability students" has kept gifted education from becoming a national priority (Jolly & Robins, 2016, p. 139). This issue still haunts gifted education today as only four US states mandate and fully fund gifted education compared to eight states who provide no funding or mandate for gifted educational services (Davidson Institute, 2018). The remaining 38 states provide some variation of mandates and funding (Davidson Institute, 2018).

Finding teachers who are appropriately suited to teach gifted students has been a challenge for 110 years (Jolly, 2009). In some cases, the challenge is that teachers are not adequately prepared to address the social and emotional needs of gifted students. Gifted students have unique emotional needs that stem from their asynchronous development (Jolly, 2009). Supporting the Emotional Needs of the Gifted (SENG) was formed in 1981 to help support gifted students with these needs (Supporting the Emotional Needs of the Gifted, 2018). A second challenge is finding teachers who have the subject matter expertise to teach advanced subjects to gifted students (Belcastro, 2002; Jolly, 2009). This challenge is one that online education is particularly well suited to address.

Gifted students have diverse and unique educational needs (Marland, 1972). They develop abstract formal operational reasoning earlier and are more open to new learning experiences than their peers (Gallagher, 2009). The federal definition of gifted includes students with superior intellectual ability, specific academic ability, creative or productive thinking, advanced leadership ability, and visual or performing arts skills (Marland, 1972). It is estimated that up to 5% of US students meet at least one measure of giftedness (Marland, 1972). Since giftedness can be honed and developed, "there is an immense loss to both the nation and the gifted individuals themselves" if their abilities and talents are not fully developed (Jolly & Robins, 2016, p. 140). The goal of gifted education thus should be to identify, support, and nurture students with unique gifts and talents.

Technology in Gifted Education

Some of the first students to use computers in the classroom were gifted students (Mann, 1994). This happened inadvertently at a time when classrooms had only one computer. Gifted students would often finish their work early and then have the option of exploring the computer. Because gifted students "require a broad range of subject matter as well as accelerated learning activities that involve complex thinking and the synthesis of information" (Mann, 1984, p. 172), educators who brought computers into their classrooms were giving gifted students the opportunities to tackle complex thinking in a new context - technology.

One of the ways that technology is used in gifted education classrooms is to deliver curriculum. Technology-based curriculum has three distinct advantages for gifted students (Suppes et al., 2013). First, students receive immediate feedback on their

progress. This is important to gifted students who may often get less attention in traditional classrooms. Second, digital curriculum can provide concrete support as soon as the student gets an answer incorrect. This eliminates the need for a gifted student to move forward in their learning laboring under incorrect ideas. Third, progress for each student is individualized. This is helpful for gifted students who often have unique and asynchronous learning needs.

The key to successful digital learning experiences for gifted students is their motivation (Ng & Nicholas, 2010). Gifted students often enjoy and are motivated to learn with technology (Ng & Nicholas, 2007) because many already use technology daily (Periathiruvadi & Rinn, 2012). The motivation of gifted students to complete learning activities has a greater effect on the successful completion of online courses than the number of times a student accesses the course (Ng & Nicholas, 2010). Research has shown that "a relationship seems to exist between the opportunities that technology presents and motivation for gifted students" (Housand & Housand, 2012, p. 706). Gifted students have a high level of confidence when completing computer-based tasks (Housand & Housand, 2012). This confidence is attributed to their motivation to achieve when given autonomy over parts of their learning (Housand & Housand, 2012). Ng and Nicholas (2010) posit that gifted students are motivated to learn using technology and therefore call for creating autonomous, collaborative online learning spaces for gifted students.

Providing gifted students with the appropriate level of challenge is also a primary determinant in their motivation (Housand & Housand, 2012). That challenge, when combined with the natural curiosity of gifted students, creates a need for deeper

exploration. Once the curiosity "trigger" is pulled, gifted students have a compelling need to learn more and assimilate that knowledge into their existing schema. Neglecting to allow this process to occur in real time can stifle curiosity and lead to underachievement. Without access to technology, it is virtually impossible for a general education teacher to ask questions that will stimulate the gifted mind or answer every question that a curious gifted student will pose (Housand & Housand, 2012). Research supports the use of technology in opening options for gifted programming that will provide gifted students with the appropriate challenge (Periathiruvadi, & Rinn, 2012).

Online Learning in K-12 Gifted Education

Online learning is on the rise in the United States (Picciano et al., 2010). According to Wallace (2005), online education has been used to reach gifted students since the 1980s when the National Endowment for the Humanities helped to fund writing courses at Johns Hopkins University's Center for Talented Youth (CTY). Over two-thirds of CTY students re-enroll after taking their first CTY course and 90% of all students respond that they are satisfied with their distance learning experience. Using CTY as a successful online learning model, Wallace (2005) identifies five aspects of successful online courses for gifted students. First, a one-to-one relationship between the student and teacher where the student feels connected and valued is important. In many cases, the teacher may act as a mentor for the student. This can lead to higher motivation which has been shown as a success factor in online education for gifted students. Second, the rigor and pacing of the content should be suitable for gifted students. Third, relying on technology that is known to work well instead of new, untested technology limits the potential for technology issues to impact the online experience for students. Fourth,

offering support services for all students including community forums, counseling services, placement, and technical support helps gifted students feel socially connected to their online community. Lastly, recognizing the unique advantages of online learning instead of attempting to recreate face-to-face courses in the online environment is an important strategy for success (Thomson, 2010; Wallace, 2005).

There is evidence that online courses for gifted students can be just as good as their brick and mortar counterparts. Florida Virtual School (FLVS) opened in 1997 as one of the first online providers of Advanced Placement (AP) courses (Johnston & Barbour, 2013). In 2010, FLVS began requiring all students taking AP courses to take the College Board AP exam (Johnston & Barbour, 2013). Unlike many other online AP course providers, FLVS allows open access to their AP courses for Florida students, meaning any Florida student can take an AP course (Johnston & Barbour, 2013). Johnston and Barbour (2013) analyzed AP scores for FLVS students and traditional Florida high school students in 2010, 2011, and 2012 and, in each year, FLVS students had a higher percentage of qualifying scores (three or better on most exams) on the AP exams than other Florida students. In fact, the AP scores of FLVS students were 6%, 10% and finally 15% higher, respectively, than other Florida students over the three years. This lead to the conclusion that online AP courses can be at least as good as AP courses at brick-and-mortar schools (Johnston & Barbour, 2013). Johnson and Barbour were also interested in student perceptions of FLVS online AP courses compared to their face-to-face AP courses. They conducted follow-up surveys and interviews with FLVS students who had also taken traditional AP courses. Of those students surveyed, 71% responded that the FLVS AP course was the same or better quality as their previous AP courses.

Online education is popular with gifted students who live in rural areas, despite the technological challenges that they often face (Belcastro, 2002). Forty percent of U.S. students attend schools that are classified as rural (Belcastro, 2004). These schools and students face unique challenges due to declining populations and limited resources that are not prevalent in suburban and urban schools (Belcastro, 2002; KewalRamani et al., 2018). Using technology and online learning can provide a boon to rural students (Belcastro, 2004).

Thomson (2010) reports that teachers and students feel that online courses have the power to be more personal than traditional face-to-face instruction since asynchronous communication tools allowed teachers to provide specific feedback to individual students instead of feeling compelled to address the class as a whole. Online learning offers specific advantages over traditional instruction that course designers and instructors can embrace rather than trying to build online courses that mimic face-to-face instruction (Thomson, 2010). Online courses for gifted students should be enjoyable. One gifted student echoed this in his online course evaluation by saying “a very important aspect in engaging a young mind’s attention is to make things an enjoyable and memorable experience” (Ng & Nicholas, 2010, p. 247).

There are several distinct advantages of online education for gifted education. First, online learning provides opportunities for gifted students to interact with and learn alongside their academic peers (Adams & Cross, 1999; Mann, 1994). This is important in light of the unique social and emotional needs of gifted students (Housand & Housand, 2012). Second, online learning offers gifted students the opportunity to take unique classes that would not normally be available to them (Adams & Cross, 1999; Belcastro,

2002; Belcastro, 2004; Picciano et al., 2010; Potts & Potts, 2017). Third, online learning opens up the opportunity to take advanced courses and provide gifted students with access to instructors with specializations that may not be available locally (Thomson, 2010). Fourth, online learning can allow gifted students the opportunity to take coursework that is specifically targeted for their ability level (Adams & Cross, 1999; Ravaglia et al., 1995; Wallace, 2005). Fifth, online learning has also been shown to increase open-ended inquiry-based learning for gifted students (Periathiruvadi & Rinn, 2012). Sixth, online learning requires students to be more self-directed and internally motivated than traditional classroom learning, which is a benefit for gifted students (Perry & Pilati, 2011). Lastly, online learning opens up opportunities to provide high quality professional development and outreach opportunities to teachers of gifted students across their geographic boundaries (Adams & Cross, 1999).

Social and Emotional Development in Online Learning

Building on the work of Anderson (2004), Mayes (1995), and Garrison et al. (1999), Ng and Nicholas (2007) proposed that a socially-immersed learning paradigm should be the central feature for online gifted education. The premise is that a socially-immersed focus will help to develop a learning community where interactions with peers and teachers help learners to engage and construct meaning. Their framework weaves cognitive, social, and teaching presences into a cohesive framework for designing online courses that are motivating to gifted learners. Since gifted students are at the extreme end of the intelligence and achievement curves, not all schools or communities have a critical mass of gifted students, making social learning more difficult in traditional secondary

schools. Building online learning communities that emphasize a social immersion platform is a potential solution to this issue facing schools.

Challenges Facing Online K-12 Gifted Education

While most students report that online learning is beneficial (Picciano et al., 2010), there is still work to be done in the field. There is no one body that oversees online learning, nor is there a universal rubric for quality online courses. This makes it difficult for the field to overcome the low acceptance of online learning reported by Picciano et al. (2010). Therefore, identifying a research-based list of success factors can help the field of online gifted education help gain more support and recognition. Menchaca and Bekele (2008) identified success factors across a number of studies in online learning that align with research identified in this response. First, technology is a key factor in the quality of online courses (Menchaca & Bekele, 2008). This means online courses should rely on dependable technology that is accessible across a variety of platforms and with a variety of Internet connections. Second, online course providers should emphasize characteristics of successful online students to potential students (Menchaca & Bekele, 2008). For online gifted students, these characteristics include having support at home, basic technology skills, appropriate reading level, motivation, and basic organizational skills. Third, quality online courses should be well designed (Menchaca & Bekele, 2008). For online gifted courses this means quality content, learning activities and projects, and clear goals and expectations with the appropriate level of challenge and flexibility. Fourth, the learning approach should be appropriate for the audience (Menchaca & Bekele, 2008). For online gifted students, this means courses should allow for synchronous and asynchronous discourse, offer opportunities for collaboration, provide feedback for

growth, and be responsive to the needs of the individual students. With online learning, “adding technology without changing the pedagogy does not necessarily result in any major change to teaching and learning” (Picciano et al., 2010, p. 28). Finally, online courses and programs need to offer appropriate support services (Menchaca & Bekele, 2008). At a minimum, this should include technology support, but should also include professional development for instructors, support staff such as counselors, and leadership that is continually looking at programmatic improvements. Satisfied learners who come prepared with the requisite technology skills and have the support of faculty, immediate feedback, responsive administrators, and a viable help desk will lead to a successful online learning program (Menchaca & Bekele, 2008).

In addition to gaining acceptance from the educational establishment, one of the biggest challenges facing online gifted education is ensuring equitable access for eligible students. This means that all K-12 students have multiple ways of being identified as gifted. Giftedness comes in many forms and transcends race, gender, income, and geography. K-12 online education should be available to gifted students regardless of income or Internet connectivity. Thus, online courses need to be affordable and accessible across platforms. For gifted students in public schools without access to appropriate courses, local schools should seek out opportunities for their students to take challenging online courses with their gifted peers as a part of their curriculum.
Lastly, equitable access to the Internet is an issue of central concern to online course providers. Geography, race, English language acquisition, and family income all play a factor in whether or not students are connected to the Internet at home (KewalRamani et al., 2018).

Online gifted education has much promise, but there is much left to learn in the field. As the field of online education grows, so does the need for more research (Corry & Stella, 2012; Rice, 2006). This need is especially pronounced in K-12 online gifted education (Corry & Stella, 2012; Housand & Housand, 2012; Picciano et al., 2010).

Internet Connectivity in the United States

In 2015, 77% of U.S. households had access to the Internet and 92% of U.S. eighth-grade students reported having access to the Internet at home (KewalRamani et al., 2018). This places the United States above the Trends in International Mathematics and Science Study (TIMSS) average for percentages of eighth-grade students with home Internet access, but lagging behind 15 countries including Norway, Malta, Slovenia, Sweden, Ireland, and the United Kingdom, who all report having 99% home Internet access for this same group (KewalRamani et al., 2018). These countries are significantly smaller in land area than the U.S., which makes Internet penetration easier.

Rural America and Internet Connectivity

One major concern with online learning for gifted students is the availability of broadband Internet access in rural America. In 2013, Florida became the first state to mandate that all K-12 public school students use virtual schooling, online testing, and completely digital learning materials (Mardis, 2016). This move created an educational need for Florida's K-12 students to have access to broadband connectivity at home. While the US is a global leader in home Internet penetration, over 50 million people are still not connected to the Internet (Mardis, 2016).

Over half of rural Americans lacked broadband access in 2015 (Mardis, 2016). This is noteworthy since about 40% of US students attend schools in rural areas

(Belcastro, 2004). Rural schools are plagued by shrinking populations, which leads to decreased tax revenue coupled with per-pupil state funding that forces rural schools to rely on online education to meet students' academic needs (Mardis, 2016). Nationally, 80% of classroom access to the Internet is deemed inadequate because it is either overloaded or poorly managed (Mardis, 2016). Thus, broadband access has been cited as an "emerging issue of equal access to educational opportunity" (Mardis, 2016, p. 54).

The primary reasons cited for lack of home broadband use by rural residents in Florida are: (1) no desire to have broadband, (2) too expensive, (3) unavailable, and (4) they access the Internet elsewhere (Mardis, 2016). Indeed, rurality is the key factor in the non-adoption of broadband access (Mardis, 2016). Rurality is more significant than income, race, ethnicity, and availability in home Internet adoption rates (Mardis, 2016).

While online courses can be accessed on mobile devices and through slower Internet speeds, these will often cause lag. Technical issues, especially issues with audio connectivity have been shown to be a significant deterrent for online students (Adams & Cross, 1999; Li et al., 2010). Despite technical issues, rural gifted students are still interested in online education (Belcastro, 2002; Picciano et al., 2010).

Disparity in U.S. Internet Access

Understanding disparity in Internet access is important as limitations in digital access affects educational and social opportunities for students (Katz & Gonzalez, 2016). Even though 77% of U.S. households had access to the Internet in 2015, geography was a significant factor in home Internet access. Households in New Hampshire and Washington state reported the highest penetration of Internet access (85%) compared to Mississippi with the lowest percentage (62%) (KewalRamani et al., 2018). Nineteen

states report having household Internet access penetration at a rate that is statistically significantly below the national average (KewalRamani et al., 2018).

However, geography is not the only factor that leads to significant differences in access to the Internet for U.S. eighth-grade students. Race, English language acquisition, and family income play a factor in whether or not students are connected to the Internet at home (KewalRamani et al., 2018). Using data from the National Assessment of Educational Progress (NAEP) 2015 Reading Assessment administered by the National Center for Education Statistics, a part of the U.S. Department of Education, KewalRamani et al. report that 97% of eighth grade students who identify as Asian have access to the Internet at home compared to 79% of American Indians/Alaskan Natives in the same age group. English language learners were less likely (82%) than native English speakers (93%) to have access to the Internet at home. Students eligible for free or at least 75% reduced lunch were less likely (88%) to have home Internet access than students eligible for 25% or less reduction in school lunch (96%) (KewalRamani et al., 2018).

Home Internet use by children under the age of 18 is also impacted by parents' level of educational attainment. Children with a parent who has obtained at least an undergraduate degree are 39% more likely to access the Internet at home than children with parents who have not yet obtained a high school diploma (KewalRamani et al., 2018).

There is variety in the quality of Internet access in the homes of U.S. students. Not all home Internet access is robust enough to support high-quality video-conferencing in online learning. In 2015, 78% of U.S. children between the ages of three and 18 were

accessing the Internet through high-speed connections (e.g. fiber-optic service, cable, and DSL) (KewalRamani et al., 2018). However, mobile access was still prevalent with 67% of children in this group using a mobile data plan to regularly access the Internet from home (KewalRamani et al., 2018). Some children are still using satellite (4%), dial-up (less than 1%), and other means (1%) to access the Internet at home (KewalRamani et al., 2018).

Lastly, families impacted by fear or trauma may make adjustments to how and how frequently their children access the Internet. For example, families in Arizona often prioritize spending on home Internet access as they view accessing the Internet in the privacy of their home safer than accessing the Internet in public spaces (e.g. libraries) where the searches are more public (Katz & Gonzalez, 2016). Families in the Denver area, where there have been multiple mass shootings, are more willing to let their students use the Internet regularly as they view online risks as less dire than physical threats in public places (Katz & Gonzalez, 2016).

Student Perceptions

In 1981, Ramsden and Entwistle were the first researchers to establish an empirical relationship between "approaches to learning and perceived characteristics of the academic environment" (Lizzio et al., 2002, p. 28). They found a strong association between student workload and the adoption of a surface learning approach, meaning that when students perceived the workload to be heavy, they tended to adopt a surface rather than deep approach to their learning. This finding is valuable to educators who value a deep understanding in which students are able to apply their knowledge across domains and contexts over rote memorization with limited transference. This finding also opened

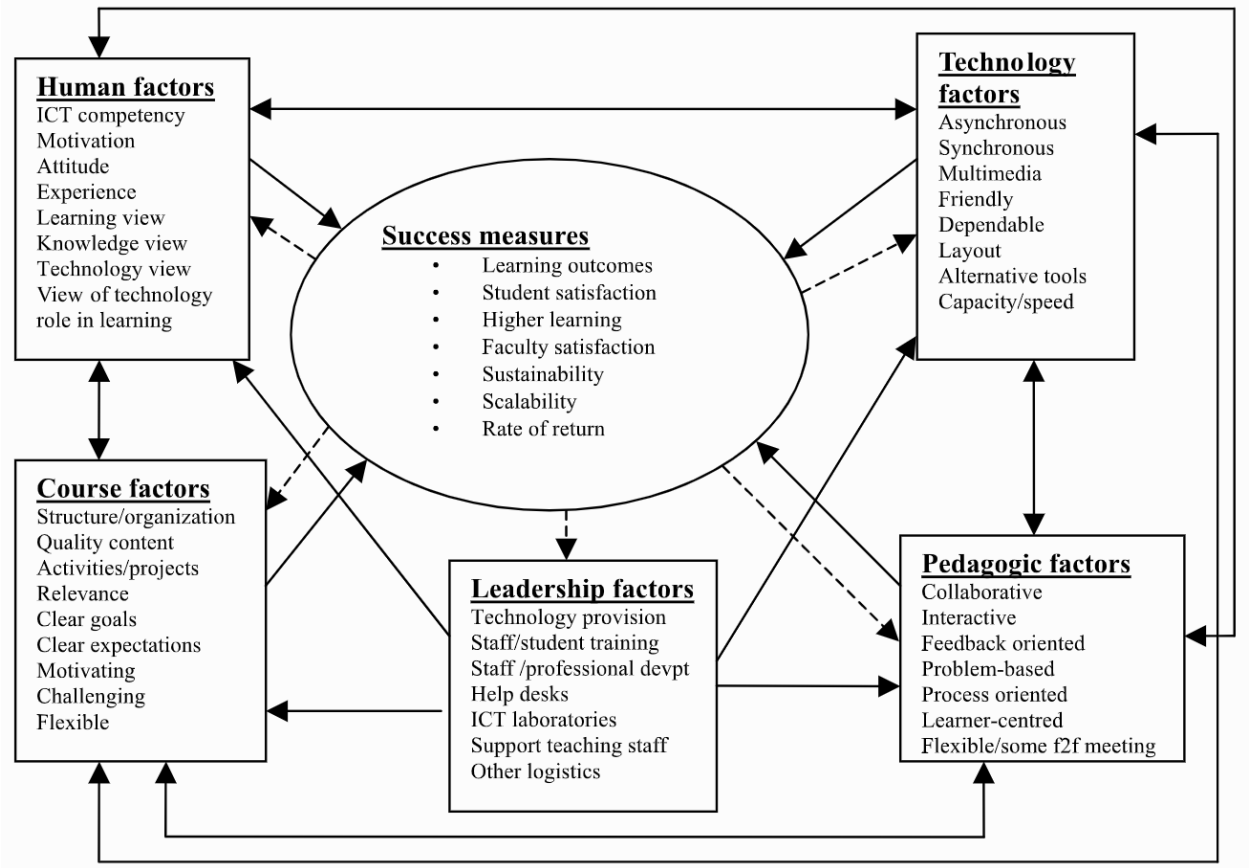
the door for researchers who seek to understand how student perceptions around a variety of topics (e.g. technology, workload, gamification, problem-based learning) impact a variety of outcomes (e.g. final course grades, participation, attendance, graduation rates, reenrollment). There is still a lack of thorough understanding of how students' perceptions impact their academic achievement (Wongwatkit et al., 2017). Moreover, student perceptions can be studied both quantitatively and qualitatively (Zumbrunn et al., 2016).

Frameworks for Understanding Perceptions

With increased understanding in student perceptions comes new and evolving frameworks from which to base research. Briggs' (1989) 3P model views perceptions as a combination of presage, process, and product factors (Lizzio et al., 2002). Presage factors exist prior to learning and include personal (e.g. prior knowledge, ability, personality) and situational (e.g. learning environment, teaching methods, course structure) characteristics. The key to presage factors is the understanding that it is "students' perceptions of their learning environment, in light of their motivations and expectations, which determine how situational factors influence approaches to learning and learning outcomes" (Lizzio et al., 2002, p. 28). Process factors address how students approach learning. Students can approach their studies as either surface or deep learning. Surface learning focuses on memorization with limited transferability. Deep learning is evidenced by a thorough understanding and the ability to apply the learning to new contexts and compare it with other ideas. Product factors are comprised of cognitive, affective, and behavioral outcomes derived from the learning process.

After reviewing 82 studies in e-learning, Bekele (2008) developed a framework

which shows success as a combination of learning outcomes, satisfaction, scalability, retention, and deep learning in e-learning as a function of the interplay of human, technological, course, pedagogical, and leadership factors (Menchaca & Bekele, 2008). Figure 2.1 illustrates the interplay between the factors. Human factors include individual technical competency, motivation, attitude, and views of technology in education. Technological factors include synchronous and asynchronous learning opportunities, dependability, speed and capacity of the infrastructure, course design, and user interface. Course factors include overall structure, organization, quality of course materials, goals, expectations, and challenge. Pedagogical factors include collaboration, feedback, interaction, flexibility, and process orientation. Leadership factors include technology support, professional development, support teaching staff, and other logistical considerations. Bekele's (2008) framework seeks to help researchers see the totality of success factors that can impact student perceptions and success in online learning. According to Bekele (2008), it is the complicated interplay between all six factors that determines success in online learning.



Note: (Bekele, 2008, p. 57, Reprinted with permission).

Figure 2.1 Model of success and success factors in Internet-supported learning environments

Research has shown a link between students' perceptions of their education and the objective outcome of that education (Crawford et al., 1998). This led Lopez-Perez et al. (2011) to study student perceptions from a different viewpoint - the subjective perspective. They studied student perceptions of blended learning from utility (benefits gained), motivation (how blended learning impacted motivation), and satisfaction (overall course satisfaction) perspectives. They built their framework of perceptions on prior research, which showed that how students perceive the utility of their learning is a measure of efficiency (Ozkan & Koseler, 2009), motivation (Lim & Morris, 2009), and a broad understanding of satisfaction referring to the teacher, the course materials, and/or methodologies (Sanderson, 1995). The Lopez-Perez et al. (2011) framework was

centered on the belief that “learning outcomes are of a multi-dimensional nature; they may reflect acquired skills and competences, and knowledge received, or be measured by student experiences or by their final degree of satisfaction” (Lopez-Perez et al., 2011, p.821).

Engagement has also been linked to a better understanding of the importance of student perceptions. Building on the Garrison et al. community of inquiry (COI) framework (1999), Louwrens and Hartnett (2015) researched engagement in an online middle school course in New Zealand. They used three key metrics to measure engagement: (a) behavioral engagement (doing what is expected), (b) cognitive engagement (personal investment in learning), and (c) emotional engagement (reacting positively to the school environment). Behavioral engagement was seen when students submitted appropriate comments in the discussion forum. Cognitive engagement was evidenced by students responding appropriately to one another in discussion forums. Emotional engagement was evidenced by showing a sense of belonging in discussion forums. The research questions focused on what teachers perceive engages their students and what encourages students to engage in online activities. The researchers chose to study engagement because it is recognized as a key component in teaching and learning (Dixson, 2010). Louwrens and Hartnett (2015) believed that learning activities that are perceived as relevant and interesting encourage all three types of engagement, thus they used engagement as a way to better understand perceptions.

Similar to engagement, interest has been “recognized as an important condition for learning” (Hidi & Renninger, 2016, p. 111). Two ways in which researchers can view interest are personal interest and situational interest (Hidi & Baird, 1988). Personal

interest is information that is of personal and enduring value. Situational interest is specific to the topic under study and emerges as a response to the learning environment (Linnenbrink-Garcia et al., 2010). Situational interest can be fleeting and context specific or catching/holding, meaning that it captures and holds a student's attention, which can lead to personal interest. Hidi and Renninger (2016) propose a four-tiered model of interest development: (1) triggered situational interest, (2) maintained situational interest, (3) emerged individual interest, and (4) well-developed individual interest. Another view of interest is the three-factor model discovered by Linnenbrink-Garcia et al., (2010) where interest is comprised of (1) triggered situational interest, (2) maintained situational interest concerning feeling, and (3) maintained situational interest concerning value. Student interest has been shown to play a role in their perceptions (Li et al., 2010; Lowyck, 2013).

So-Chen et al. (2016) studied student perceptions as a combination of situational interest and course satisfaction. They measured learning outcomes and gender differences in a five-week flipped pre-calculus course, which relied on a massive-open online course (MOOC) for the online lectures. Situational interest included feeling (personal emotions), value (personal beliefs about the course), and topic interest (pure interest in the course) while course satisfaction included course design, system quality, course arrangement, and online assessment. The situational interest factors were self-developed perception measures for this study. The authors concluded that student perceptions as evidenced by situational interest should be considered as motivational strategies as teachers design teaching and learning activities.

Several studies have looked at perceptions from the perspective of perceived

usefulness, satisfaction, and ease of use. Su et al. (2010) sought to understand student perceived attitudes toward their use of a collaborative, web-based personalized annotation management system (PAMS 2.0). They found that student attitudes toward PAMS 2.0 could be predicted by perceived usefulness, perceived ease of use, overall learning satisfaction, and willingness to use the system in the future.

Lee (2010) developed the expanded expectation-confirmation model to help explain the variation in whether or not students plan to continue in e-learning courses. This model created a new framework by adopting constructs from the expectation-confirmation model, technology-acceptance model, the theory of planning behavior, and flow theory. Lee (2010) found students' intention to re-enroll could be predicted based on satisfaction (which was predicted by confirmation and perceived usefulness), attitude (a function of perceived usefulness, perceived ease of use, and perceived enjoyment), concentration, subjective norms, perceived behavioral control, and perceived usefulness directly. In this model, perceived usefulness impacted reenrollment directly and indirectly through satisfaction and attitude.

Horak and Galluzzo (2017) studied the achievement and perception of classroom quality of gifted middle school students during a problem-based science unit. They collected academic pre- and post-test data to measure achievement and used the Student Perceptions of Classroom Quality (SPOCQ) to quantify perceptions. The SPOCQ was developed by Gentry and Owen (2004) specifically for use with gifted secondary students. The SPOCQ asks students to evaluate five aspects of classroom environments: (a) meaningfulness, (b) challenge, (c) academic self-efficacy, (d) choice, and (e) appeal. These constructs or domains align with long-standing research, which shows that good

gifted curriculum is interdisciplinary, emphasizes real-world applications, enables students to function as professionals, supports flexibility, allows for self-directed learning, results in authentic products to show mastery, and contains abstraction, breadth, and depth (Horak & Galluzzo, 2017). Meaningfulness measures the degree to which the curriculum is relevant to the student (Gentry & Owen, 2004). Challenge involves rigor, depth, and complexity and how those three ideas are embedded in the learning content, process, and product. Academic self-efficacy is a reflection of "students perceived confidence in performing important classroom learning behaviors" (Gentry & Owen, 2004, p. 21). Choice is a measure of the empowerment students feel in making decisions about their own learning. Appeal combines interest and enjoyment in a safe and supporting learning environment that engages students and takes into account their preferences for topics and learning activities. The SPOCQ is a comprehensive framework from which to study gifted students' perceptions of classroom quality. The SPOCQ is broad enough to cover both asynchronous and synchronous aspects of online courses.

Qualitative Measures of Student Perceptions

There is a call for more in-depth student interviews to understand how students perceive e-learning environments and if and how student perceptions actually impact learning outcomes (Gilbert et al., 2007). Buckley et al. (2017) used focus groups to study student perceptions of gamified learning. They incentivized students to participate in 90-minute, semi-structured focus groups at the end of the semester. They focused on ensuring that the focus group moderators were well-versed on focus group methodology and were able to encourage involvement from all participants while accurately recording data. To avoid any potential bias, an experienced, external moderator was employed.

Then the researchers transcribed the recordings verbatim, coded, and analyzed the data. This process allowed them to identify six themes related to student perceptions: (a) learning outcomes, (b) motivation, (c) perceived stakes, (d) group dynamics, (e) gender, and (f) challenges.

Buckley et al. (2017) undertook their research with no preconceived notion of what perceptions they would uncover or any framework or literature review to guide their research. They employed a funneled conversational method in the focus groups which started with general views, then focused on perceptions of the specific gamified learning the students experienced, and concluded with general views of gamified learning. In all, 9% of undergraduate students and 47% of graduate students in the sample participated in the focus groups. One of their research goals was to "assess students' perceptions of the effectiveness of gamification" (p. 2), and their six themes meet Schunk and Meece's (1992) definition of student perceptions. While their research method and the themes they identified are valid for their study, the disproportionate size of their focus groups seems problematic if future researchers wanted to use Buckley et al. themes as a framework for understanding student perceptions in new research.

Rather than conducting live interviews or focus groups, perceptions can be understood qualitatively by reviewing transcripts of discussion boards, wikis, or other social learning tools in e-learning environments. Louwrens and Hartnett (2015) reviewed online middle school students' e-learning activities for cognitive engagement evidenced by deep and/or critical thinking and emotional engagement evidenced by reactions to others in their online environment. They reviewed and coded transcripts to better understand perceptions as a function of cognitive and emotional engagement. They

posited that learning activities that are perceived as relevant and interesting encourage cognitive, emotional, and behavioral engagement.

Quantitative Measures of Student Perceptions

Most studies of student perceptions are quantitatively driven (Menchaca & Bekele, 2008). One of the most common ways of measuring student perceptions is through questionnaires or surveys (Schunk & Meece, 1992). A variety of survey instruments have been developed to measure perceptions from a variety of perspectives. The Approaches to Studying Inventory (ASI) developed by Entwistle et al. (1979) and the Course Perceptions Questionnaire (CPQ) developed by Entwistle and Ramsden (1983) were some of the first quantitative measures of student perceptions developed for large-scale, cross-disciplinary use (Lizzio et al., 2002). More recently, Gentry and Owen (2004) developed the Student Perceptions of Classroom Quality (SPOCQ), a survey comprised of 38 questions using a 5-point Likert scale to understand the perceptions of gifted secondary students. Lopez-Perez et al. (2011) used a questionnaire to understand undergraduate student perceptions of their blended learning classroom. In addition to using survey tools to quantitatively study student perceptions, some researchers have used a more rudimentary method of reviewing quantitative data from the learning management system (LMS) used in e-learning to measure behavioral engagement (Louwrens & Hartnett, 2015). Louwrens and Hartnett used the number of appropriate online forum comments by students as their measure of behavioral engagement. This measure simply quantifies the extent to which students are compliant with course instructions.

Framework for this Study

Despite the availability of a number of reliable and valid survey tools, it is necessary to develop a solid framework from which to understand student perceptions before adopting a tool. Research has shown that there is a connection between student perceptions and achievement (Crawford et al., 1998; Horak & Galluzzo, 2017; Ramsden & Entwistle, 1981). Additionally, research has shown a connection between technology and the student's online classroom experience (Li et al., 2010). This study connected these two understandings to see if, and if so how, Internet speed impacts gifted students' perceptions of their online English courses. After reviewing a number of studies, Gentry and Owen's (2004) SPOCQ has the constructs - meaningfulness, challenge, academic self-efficacy, choice, and appeal - that were most meaningful to this study as the framework for understanding student perceptions in this study. Additionally, communication was introduced as a new construct to the framework proposed by Gentry and Owen (2004).

The guidelines for high quality of gifted curriculum as defined by Horak and Galluzzo (2017) align with most of the core values (personalization, rigorous, critical thinking, collaboration, flexible, and rich discourse) of the research site (Appendix A). Choosing a framework from which to understand perceptions that aligns with the core values of the research setting will allow the research site to use the results of the study to make programmatic adjustments while still producing results that are transferable to other e-learning environments that align with best practices in gifted curriculum.

Horak and Galluzzo (2017) relied on Gentry and Owen's (2004) Student Perceptions of Classroom Quality (SPOCQ) survey to measure perceptions as factors of meaningfulness,

challenge, academic self-efficacy, choice, and appeal. This model aligns with five of the core values at the research site. Personalization aligns with appeal, which measures if a course reflects student "preferences for topics and activities" (Gentry & Owen, 2004, p. 21). Rigorous aligns with challenge, which measures "rigor, depth, and complexity" (p. 21). Critical thinking has marginal alignment with academic self-efficacy, which measures student confidence in "performing important classroom learning behaviours" (p. 21). The alignment stems from the emphasis the school places on students forming and supporting their own opinions as opposed to being taught how to think about specific topics. This concept can be difficult for students who have not been encouraged to think critically in their previous learning experiences. Collaboration aligns with meaningfulness as students need to see meaning in topics in order to work effectively with others. Flexible aligns with choice, which measures the degree to which students are empowered to "make important decisions about their learning" (p. 21). Therefore, the SPOCQ is a suitable framework for this research.

Adding communication as a sixth dimension from which to understand student perceptions of online courses is supported by Moore's (1993, 2019) theory of transactional distance. Transactional distance can be reduced through effective and frequent dialogue between the instructor and students, especially in high dialogic mediums such as synchronous video conferencing (Moore, 2019). Adding communication as a dimension from which to study gifted online student's perceptions is also supported by Adams and Cross (1999) and Mann (1994). Communication will address student perceptions of the synchronous and asynchronous opportunities for interaction in online courses. This additional construct is supported by research that

identifies communicating and interacting with intellectual, same-age peers is a benefit of online learning for gifted students (Adams & Cross, 1999; Housand & Housand, 2012; Mann, 1994; Ng & Nicholas, 2007) and Moore's (1993) assertion that highly interactive online courses can minimize transactional distance. Adding communication allowed the framework to address all six of the proposed research site's core values, thus making the research valuable to the site while also contributing a new understanding to the broader field of online education.

Chapter Summary

This chapter reviewed the significant literature in online education, gifted education, technology in gifted education, Internet connectivity in the United States, and student perceptions. There is a growing body of evidence that online learning is on the rise in K-12 education (Barbour, 2019; Watson et al., 2011) and that online learning has unique benefits for gifted students (Adams & Cross, 1999; Belcastro, 2002; Mann, 1994). Additionally, there is research that supports the understanding that the technical experience is a determining factor in students perceived quality of their online courses (Li et al., 2010) and that there is disparity in the availability and quality of home Internet access for U.S. students (KewalRamani et al., 2018). Lastly, there is a significant body of research that supports perceptions as a valid construct and a specific call for more research in understanding how perceptions impact student achievement (Horak & Galluzzo, 2017; Wongwatkit et al., 2017). This study combines and adds to the existing body of research in all of the domains addressed in this literature review. The next chapter describes the research methods that will be used in the study.

CHAPTER THREE: METHODOLOGY

Previous research has established a connection between student perceptions and achievement (Crawford et al., 1998; Horak & Galluzzo, 2017; Ramsden & Entwistle, 1981). Moreover, research has shown a relationship between technology and a student's online classroom experience (Li et al., 2010). Building on this previous research, the author conducted a mixed methods study to understand how technology helps to explain gifted students' perceptions of their online learning experience. Specifically, the researcher sought to understand if the speed of the Internet connection, as measured by download speeds, can help explain gifted students' perceptions of their online English courses.

The purpose of this study is to examine the role of Internet connectivity on the perceptions of highly gifted students on the quality of their fully online English course on six domains: (a) appeal, (b) challenge, (c) choice, (d) meaningfulness, (e) self-efficacy, and (f) communication. The author believes this research contributes knowledge to the field of online gifted education, a subset of the field of technology in gifted education, which is a field currently lacking research (Housand & Housand, 2012; Periathiruvadi & Rinn, 2012), advances the understanding of how technology helps explain student perceptions of their course experience, and expands the existing body of knowledge on reducing transactional distance as defined by Moore (1993, 2019) in online education.

Study Design

The use of mixed methods research has been on the rise for the past 25 years

(Archibald et al., 2015). Mixed methods research is a methodology that combines the salient features of quantitative and qualitative research approaches “for the broad purposes of breadth and depth of understanding” (Johnson et al., 2007). Quantitative research is an appropriate method for those who seek to understand how one attribute or variable explains another (Creswell, 2014). Through qualitative research, researchers use an interpretive lens to help inform a study in which individuals or groups of individuals “ascribe to a social or human problem” (Creswell, 2013, p. 44). By combining these two methods in this research, the problem under study was understood and explained from a statistical and human interpretive lens.

In this study, the researcher used an explanatory sequential design with the data collection happening in two distinct phases (Creswell & Plano Clark, 2018). A QUAN + qual approach was adopted where the qualitative data was used as supportive and explanatory data from which to better understand the results of the quantitative data. The initial data collection was through a modified version of the SPOCQ, an online survey designed to measure student perceptions on various dimensions of course quality (Gentry & Owen, 2004; Gentry & Springer, 2002). In addition to answering a series of 42 Likert scale questions on their perceptions, participants also self-reported Internet download speed (QUAN). Using maximum variation sampling, the researcher identified two independent groups: students with low Internet speed and students with high Internet speed. Students with the most extreme Internet download speeds in each group were asked to participate in focus groups (qual) to share how their lived experiences related to the speed of their Internet connection helps to explain their perceptions of course quality.

Research Questions

As an explanatory sequential design mixed methods study, it was appropriate to have three research questions, one to guide each stage of data collection and a mixed methods question (Creswell & Plano Clark, 2018). The research questions represent the quantitative (Q1), mixed methods (Q2), and qualitative (Q3 with sub-questions Q3a and Q3b) aspects of this study. These questions allowed the researcher to fully explore the problem under study.

Q1. Is there a significant difference in the perceptions of fully online, gifted students' on the quality of their online English course as measured by a modified version of the SPOCQ between students with high and low Internet download speeds?

Q2. In what ways does data from focus groups comprised of fully online, gifted students with high and low Internet download speeds help explain the results of the quantitative survey related to their perceptions of the quality of their English course as measured on modified SPOCQ constructs?

Q3. What themes emerge from focus group interviews with fully online, gifted students about their perceptions of the quality of their English course?

- a. How do the participants perceive the quality of their English course by the constructs in the modified SPOCQ?
- b. How do participants discuss the connectivity issues they may have encountered?

Hypotheses

The null hypothesis (H_0) for this study was "The speed of a fully online student's home Internet connection has no impact on their perceptions of the quality of their English course." The alternative hypothesis (H_a) for this study was "The speed of a fully online student's home Internet connection impacts their perceptions of the quality of their English course in at least one domain on a modified SPOCQ."

Participants/Sample

The study took place at an online campus of a public school for highly gifted students that opened in the fall of 2017. There were 46 students from 21 states - Arizona, California, Connecticut, Georgia, Illinois, Kentucky, Maine, Michigan, Minnesota, Missouri, New Mexico, Nevada, New Jersey, New York, North Carolina, Ohio, Oregon, Pennsylvania, Texas, Virginia, and Washington - enrolled at the time of the study. The online campus operates as a free public school for students residing in the southwestern state where it has a physical presence. Students residing outside of the home state must pay out-of-district tuition that is capped at $15,000 per year.

At the time of the study, there were 29 boys and 17 girls in the school with an average age of 14.4 years (range is 11-18). Of the 46 students, 40 were full-time students taking a full course load, which typically includes English, social studies, mathematics, science, and at least one elective course. Four students are taking a single English course and two students are taking a single mathematics course. All students taking English courses were recruited for this study. Since most participants are minors, the researcher directly emailed parents of students in the school for permission to approach the student about participating in the research study (Appendix B). Students were directly recruited

for participation after a parent gave their authorization for the student to participate (Appendix B). The research site was interested in the results of the study and encouraged participation. However, there was no consequence for students that opted not to participate.

Parents of 42 unique students were emailed about participating in the study. A total of 31 parents provided consent for their student to participate. All 31 of these students were emailed and asked to provide their consent for participation. Nineteen of the students responded with their consent ($N = 19$) and, thus, comprise the sample for this study.

Teaching Methodology at Research Site.

All core classes (English, mathematics, science, and social studies) and world language have two scheduled live sessions per week. The live sessions are mandatory synchronous sessions that last ninety minutes each. During the live sessions, the instructor and students use Zoom video conferencing to connect. All participants are required to have audio and video enabled throughout the live session. The goal of the live sessions is to foster rich discourse among the participants about the course materials. The emphasis is on collaboration between the different stakeholders and not on direct instruction during the live session.

In addition to the three hours per week of live, synchronous instruction, students spend another five to seven hours per course per week with asynchronous work. Asynchronous coursework includes watching instructional videos, reading instructional materials, working on assignments, and, in some courses, required collaborative study groups. Students use Microsoft Teams, Office 365 including Outlook, and GSuite for

Education to collaborate outside of the live sessions. Instructors are available outside of live sessions through Microsoft Teams, email, and virtual office hours in Zoom. All of these learning activities and collaboration opportunities rely heavily on students having a robust Internet connection.

English Courses at Research Site.

Most course materials are delivered in the Blackboard learning management system. Currently the research site offers six online English courses (Table 3.1). The courses were originally created as face-to-face courses by curriculum specialists at the research site. Online versions of the courses were created by two instructors in 2016. The Online Curriculum Coordinator at the research site designed Writing in the Humanities, Critical Reading and Writing, Composition and Analysis, Introduction to Literary Studies, and British Literature. With the support of the Online Curriculum Coordinator, an instructor designed the American Literature course. Before the courses were implemented they went through a quality review from an independent educational consortium. The courses were reviewed against the Course Standards adopted by the school (Appendix C). The courses are reviewed each semester by the Online Curriculum Coordinator to ensure that they are consistent in quality and delivery. The Online Curriculum Coordinator uses both the Course Standards and Teaching Standards (Appendix D) in her review and feedback process. The research site formally solicits student feedback each semester that is analyzed and used to ensure quality and parity in structure and rigor across all English courses (Appendix E). Lastly, all courses have been approved by the University of California (UC) system as meeting “B” (English) requirement for California high school students applying to a UC school. The UC

approval process requires a formal submission of each course and review against the International Association for K-12 Online Learning (iNACOL) Standards for Quality Online Courses v2 (2011).

Table 3.1 Online English Course Sequence

Course Name	Corresponding Grade Level
Writing in the Humanities	Middle school
Critical Reading and Writing	Middle school
Composition and Analysis	Middle school
Introduction to Literary Studies	First year high school
American Literature	Second year high school
British Literature	Third year high school

English courses were deliberately selected for this study as (a) the six courses are taught by three instructors which minimized variation in teaching styles, (b) all but one course was designed by the Online Curriculum Coordinator which minimized variation in course design, (c) more students at the research site are taking English courses which maximized the potential number of study participants, and (d) English courses rely heavily on communication, both asynchronous and synchronous, which supports the sixth construct from which perceptions are being studied in this mixed methods research.

Sample Internet Speeds at Research Site.

In addition to a fully online public school, the research site also offers fully online courses for enrichment. The enrichment courses are offered in the evening and are generally viewed as preparatory courses for younger students who may wish to apply as full-time students to the research site when they are older. The research site regularly

collects data from students in the enrichment courses about the speed of their home Internet connection. In December of 2019, 29 students in the enrichment courses used Speedtest (www.speedtest.net) and self-reported their Internet download speeds. While the students in the enrichment courses were not included in this study, their self-reported Internet speeds showed a wide range of download speeds (Table 3.2). Similar to the sample in this study, students in the enrichment classes are all highly gifted and reside across the U.S. The variability and range shown in Table 3.2 helps to illustrate the disparity in home Internet speed across the U.S., even in a small sample.

Table 3.2 Internet download speeds from similar sample

Statistic	Value
N	29
Mean	84.1958
Median	50.450
Std. Dev.	123.4388
Range	648.0
Minimum	2.0
Maximum	650
Percentile 25	12.780
Percentile 50	50.450
Percentile 75	116.620

Data Collection and Analysis/Instruments and Procedures

All students in the school who were taking a course in English were invited to participate in the quantitative data collection process, which was conducted using an online survey administered through Google Forms. Using maximum variation sampling,

participants were identified as belonging to high or low Internet download speed groups. Twelve participants, six from each group, were recruited to participate in the focus groups. A total of six participants, three from each group, agreed to participate in the focus groups.

Quantitative Data

Quantitative research can be used to understand how one attribute or variable explains another (Creswell, 2014). The independent variable in this study, the speed of Internet connection, is relatively easy to categorize and quantify using an online tool, Speedtest (www.speedtest.net). The dependent variables, which are various measures of student perceptions, require more analysis to quantify. Perception is generally viewed as a way something is understood or interpreted (Lexico, n.d.). Schunk and Meece (1992) defined student perceptions as "thoughts, beliefs, and feelings about … situations and events" (p. xi). Perceptions are complex processes influenced by a number of factors (Schunk, 1992).

Quantitative data collection was conducted with a Google Forms online survey. Questions related to the dependent variables were presented in a grid format. A 5-point Likert scale set of questions was used where 1 is strongly disagree and 5 is strongly agree. Additionally, respondents were given the option of selecting "Not Applicable." This option prevented respondents from being forced to answer a question for which they were not confident about their response. One open-ended question was included in the survey. This allowed participants to add any explanatory comments.

The survey was framed around the work of Gentry and Springer (2002) and Gentry and Owen (2004) who developed and validated the Student Perceptions of

Classroom Quality (SPOCQ), which is comprised of 38 questions using a 5-point Likert scale to understand the perceptions of gifted secondary students (Appendix F). The SPOCQ is copyrighted by Gentry, Owen, and Springer but freely available for use without prior permission from Purdue University's Gifted Education Resource and Research Institute (Gifted Education Resource Institute Instrument Repository, n.d.). Since the SPOCQ only addressed five (appeal, challenge, choice, meaning, and self-efficacy) of the six constructs from which the author was measuring student perceptions, the tool was modified to include questions related to perceptions of communication (the sixth dimension for this study) within the online course.

Questions for the sixth construct, communication, were written and tested in the Spring of 2018 by the author during an Advanced Quantitative Research Methods class at Boise State University. Initially, five questions were drafted:

1. The course uses an appropriate amount of asynchronous (e.g., discussion boards, email, instant messaging) communication. (C1)
2. The course uses an appropriate amount of synchronous (e.g., live online class session with audio and/or video enabled) communication. (C2)
3. The communication methods in the course contribute to my understanding of the content. (C3)
4. The communication methods in the course help me feel connected to my classmates. (C4)
5. The communication methods in the course help me feel connected to my teacher. (C5)

The first four of these questions were included on the modified SPOCQ used for this study (see Reliability and Validity for more).

Questions relating to select demographics (age, gender, English course, community type, and race) were included on the survey. Age, gender, and English course were included for classification and descriptive purposes. Community type (rural, suburban, and urban) and race were included as these have been identified as factors impacting differences in home Internet access for U.S. eighth-grade students (KewalRamani et al., 2018). A complete copy of the survey administered for this study is included in Appendix G.

In addition to completing the survey, respondents were asked to self-report their Internet speed by using the website Speedtest by Ookla (www.speedtest.net), a free online tool that measures data upload and download speeds to and from the Internet. Speedtest is used over 10 million times a day by users across the globe (Speedtest, n.d.). Speedtest can be accessed from Internet-enabled devices running iOS, Android, macOS, Windows, or Google Chrome operating systems. Internet download speed data was collected from all respondents three times during the course of the study. One Speedtest was conducted during the survey completion to simulate bandwidth while working asynchronously on course materials. The other two Speedtests were conducted during a live session to accurately report bandwidth during synchronous learning, a key component of the online course experience. Students were placed into high and low Internet speed groups based on the mean of their three Speedtests.

As the researcher was interested in understanding if the speed of the Internet connection has any impact on a student's perception of the quality of their online course,

using a test suitable for bivariate data analysis is appropriate. Bivariate data analysis is an appropriate tool to help understand how one variable affects another (Schacht & Aspelmeier, 2018). By comparing the means of the high and low Internet speed groups, the researcher was able to show if there is a bivariate relationship between Internet speed and student perceptions of course quality on the six domains included in this study. The research site for this study was a small sample of the general population (middle and secondary students taking online courses from a remote location). No data is known about the general population and the researcher was interested in whether or not there is a statistically significant difference between the two, independent groups, thus an independent samples *t*-test was an appropriate statistical test to analyze the quantitative data (Schacht & Aspelmeier, 2018). Independent samples *t*-tests were conducted for each of the six domains (constructs) for which perceptions are being reported by the participants. Due the small sample size and potential for the data to not meet the assumptions necessary for parametric testing, the Mann-Whitney *U* test, a nonparametric test, was added as a second quantitative analysis tool.

Reliability and Validity

Data used to measure the six latent constructs was collected on a modified version of the SPOCQ Survey developed by Gentry and Owen (2004). The SPOCQ was specifically designed for use with gifted student populations and is designed to measure student perceptions in five areas, (a) appeal, (b) challenge, (c) choice, (d) meaningfulness, and (e) academic self-efficacy, that are considered cornerstones of good gifted education. The addition of the sixth construct, communication, is the modification to the SPOCQ.

Gentry and Owen (2004) conducted a review of the literature and relied on 22 content experts to assess the content validity of the SPOCQ. The survey was then pilot tested with 500 high school students. The results of the pilot study were subjected to exploratory factor analysis (EFA). The EFA showed internal consistencies ranged from .80 to .84 for the five constructs (Gentry & Springer, 2002). To further assess validity, Gentry and Owen (2004) conducted confirmatory factor analysis (CFA), as it has a stronger requirements than EFA. The CFA results were strong with a Bentler's Comparative Fit Index of .997 (exceeding the .95 threshold of good fit) and a root mean square error of approximation of .051 (.90 confidence interval between .048 and .055). Reliability for the SPOCQ was analyzed through Statistical Package for the Social Sciences (SPSS) with alpha reliability coefficients above .80 for all five constructs.

The researcher for this study drafted a total of five questions designed to measure student perceptions of communication in their online classes. The additional communication questions were administered to senior aerospace engineering students in the spring of 2018 to pilot test the validity of the questions to measure the desired construct. All of the respondents were in the final semester of their senior projects class. Initial reliability was assessed in SPSS, which showed Cronbach's alpha of .809 (desired threshold > .80). Construct validity was assessed using principal component analysis in SPSS. The resulting correlation matrix indicated the fifth question (The communication methods in the course helps me feel connected to my teacher. (C5)) was not correlated with the other four communications questions and thus is not included in this study. Questions C1, C2, C3, and C4 did constitute a component and were retained for use in the study. The

wording of C1, C2, C3, and C4 was slightly modified to align with the general wording used on the SPOCQ.

Qualitative Data

The qualitative portion of the study was designed to understand the essence of the student's experience in regard to how their Internet speed impacted their perceptions of their online courses. Qualitative data was collected after the quantitative data had been collected and analyzed. This allowed for the researcher to use maximum variation sampling to identify participants from both groups (low and high Internet speeds) for the focus groups. Qualitative data was collected using a focus group format with open-ended questions. The focus groups were conducted using online video conferencing software and recorded for full transcription. The focus group participants were asked opinions/values and experience/behavior questions.

Opinions and values questions allow the researcher to better understand the participants' beliefs and opinions about a topic under study (Merriam, 2009). Opinions and values questions were used to help answer mixed methods research questions (Q2) and the qualitative research questions (Q3 and Q3a) as these questions are most interested in better understanding the perceptions of the participants. Participants were given a list of the constructs with definitions addressed by the modified SPOCQ (Appendix H) with their invitation to participate in the focus group. This list also included the survey questions that aligned with each of the six domains on the survey. Having this information in advance, and also available during the focus group, helped the participants better understand the opinions and values questions. The opinions and values focus group questions were:

F1. Please review and consider your answers on the survey related to the appeal construct. Discuss your thoughts about the appeal of your online English course.

F2. Please review and consider your answers on the survey related to the challenge construct. Discuss your thoughts about the challenge of your online English course.

F3. Please review and consider your answers on the survey related to the choice construct. Discuss your thoughts about the choice construct of your online English course.

F4. Please review and consider your answers on the survey related to the meaning construct. Discuss your thoughts about the meaningfulness of your online English course.

F5. Please review and consider your answers on the survey related to the self-efficacy construct. Discuss your thoughts about your self-efficacy in your online English course.

F6. Please review and consider your answers on the survey related to the communication construct. Discuss your thoughts about communication in your online English course.

Experience and behavior questions help the researcher to better understand the participants' behaviors and actions (Merriam, 2009). Experience and behavior questions were used to help answer qualitative research Q3b. Three guiding experience and behavior questions were used for the focus groups:

F7. How did Internet speed impact your learning?

F8. How did you troubleshoot any Internet connectivity issues?

F9. How was your learning impacted by any temporary Internet outages? If applicable, how did you resolve for temporary Internet outages?

These three questions lead to unscripted, follow-up questions and comments which provided further insight and allowed each participant to share what was important to the topic under study.

The focus groups were recorded and transcribed verbatim using Otter.AI. The transcript was reviewed in NVivo and coded for themes that began to answer the research questions. Six participants with the most extreme low or high Internet download speeds were selected for each focus group. Three participants consented to participate in each of the two focus groups. Focus groups of this size allow for diversity in experience without creating a group too large for participants to feel their voice may not be heard (Creswell, 2013; Onwuegbuzie et al., 2009).

The transcripts were coded using a two cycle coding method. The first stage of coding used In Vivo codes - carefully selected verbatim words and phrases from the transcript that represent larger units of data (Saldaña, 2009, 2018). In Vivo coding, also known as literal or verbatim coding, is an elemental coding method, which is a primary approach appropriate for virtually all qualitative studies (Saldaña, 2009). Using In Vivo coding allowed the researcher to maintain an emphasis on the actual language used by participants in the focus group.

Pattern coding was used for the second and final stage of coding. Pattern codes are explanatory codes that identify emerging themes (Saldaña, 2009). Pattern codes “call together a lot of material into a more meaningful and parsimonious unit of analysis”

(Miles & Huberman, 1994, p.69). Pattern coding allowed the researcher to summarize the focus group findings into themes that help answer the research questions (Saldaña, 2009). Patterns were identified when at least three (50%) of the focus group participants addressed a similar topic as they were explaining their responses to the dimensions of perceptions.

The researcher used a prosaic style of writing that relied on simplicity and trusted "in the power of the research tale itself, told in a clear and straightforward manner" to express the findings from the focus groups (Saldaña et al., 2011, p.141). The main emphasis was on using the group as the unit of analysis; however, data on the proportion of participants that were a part of the consensus from which the themes emerged and the proportion of participants that expressed any dissenting or non-viewpoints is included to help the reader better understand the complexity of the focus group conversations (Onwuegbuzie et al., 2009).

Answering the Research Questions

The three research questions will be discussed in the order they are presented in this chapter. This order was deliberately chosen for this study as the mixed methods question (RQ2) is designed to better understand the quantitative question (RQ1). The qualitative research question (RQ3) and its sub-questions (RQ3a and RQ3b) are largely independent of the quantitative question and results. The researcher conducted the qualitative data analysis described in this chapter before answering the RQ2. The full discussion of qualitative data analysis will be discussed in Chapter 4 with RQ3. Table 3.3 shows the alignment of the research questions to the data collection strategies/methods and the data analysis tools.

Table 3.3 Alignment of research questions to data analysis

Research Questions	Data Collection and Instruments	Data Analysis
Q1. Is there a significant difference in the perceptions of fully online, gifted students' on the quality of their online English course as measured by a modified version of the SPOCQ between students with high and low Internet download speeds?	Quantitative survey - modified SPOCQ	Independent *t*-test and Mann-Whitney *U* test
Q2. In what ways does data from focus groups comprised of fully online, gifted students with high and low Internet download speeds help explain the results of the quantitative survey related to their perceptions of the quality of their English course as measured on modified SPOCQ constructs?	Qualitative focus groups and Quantitative survey	Maximum variation sampling to identify focus group participants and In Vivo and pattern coding for focus group data
Q3. What themes emerge from focus group interviews with fully online, gifted students about their perceptions of the quality of their English course?	Qualitative focus groups	In Vivo and pattern coding for focus group data
Q3a. How do the participants perceive the quality of their English course by the constructs in the modified SPOCQ?	Qualitative focus groups	In Vivo and pattern coding for focus group data
Q3b. How do participants discuss the connectivity issues they may have encountered?	Qualitative focus groups	In Vivo and pattern coding for focus group data

Timeline

The researcher received IRB approval for the study on February 21, 2020 (Appendix I). The researcher immediately began recruiting participants after receiving the IRB approval. The quantitative surveys were administered from March 13 to April 6,

2020. Between April 8 and April 20, 2020 students conducted two additional Speedtests during their synchronous live sessions. Focus groups were conducted on April 22, 2020 (low-Internet group) and May 2, 2020 (high-Internet group).

Chapter Summary

Research has shown that there is a relationship between student perceptions and achievement (Crawford et al., 1998; Horak & Galluzzo, 2017; Ramsden & Entwistle, 1981). Additionally, research has shown a relationship between technology and the student's online classroom experience (Li et al., 2010). The author sought to include these two constructs in this study to better understand if the speed of Internet connection influenced gifted students' perceptions of their online English course. After reviewing a number of measures of student perceptions, Gentry and Owen's (2004) SPOCQ, which measures perceptions from the lenses of meaningfulness, challenge, academic self-efficacy, choice, and appeal, was selected as the primary quantitative instrument for this study. The researcher introduced communication into the framework proposed by Gentry and Owen (2004). Communication addresses student perceptions of the synchronous and asynchronous opportunities to communicate with classmates and their instructor in the online courses. Including communication as a dimension from which to understand student perspectives was supported by research that identifies communicating and interacting with intellectual, same-age peers is a benefit of online learning for gifted students (Adams & Cross, 1999; Housand & Housand, 2012; Mann, 1994; Ng & Nicholas, 2007) and Moore's (1993, 2009) theory of transactional distance. Adding communication allowed the framework to address all six of the proposed research site's core values, thus making the research valuable to the site while also contributing a new

understanding to the broader fields of online education, gifted education, perceptions, and transactional distance.

The researcher designed and conducted a mixed method study to better understand the relationships between Internet connectivity as measured by download speeds and gifted students' perceptions of the quality of their online English course. The researcher chose an explanatory sequential design with the data collection happening in two distinct phases (Creswell & Plano Clark, 2018). The initial data collection happened through an online survey, a modified version of the SPOCQ, and was used to answer the first research question, "Is there a significant difference in the perceptions of fully online, gifted students' on the quality of their online English course as measured by a modified version of the SPOCQ between students with high and low Internet download speeds?" This quantitative data collection phase was followed by two independent focus groups where participants were selected based on their Internet download speed as reported on the survey. The qualitative data was used in combination with the quantitative data to answer the second research question, "In what ways does data from focus groups comprised of fully online, gifted students with high and low Internet download speeds help explain the results of the quantitative survey related to their perceptions of the quality of their English course as measured on modified SPOCQ constructs?" and independently to answer the third research question and sub-questions, which focused on themes that emerged from focus group interviews about perceptions of the quality of their English course and how participants discussed connectivity issues they may have encountered. The next chapter details the results of the data collection phase of this study.

CHAPTER FOUR: RESULTS

The purpose of this study was to examine the role of Internet connectivity on the perceptions of highly gifted students on the quality of their fully online English course on six domains: (a) appeal, (b) challenge, (c) choice, (d) meaningfulness, (e) self-efficacy, and (f) communication. Research has shown a connection between technology and a student's online classroom experience (Li et al., 2010). Building on previous research, with the assumption that online schools and course providers may have no control over the speed of a student's home Internet connection, the author conducted a mixed methods study to understand how technology helps to explain gifted students' perceptions of their online learning experience.

The researcher used mixed methods with an explanatory sequential design with data collection happening in two distinct phases (Creswell & Plano Clark, 2018). A QUAN + qual approach was adopted where the qualitative data was used to support and better explain the results of the quantitative data. The initial data was collected in an online survey designed to measure student perceptions on six dimensions of course quality - appeal, challenge, choice, meaningfulness, self-efficacy, and communication. In addition to answering a series of 42 Likert scale questions on their perceptions, participants also self-reported on their Internet download speed (QUAN). Through maximum variation sampling, the researcher identified two independent groups: students with low Internet download speeds and students with high Internet download speeds. Students with the most extreme Internet download speeds were selected from each group

to participate in focus groups (qual) to share their perceptions of the online course quality and how the speed of their Internet connection may influence their perceptions related to course quality. Focus group participants were also asked to share how they troubleshooted and adjusted for any Internet connectivity issues.

The results of the study are presented in three parts, one corresponding with each of the three research questions. The research questions represent the quantitative, mixed methods, and qualitative aspects of this study.

Survey Findings

The quantitative phase of the study sought to answer the first research question: "Is there a significant difference in the perceptions of fully online, gifted students' on the quality of their online English course as measured by a modified version of the SPOCQ between students with high and low Internet download speeds?" Independent samples *t*-test and Mann-Whitney *U* tests were conducted to test the null hypothesis (H_0),"The speed of a fully online student's home Internet connection has no impact on their perceptions of the quality of their English course."

Participants

Before specifically recruiting student participants, parent approval was sought as all participants were minors. Recruiting emails were sent to parents twice in February 2020 (Appendix B). A total of 31 parents provided consent. The students of those 31 parents were then recruited for participation in the study. The students received two emails in early March 2020 asking for their participation (Appendix B). The recruitment emails explained the potential benefits for their school for their participation. Students were not incentivized or coerced to participate in the study. A total of 19 students

returned the Student Consent to Participate form. The author wanted to ensure that students were participating voluntarily, so no email appeals were sent to the parents of the 12 students who did not respond to the recruitment emails, despite their parents completing the Parental Consent to Participate.

The primary quantitative data collection tool was an online survey, a modified version of Gentry and Owens' (2004) SPOCQ (Appendix G). The survey was administered to students who attended a full-time online campus of a public school for highly gifted students. The SPOCQ measures student perceptions of course quality on five domains: (a) appeal, (b) choice, (c) challenge, (d) self-efficacy, and (e) meaningfulness. The modification included a sixth domain from which to understand student perceptions, communication. Additionally, the survey asked participants to verify their Internet download speeds at Speedtest (www.speedtest.net) and self-report the speed in Mbps. The survey was available from March 13 to April 6, 2020, a period of 25 days. All 19 participants completed the survey. To increase the reliability of reported Internet download speeds, participants were also asked to self-report their speeds during two different synchronous live sessions between April 20 and May 2, 2020. All participants completed the additional two Internet download speed submissions.

A total of 19 students participated in the quantitative phase of the research study. This represents 45% of the total population ($N = 42$) at the research site. The sample (Table 4.1) was a similar representation of the total population where 63% of the students are male, 37% are female, and the average student age is 14.4 (Table 4.2). The sample, like the research site, had a high percentage of Caucasian-Americans. Participants primarily resided in suburban areas (73.7%) with 21.2% residing in urban areas. One

participant resided in a rural area, an area where high-speed Internet access is typically lagging (Federal Communications Commission, 2018). Participants in the sample represented all six English courses available at the research site (Table 4.3).

Table 4.1 Sample Demographics

		Frequency	Percent
Gender	Male	11	57.9
	Female	8	42.1
Ethnicity	Asian-American	4	21.1
	Caucasian-American	14	73.7
	Hispanic-American	1	5.3
Age	12	4	21.1
	13	2	10.5
	14	6	31.6
	15	5	26.3
	16	1	5.3
	17	1	5.3
Community	Rural	1	5.3
	Suburban	14	73.7
	Urban	4	21.1

Table 4.2 Age Descriptive Statistics

	N	Mean	Std. Deviation
Age	19	14.00	1.414

Table 4.3 Participants' English Courses

	Frequency	Percent
Writing in the Humanities	1	5.3
Critical Reading and Writing	3	15.8
Composition and Analysis	7	36.8
Introduction to Literary Studies	5	26.3
American Literature	2	10.5
British Literature	1	5.3
Total	19	100.0

Assumptions for Independent Samples *t*-test

To use an independent samples *t*-test, the data must meet several assumptions. First, the data must include two independent groups (Stone, 2010). In this study, participants reported their Internet download speed three times between April 13, 2020 and May 2, 2020. The average download speed was calculated and used to divide the participants into two independent groups, low and high, based on their Internet download speed. Twenty-five (25) Mbps was used as the cut point to distinguish between low and high Internet download speeds. The Federal Communications Commission (2018) considers download speeds of 25 Mbps or greater for a fixed (not mobile) connection to the Internet suitable for transmission of high-quality audio, video, data, and graphics. Using a definitive measure, like 25 Mbps, ensures that all average download speeds in the data can be categorized as low or high speeds. This also helps to ensure that the independent variable is categorical, another assumption of the independent samples *t*-test.

Another assumption of the independent samples *t*-test is that outliers should be minimized (Kent State University Libraries, 2017). Winsorizing, converting the value of

an outlier to the value of the nearest data point not considered an outlier, is an appropriate technique for handling an outlier (Reifman & Keyton, 2010). One average download speed in the high group (685.02 Mbps) was Winsorized to 196 Mbps, slightly higher than the next closest average download speed (195.78 Mbps) to reduce the effect it would have on the data as a spurious outlier.

An independent samples *t*-test assumes that the two groups are roughly equal in size (Kent State University Libraries, 2017). The case processing summary (Table 4.4) indicates that the high group (N_2 = 13) is more than 1.5 times the size of the low group (N_1 = 6), meaning the groups are unbalanced. To correct for this a random sample was taken of six of the high cases in SPSS and was used as a representative sample of the high group in all quantitative calculations (Table 4.5).

Table 4.4 Initial Case Processing Summary

	High/ Low	Cases					
		Valid		Missing		Total	
		N	%	N	%	N	%
Download Mean	Low	6	100.0%	0	0.0%	6	100.0%
	High	13	100.0%	0	0.0%	13	100.0%

Table 4.5 Case Processing Summary After Balancing

	High/ Low	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Download Mean	Low	6	100.0%	0	0.0%	6	100.0%
	High	6	100.0%	0	0.0%	6	100.0%

Another assumption of the independent samples *t*-test is that the dependent variable is at the interval or ratio level (Pallant, 2010). The dependent variable in this study is perceptions as reported by participants. The survey used a five-point Likert scale which allows it to be an “ordinal approximation of a continuous variable” (Statistics Solutions, 2020). Likert scale questions with a scale of five or greater can be analyzed as continuous instead of discrete without negatively harming the statistical analysis (Johnson & Creech, 1983; Norman, 2010; Sullivan & Artino, 2013; Zumbo & Zimmerman, 1993). One or more participants responded “not applicable” at least once on three of the dimensions of perceptions (appeal, choice, and self-efficacy) (Table 4.6). The survey was constructed with an “undecided” option in the middle of the Likert scale and “not applicable” outside the scale to add clarity that a “not applicable” response indicates that "this item does not apply to my situation" while “undecided” indicates that the respondent is undecided in their opinion (Van Tilburg Norland, 1991, para. 11). Thus, it is appropriate to treat responses of “not applicable” as missing data (Van Tilburg Norland, 1991). Each of the domains for which the survey measured perceptions was composed of multiple survey questions (Table 4.7). The mean score for each of the six domains was used in the statistical analysis. Using the mean score for Likert scale data is recommended, particularly when the scale is attempting to measure data that is less concrete, like perceptions (Sullivan & Artino, 2013).

Table 4.6 Not Applicable Responses

		Number of N/A Responses	
		Low	High
Appeal	Q3	5	4
	Q4	5	4
Choice	Q3	0	1
Self-Efficacy	Q5	3	3

Table 4.7 Modified-SPOCQ Questions for each Domain

	Survey Questions
Appeal	3, 9, 19, 20, 25, 26, 31
Choice	1, 5, 6, 12, 16, 17, 22
Challenge	4, 8, 11, 15, 18, 27, 33
Self-Efficacy	2, 14, 21, 23, 28, 30, 32, 34
Meaningfulness	7, 10, 13, 24, 29
Communication	39, 40, 41, 42

The independent samples *t*-test also assumes that the dependent variable(s) have a normal distribution within each group (Kent State University Libraries, 2017; Laerd, n.d.). There are six dependent variables - appeal, choice, challenge, self-efficacy, meaningfulness, and communication - in this study. The Shapiro-Wilk test of normality was used to check for normality. The Shapiro-Wilk test is the most common test for normality (Salkind, 2007). The results of the Shapiro-Wilk test (Table 4.8) indicate that appeal (low) and meaningfulness (high) are not normally distributed, thus an independent samples *t*-test is not suitable for comparing the means for these two domains. The Mann-

Whitney *U* test, a nonparametric test, was used to compare the means of the two groups for the appeal and meaningfulness domains.

Table 4.8 Shapiro-Wilk Test for Normality

	Group	Shapiro-Wilk Statistic	df	Sig.
Appeal	Low	.775	6	.035
	High	.851	6	.161
Choice	Low	.956	6	.787
	High	.885	6	.291
Challenge	Low	.917	6	.487
	High	.902	6	.387
Self-Efficacy	Low	.847	6	.149
	High	.925	6	.546
Meaningful	Low	.913	6	.457
	High	.764	6	.027
Communication	Low	.876	6	.252
	High	.809	6	.070

Homogeneity of variance is the final assumption of the independent samples *t*-test (Kent State University Libraries, 2017). Levene's *F* test was used to test for homogeneity of variance between the two independent groups, low and high Internet download speed (Table 4.9). There was homogeneity of variance for all dependent variables as Levene's $F(10) = .324$, $p = .083$ for appeal, $F(10) = .072$, $p = .793$ for choice, $F(10) = .870$, $p = .373$ for challenge, $F(10) = .440$, $p = .522$ for self-efficacy, $F(10) = 1.022$, $p = .336$ for meaningfulness, and $F(10) = .640$, $p = .442$ for communication with $\alpha \leq .05$ for all.

Table 4.9 Test of Homogeneity of Variance

Levene Statistic			df1	df2	Sig.
Appeal Mean	Based on mean	.314	1	10	.588
	Based on median	.023	1	10	.882
	Based on median and w/ adjusted df	.023	1	7.772	.883
	Based on trimmed mean	.248	1	10	.629
Choice Mean	Based on mean	.072	1	10	.793
	Based on median	.028	1	10	.870
	Based on median and w/ adjusted df	.028	1	9.576	.870
	Based on trimmed mean	.056	1	10	.817
Challenge Mean	Based on mean	.870	1	10	.373
	Based on median	.311	1	10	.589
	Based on median and w/ adjusted df	.311	1	8.929	.591
	Based on trimmed mean	.757	1	10	.405
Self-Effic. Mean	Based on mean	.440	1	10	.522
	Based on median	.370	1	10	.557
	Based on median and w/ adjusted df	.370	1	9.025	.558
	Based on trimmed mean	.438	1	10	.523
Meaningful Mean	Based on mean	1.022	1	10	.336
	Based on median	.060	1	10	.812
	Based on median and w/ adjusted df	.060	1	8.252	.813
	Based on trimmed mean	.884	1	10	.369
Commun. Mean	Based on mean	.640	1	10	.442
	Based on median	.233	1	10	.640
	Based on median and w/ adjusted df	.233	1	6.715	.645
	Based on trimmed mean	.502	1	10	.495

Independent Samples *t*-test

After verifying the data met the assumptions necessary to conduct the independent samples *t*-test for the choice, challenge, self-efficacy, and communication domains, the test was conducted in SPSS (Table 4.10). The independent samples *t*-test indicated that there is no statistically significant difference in perception of online course quality as measured by choice ($p = .664$; $\alpha \leq .05$), challenge ($p = .724$; $\alpha \leq .05$), self-efficacy ($p = .482$; $\alpha \leq .05$), and communication ($p = .721$; $\alpha \leq .05$) domains between students with low and high Internet download speeds. Thus, the null hypothesis cannot be rejected for these four measures of student perceptions.

Table 4.10 Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	Lower	Upper
Choice Mean	Equal variances assumed	.072	.793	-.448	10	.664	-.1865	.4166	-1.1149	.7419
	Equal variances not assumed			-.448	9.811	.664	-.1865	.4166	-1.1173	.7443
Chall. Mean	Equal variances assumed	.870	.373	.363	10	.724	.0952	.2625	-.4897	.6802
	Equal variances not assumed			.363	9.412	.725	.0952	.2625	-.4947	.6852
Self-Efc. Mean	Equal variances assumed	.440	.522	.729	10	.482	.2023	.2774	-.4157	.8205
	Equal variances not assumed			.729	9.973	.483	.2023	.2774	-.4160	.8207

Comm .Mean	Equal variances assumed	.640	.442	.368	10	.721	.1250	.3400	-.6326	.8826
	Equal variances not assumed			.368	8.029	.723	.1250	.3400	-.6586	.9086

Nonparametric Test

Nonparametric tests are not bound by the assumptions of parametric tests, like the independent samples *t*-test. Nonparametric tests, such as the Mann-Whitney *U* test, can be used to compare groups when a parametric test is not suitable (Hinton, 2010, Saldaña, 2016). The Mann-Whitney *U* test is a commonly used nonparametric test that compares two independent groups (Hinton, 2010). The Mann-Whitney *U* test is particularly well suited for comparing small sample sizes (Hinton, 2010). While a nonparametric test was necessary for comparing the appeal and meaningfulness domains because they did not meet the assumptions for normality, the Mann-Whitney *U* test was also used to compare the choice, challenge, self-efficacy, and communication domains to increase validity of the results. While these domains met the assumptions for the independent samples *t*-test, they had small sample sizes ($n = 6$). While an independent samples *t*-test can be done with samples as small as six, inferences can be tenuous with sample sizes this small (Kent State University Libraries, 2017; Stone, 2010).

There are four assumptions that must be met for the Mann-Whitney *U* test to be valid (Laerd, n.d.). The first three assumptions - dependent variable is at the ordinal or continuous level, independent variable is composed of two categorical independent

groups, and independence of observations - have already been shown to have been met for all six domains (see Assumptions for Independent Samples *t*-test). The fourth assumption requires the shape of the distribution to be known for both groups. Interpretation of the Mann-Whitney *U* test is predicated on knowing the shape of the two distributions (Laerd, n.d.). If the shapes of the distributions of the two groups for each dependent variable are similar then a comparison of the medians is appropriate. If the shapes of the distributions are dissimilar then inferences can be made about the differences in the distributions, high and low scores, and mean ranks rather than the median (Laerd, n.d.) The initial results of the Mann-Whitney *U* test from SPSS indicate that the null hypothesis should be retained for all six domains (Table 4.11). However, the shape of the distributions for each dependent variable must still be evaluated.

Table 4.11 Mann-Whitney U Test

Null Hypothesis	Sig.	Decision
The distribution of Appeal mean is the same across categories of high/low.	.699[1]	Retain the null hypothesis.
The distribution of Choice mean is the same across categories of high/low.	.589[1]	Retain the null hypothesis.
The distribution of Challenge mean is the same across categories of high/low.	.818[1]	Retain the null hypothesis.
The distribution of Self-efficacy mean is the same across categories of high/low.	.485[1]	Retain the null hypothesis.
The distribution of Meaningfulness mean is the same across categories of high/low.	.699[1]	Retain the null hypothesis.
The distribution of Communication mean is the same across categories of high/low.	1.000	Retain the null hypothesis.

[1] Exact significance is displayed for this test.

Comparing the shapes of the distributions for similarity is a judgement call that is more subjective when the sample size is small (Laerd, n.d.). The researcher compared the shapes looking for similar, not identical shapes, in reviewing the results of the data and found that two of the dependent variables, choice and communication, had similar shapes while the remaining four, appeal, challenge, self-efficacy, and meaningfulness, did not.

Distributions of the appeal scores for low and high were not similar, as assessed by visual inspection (Figure 4.1). Results of the Mann-Whitney *U* test (Table 4.12) indicate there was no statistically significant difference in student perceptions of the appeal domain between the low (mean = 7.00) and high (mean = 6.00) Internet download speeds groups (Table 4.13), $U = 15.0$, $z = -.499$, $p = .699$, using an exact sampling distribution for *U* (Dineen & Blakesley, 1973).

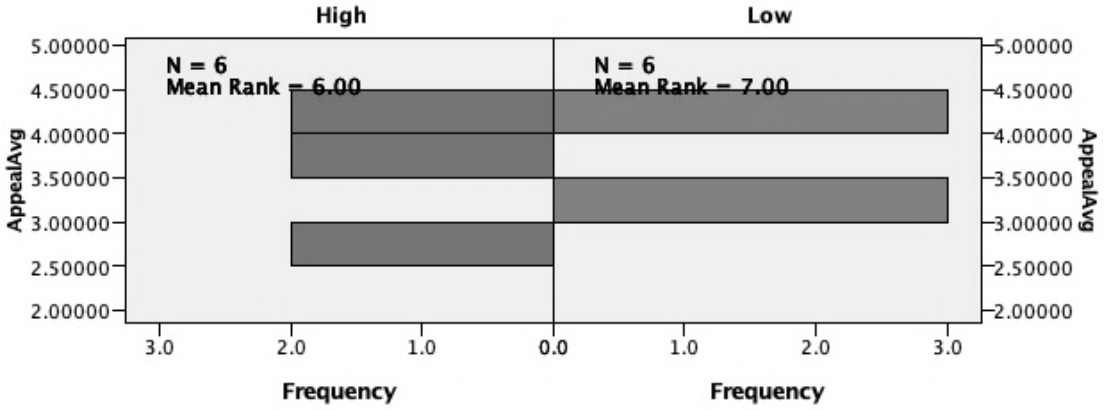


Figure 4.1 Shape of Distribution – Appeal

Table 4.12 Mann-Whitney U Test Statistics

	Appeal	Choice	Challenge	Self-Effic.	Meaningful	Commun.
Mann-Whitney *U*	15.000	14.000	16.500	13.000	15.000	18.000
Wilcoxon W	36.000	35.000	37.500	34.000	36.000	39.000
Z	-.499	-.642	-.244	-.802	-.486	.000
Asymp. Sig. (2-tailed)	.618	.521	.807	.423	.627	1.000
Exact Sig. [2*(1-tailed Sig.)]	.699[b]	.589[b]	.818[b]	.485[b]	.699[b]	1.000[b]

[a] Grouping variable high/low.
[b] Not corrected for ties.

Table 4.13 Mean Ranks

	High/Low	N	Mean Rank	Sum of Ranks
Appeal	Low	6	7.00	42.00
	High	6	6.00	36.00
	Total	12		
Choice	Low	6	5.83	35.00
	High	6	7.17	43.00
	Total	12		
Challenge	Low	6	6.75	40.50
	High	6	6.25	37.50
	Total	12		
Self-Efficacy	Low	6	7.33	44.00
	High	6	5.67	34.00
	Total	12		
Meaningful	Low	6	7.00	42.00
	High	6	6.00	36.00
	Total	12		
Commun.	Low	6	6.50	39.00
	High	6	6.50	39.00
	Total	12		

Distributions of the choice scores for low and high groups were similar, as assessed by visual inspection (Figure 4.2). Results of the Mann-Whitney *U* test indicate there was no statistically significant difference in student perceptions of the choice domain between the low (median = 2.571) and high (median = 3.142) Internet download speed groups (Table 4.14), $U = 14.00$, $z = -.642$, $p = .589$.

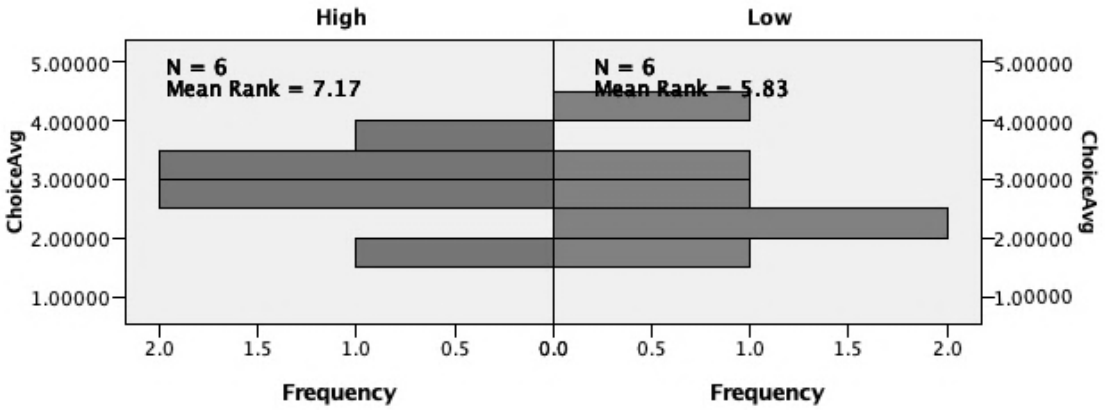


Figure 4.2 Shape of Distribution – Choice

Table 4.14 Choice Median

Group	Choice
Low	2.5714286
High	3.1428571
Total	2.7857143

Distributions of the challenge scores for low and high groups were not similar, as assessed by visual inspection (Figure 4.3). Results of the Mann-Whitney *U* test indicate there was no statistically significant difference in student perceptions of the challenge domain between the low (mean = 6.75) and high (mean = 6.25) Internet download speed groups, $U = 16.5$, $z = -.244$, $p = .818$, using an exact sampling distribution for *U* (Dineen & Blakesley, 1973).

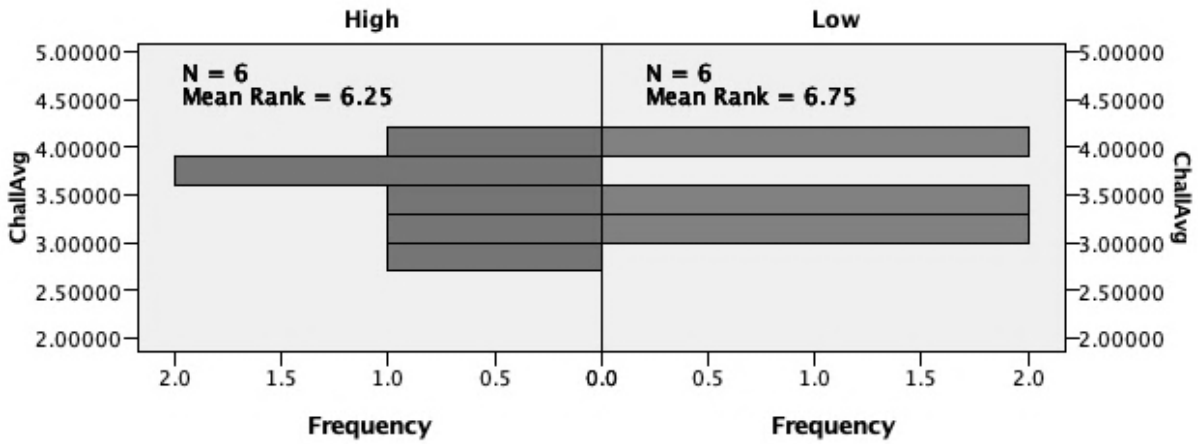


Figure 4.3 Shape of Distribution - Challenge

Distributions of the self-efficacy scores for low and high groups were not similar, as assessed by visual inspection (Figure 4.4). Results of the Mann-Whitney *U* test indicate there was no statistically significant difference in student perceptions of the self-efficacy domain between the low (mean = 7.33) and high (mean = 5.67) Internet download speed groups, $U = 13.0$, $z = -.802$, $p = .485$, using an exact sampling distribution for *U* (Dineen & Blakesley, 1973).

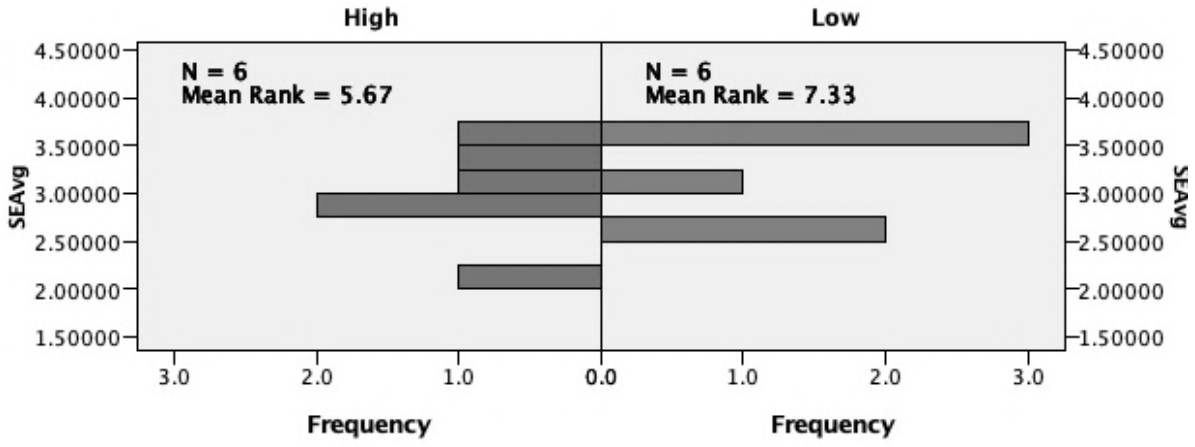


Figure 4.4 Shape of Distribution - Self-Efficacy

Distributions of the meaningfulness scores for low and high groups were not similar, as assessed by visual inspection (Figure 4.5). Results of the Mann-Whitney *U* test

indicate there was no statistically significant difference in student perceptions of the appeal domain between the low (mean = 7.00) and high (mean = 6.00) Internet download speed groups, $U = 15.0$, $z = -.486$, $p = .699$, using an exact sampling distribution for U (Dineen & Blakesley, 1973).

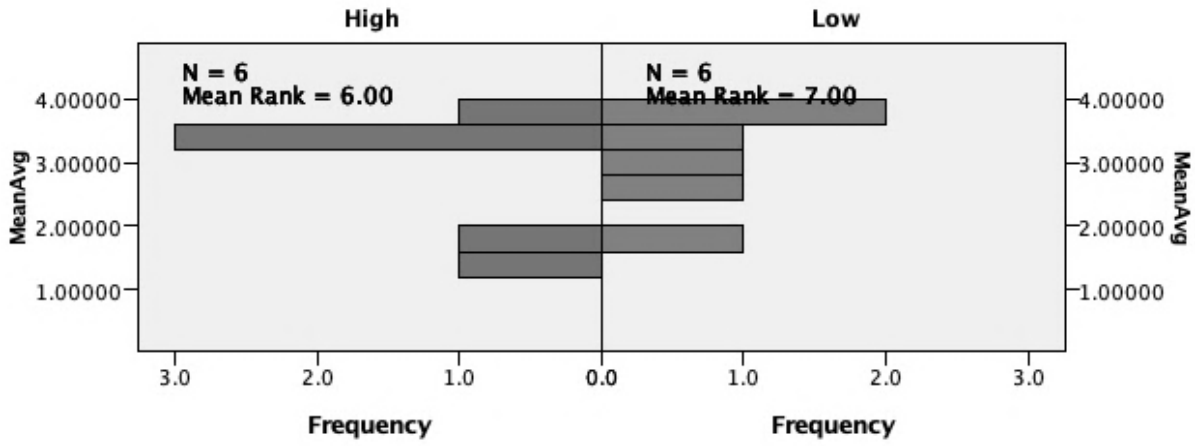


Figure 4.5 Shape of Distribution - Meaningfulness

Distributions of the communication scores for low and high groups were similar, as assessed by visual inspection (Figure 4.6). Results of the Mann-Whitney U test indicate there was no statistically significant difference in student perceptions of the communication domain between the low (median = 3.625) and high (median = 3.625) Internet download speed groups (Table 4.15), $U = 18.00$, $z = 0$, $p = 1.00$.

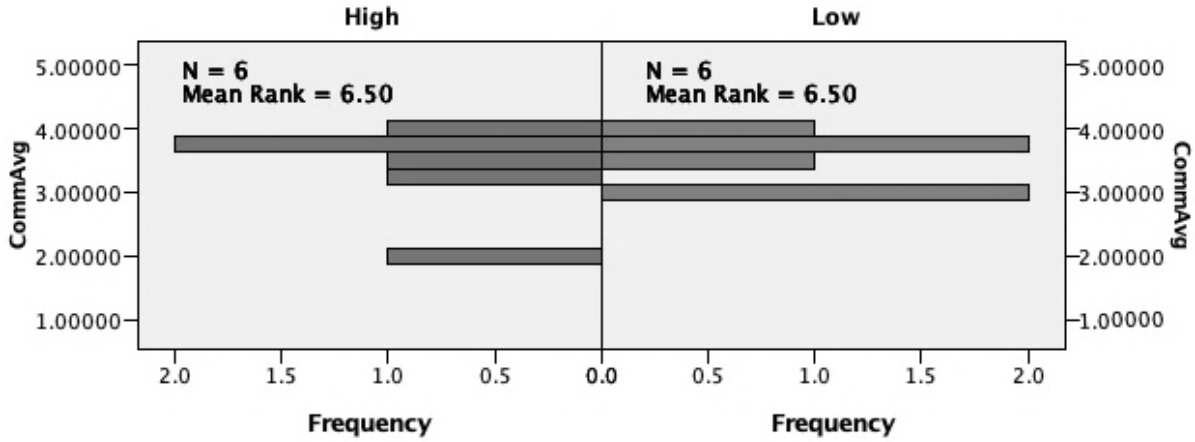


Figure 4.6 Shape of Distribution - Communication

Table 4.15 Communication Median

Group	Communication
Low	3.6250000
High	3.6250000
Total	3.6250000

The results of the quantitative analysis support retaining the null hypothesis (H_0) "The speed of a fully online student's home Internet connection has no impact on their perceptions of the quality of their English course" and rejecting the alternative hypothesis (H_a) "The speed of a fully online student's home Internet connection impacts their perceptions of the quality of their English course in at least one domain on a modified SPOCQ."

Focus Group Findings

Focus groups were conducted on April 25, 2020 and May 2, 2020 to collect qualitative data to answer the qualitative research question and provide support with answering the mixed methods research question. There were two focus groups, one for participants with the lowest Internet download speeds and one for participants with the

highest Internet download speeds. Prior to the start of the focus groups, participants were provided a list of the questions for the focus groups and descriptions for each of the six domains from which perceptions were being studied (Appendix H). Twelve participants (six from each independent group) with the most extreme Internet download speeds were invited to the focus groups. A total of six students (three low and three high) agreed to participate. Focus group participants were evenly split by gender, were predominantly Caucasian-Americans, and lived primarily in suburban areas (Table 4.16). The mean age of the focus group participants was 13.83, which is younger than the population (M = 14.4) (Table 4.16). The focus group participants represent five of the six English courses offered at the research site (Table 4.18).

Table 4.16 Focus Group Demographics

		Frequency	Percent
Gender	Male	3	50.0
	Female	3	50.0
Ethnicity	Asian-American	2	33.3
	Caucasian-American	4	66.7
Age	12	1	16.7
	13	1	16.7
	14	2	33.3
	15	2	33.3
Community	Rural	1	16.7
	Suburban	5	83.3

Table 4.17 Mean Age of Focus Group Participants

	N	Mean
Age	6	13.83

Table 4.18 English Course for Focus Group Participants

	Frequency	Percent
Writing in the Humanities	1	16.7
Critical Reading and Writing	1	16.7
Composition and Analysis	1	16.7
Introduction to Literary Studies	2	33.3
American Literature	1	16.7

The focus groups were conducted on April 25 and May 2, 2020 through Zoom video conferencing software, recorded, and then transcribed verbatim using Otter.AI. The transcript was reviewed in NVivo and coded for themes that began to answer the research questions (Figure 4.7). The transcripts were coded using a two cycle coding method (Saldaña, 2009). In Vivo codes, carefully selected verbatim words and phrases from the transcript that represent larger units of data, were used in the first phase of coding (Saldaña, 2009, 2018). In Vivo coding, also known as literal or verbatim coding, is an elemental coding method, which is a primary approach appropriate for virtually all qualitative studies (Saldaña, 2009). Using In Vivo coding allowed the researcher to maintain an emphasis on the actual language used by participants in the focus group. Pattern coding was used for the second and final stage of coding. Pattern codes are explanatory codes that identify emerging themes (Saldaña, 2009). Pattern codes “call together a lot of material into a more meaningful and parsimonious unit of analysis”

(Miles & Huberman, 1994, p. 69). Pattern coding allowed the researcher to summarize the focus group findings into themes that help answer the research questions (Saldaña, 2009).

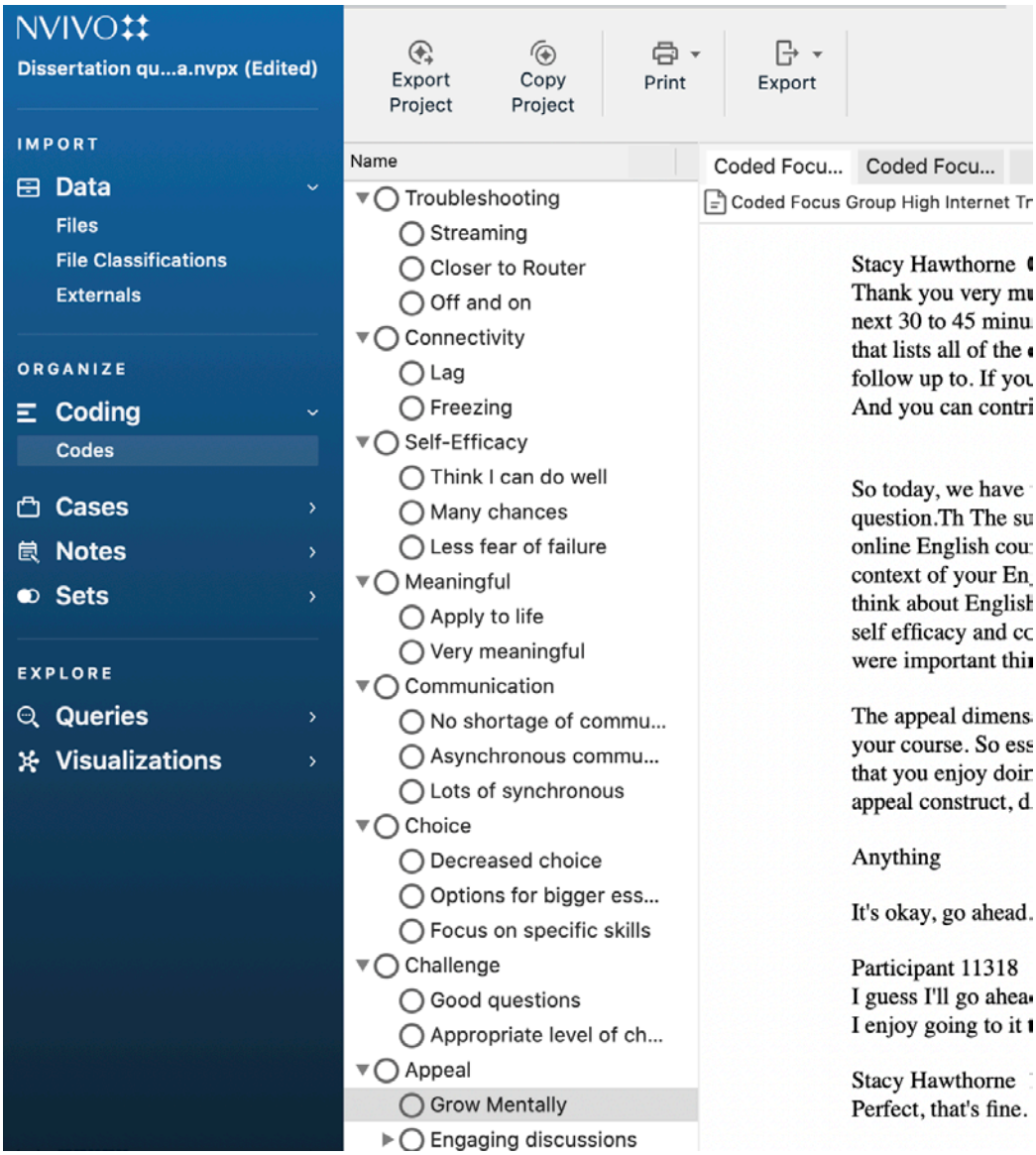


Figure 4.7 NVivo Code Book

Research Question Two

The qualitative data was used to answer the second research question, “In what ways does data from focus groups comprised of fully online, gifted students with high

and low Internet download speeds help explain the results of the quantitative survey related to their perceptions of the quality of their English course as measured on modified SPOCQ constructs?" In the quantitative portion of the study, no statistically significant difference was found between participant's perceptions on six domains - appeal, choice, challenge, self-efficacy, meaningfulness, and communication - when comparing the perceptions of participants with low and high Internet download speeds. The qualitative data was used to better understand the quantitative results. The results are discussed below by each of the six domains - appeal, choice, challenge, self-efficacy, meaningfulness, and communication.

Appeal

Participants were asked to discuss their thoughts about the appeal of their online English course during the focus groups. Participants in the high Internet speed focus group used "fun" and "engaging" to describe their online English courses. Their responses were short and focused on the enjoyment of their courses. Participants in the low Internet speed also discussed enjoyment in their course, but they expounded on their responses by saying that their courses helped them to "grow mentally." They also discussed enjoying discussions and analyzing course materials. The qualitative data supports the finding of no statistically significant difference in perception of course appeal for participants based on their Internet download speed. Both groups found their courses appealing - "fun" even.

Choice

Participants in both focus groups reported low levels of choice in their online English courses. Participants reported that the further they progressed in the English

sequence, the less they perceived that they had a choice in their curricular materials. They attributed this to progressing from generalized courses to courses with more specificity. A participant in the low Internet download speed focus group explained that he thinks the level of choice is “decreased because we were going from more generalized subjects to specific subjects. Like in a previous English class, we analyze fallacies as a whole. Whereas in this [more advanced course] if we were to analyze fallacies you might focus on specifically the strawman fallacy or slippery slope fallacy, black and white fallacy. So we would have less choice because we're learning more specifically.” For example, in Writing in the Humanities (the earliest course in the sequence) a student is learning more general writing skills compared with American Literature (a later course in the sequence) where students are doing literary analysis of specific pieces of American literature. Participants reported that they had the most choice when it came to how they composed their writing or what specific themes they chose to analyze. A participant in the high Internet download speed group commented “even though we don't really get to choose what assignments we do… we still do get a lot of options for bigger essay assignments where we get to kind of pick what we're going to argue in our essay.” Another participant from the same group reported that having more choice in curricular matters would make it difficult to proceed through the course as she would get bogged down trying to make the “right” choice. Perceptions of choice were consistent for both focus groups as both groups discussed decreasing choice as they advanced in the curriculum and that choice was primarily in how the composed their final pieces. A participant in the high Internet download speed group described this as choice “within assignments rather than between assignments” while a participant in the low Internet download speed group described it as

having the ability to “figure out how we're going to apply specific skills in what we're trying to say in our writing.” The qualitative data support the findings that Internet download speed was not a factor in student perceptions of choice in their online English course.

Challenge

Participants in both focus groups consistently reported that their online English course offered them the appropriate level of challenge. One participant in the low Internet download speed group defined having an appropriate level challenge as “basically, you have to struggle, you have to mentally work hard to do well in it. That said, it's not too hard, which would make it stressful and unhealthy. But it is just the right level. Basically, I can make A's if I work hard enough, but at the same time, it's only if I work hard enough. I can't just relax.”

All participants in the high Internet download speed focus group reported that synchronous discussions helped them to understand complex topics. One participant stated “we have a lot of discussions, which helps me and my classmates think about the concept because we can bounce ideas off of each other.” Participants in the low Internet download speed group did not specifically mention peer-to-peer discussions as a strategy to understand complex topics, but rather described talking “about high level concepts” and “about the understanding of concepts that we've been reading” as ways to help them manage the level of challenge in their English course. Regardless of Internet speed, all participants reported that their online English courses were appropriately challenging. Participants in the high Internet download speed group reported more ways to handle the challenge level (synchronous discussions), but both groups reported that they felt their

courses were appropriately challenging. The focus group discussions support the quantitative findings of no statistically significant difference in perceptions of the level of challenge in an online English course based on the Internet download speed of the student.

Self-Efficacy

Participants across both focus groups discussed having high perceptions of their self-efficacy in their online English courses. All participants in the focus groups spoke of high levels of self-efficacy. Participants in the low Internet download speed groups said "I can go into the assignments pretty confident," "I think I can do well," and "I know I can do them [assignments]" when asked about their sense of academic self-efficacy. A participant in the high Internet download speed group spoke of discussing what "we're going to write about in class" and opportunities for "first draft, second draft, and then final drafts" as helping her believe that there is "not really a place where we can exactly feel like we're going to fail because we have so many chances to make it better" in her English course. Additionally, a participant in this same group reported being able to submit drafts to a Writing Center that is staffed by peer-reviewers was increasing his academic self-efficacy. Participants in the high Internet download speed group specifically described their English course as a "supportive environment" that "removed the fear of failure." Participants in the low Internet download speed group reported high levels of self-efficacy going into assignments where participants in the high Internet download speed group spoke more of revisions and opportunities for feedback as attributing to their academic self-efficacy. While there was no noticeable difference in participants' overall level of self-efficacy based on the speed of their home Internet

connection, there was a noticeable difference as to where they derived their sense of academic self-efficacy. Participants in the high Internet download speed group seemed able to take advantage of collaborative opportunities to increase their sense of academic self-efficacy.

Meaningfulness

Participants in both focus groups reported that their online English courses were meaningful to them. They used adjectives like “very,” “extremely,” and “really” to describe how meaningful they perceived their course to be. Participants in both groups described their course as “having a lot of practical applications.” One participant in the low Internet download speed group discussed how his English course was supporting him in making real-world connections. He stated that he is able to connect the “conflict between science and belief in [the novel] Nightfall” with “the conflict in science and treatment of Coronavirus and ... the belief that you can be treated by this from panic.” Participants across both groups reported that the themes they are learning in literature are meaningful to their daily lives. Participants in both groups believed that their online English courses were meaningful to them, which aligns with the quantitative finding of no statistically significant difference between groups on the meaningfulness domain.

Communication

Participants in both groups discussed their communications in terms of synchronicity. Each English course at the research site has two 90-minute synchronous live sessions held over Zoom video conferencing each week. A participant in the low Internet download speed group said that synchronous communication “is superior due to the ability to quickly share ideas with one another” when comparing it to asynchronous

communication. Another participant in this group noted that “a lot of the idea development, a lot of our analysis of the text happens when we are talking to each other in live session.” A participant in the high Internet download speed group appreciated the ability to “form arguments with each other basically, and kind of discuss it and kind of work it [complex topics] out.” Both groups described the synchronous discussions as “very important” and “interesting.” One benefit of synchronous discussions is that “ideas can be shared and develop quickly.”

The groups varied in how they valued asynchronous communication, such as offline peer review activities and discussion boards. When discussing asynchronous communication, a participant in the low Internet download speed group noted “you could post and it could be like, another day or so until someone responds.” This contrasts with how a participant in the high Internet download speed group described the benefits of asynchronous communication. She stated that:

> every time we have an essay, we comment on each other's discussion boards, and we do a lot of peer reviewing outside of class, as well as like, there's some that's assigned and there's some that we just do to help each other out. And that provides a lot of opportunity to kind of work together with peers and make your writing as strong as possible, and to get as many different perspectives as you can.

Across both groups, participants agreed that they “need as much communication as possible” in their online English courses. While all participants reported overall high perceptions of communication in their online courses, participants in the low Internet download speed focus group favored synchronous over asynchronous communication

and participants in the high Internet download speed group found both communication methods equally valuable.

Research Question Three

The solely qualitative phase of the study was designed to better understand themes that emerged as participants discussed their perceptions of their online English courses. In addition to the primary qualitative research question, "What themes emerge from focus group interviews with fully online, gifted students about their perceptions of the quality of their English course?" there were two research sub-questions that were posed: (a) "How do the participants perceive the quality of their English course by the constructs in the modified SPOCQ?" and (b) "How do participants discuss the connectivity issues they may have encountered?"

Perceptions of Online Courses

In Vivo codes were identified for each of the six domains of perceptions studied in this research (Table 4.19). In Vivo codes were identified after reviewing the transcripts of the two focus groups. Codes were identified when at least two focus group participants (33% of participants) across the different groups use similar phraseology. Using a broader stroke to identify In Vivo codes helps to ensure all voices are captured from the focus group participants.

Table 4.19 In Vivo Codes Related to Perceptions

Perception	Code	Participant Quotes
Appeal	Engaging discussion	"English class is probably one of my favorite classes because of the super interesting and engaging discussions that we have in class."
	Grow mentally	"Interesting stories … that are fun to analyze … They're given so much thought when being created … which allows for us to grow mentally as students."
Choice	Focus on specific skills	"We do have to focus on specific skills when we're learning them, but then I feel like we do have a lot of choice and figure out how we're going to apply them in what we're trying to say in our writing."
	Decreased choice	"So, I think it's decreased because we were going from more generalized subjects to specific subjects. Like in a previous English class, we analyze fallacies as a whole. Whereas in this one if we were to analyze fallacies you might focus on specifically the strawman fallacy or slippery slope fallacy, black and white fallacy"
	Options for bigger essays	"We still do get a lot of options for bigger essay assignments where we get to kind of pick what we're going to argue in our essay."
Challenge	Good questions	"I would say we, like the teacher always asks good questions, too, that are able to prompt our thinking more."
	Appropriate level of challenge	"Challenge wise I think it's certainly an appropriate level of challenge"
Self-efficacy	Think I can do well	"I think I can do well; I just have to work hard on it."

	Many chances	“And you have so many chances to try and like, it's okay to write something, and then you're going to get feedback on it, and you're going to be able to make it better.”
	Less fear of failure	“There's like less fear of failure that way.”
Meaningfulness	Apply to life	“Things that we learned in English class definitely apply to life like all the time. And knowing how to write a strong essay or make a strong argument is really important in things that you have to do in life.”
	Very meaningful	“There's a lot of practical applications to what I'm learning. Also, I think it's very meaningful.”
Communication	No shortage	“I would say there's definitely no shortage of communication.”
	Lots of synchronous	“We have a lot of synchronous discussion. Like in class, all we really do in class is just form arguments with each other basically, and kind of discuss it and kind of work it out. And it leads to some really interesting discussions in class.”
	Asynchronous communication	“The asynchronous communication is things like peer feedback, we do that asynchronously, obviously, messaging the teacher if you have a question.”

Pattern coding was used for second cycle coding. Pattern coding allowed the researcher to summarize the focus group findings into themes that help answer the research questions (Saldaña, 2009). In Vivo codes were reviewed and analyzed to identify the patterns from the focus groups. Patterns were identified when at least three (50%) of the focus group participants addressed a similar topic as they were explaining their responses to the dimensions of perceptions (Table 4.20). A total of twelve patterns were identified from the focus groups, one each related to the appeal and challenge domains, two each related to the choice and meaningfulness domains, and three each related to self-efficacy and communication domains.

Table 4.20 Pattern Codes Related to Perceptions

Code and Description
Engaging discussions – The discussions embedded in the course are engaging and increase the overall appeal of the course. (Appeal)
Focus on specific skills – As students progress in the English course series, there is more focus on specific literary skills and pieces of work, thus less curricular choice by the students. (Choice)
Options for bigger essays – Choice most often comes in the form of choosing how to apply the literary skills within the context of larger assignments rather than choosing between assignments. (Choice)
Appropriate level of challenge – Courses that are challenging enough so that hard work earns good grades but not so challenging that students feel unable to earn good grades. (Challenge)
Think I can do well – Students have a high degree of confidence in their ability to learn and master course materials. (Self-efficacy)
Many chances – The course offers students multiple opportunities for feedback and revision, thus increasing their sense of self-efficacy. (Self-efficacy)
Less fear of failure – A supportive learning environment removes the fear of failure for students and increases their sense of self-efficacy. (Self-efficacy)
Apply to life – Courses that allow students the ability to actively apply what they are learning to their real lives in a way that helps them to make sense of the world around them. (Meaningfulness)
Very meaningful – Participants described this in terms of courses that help them grow as thinkers, writers, and speakers. (Meaningfulness)
No shortage – Online courses need as much communication as possible. (Communication)
Lots of synchronous – Synchronous communication was valued for its immediacy and depth over other forms of communication. (Communication)
Asynchronous communication – Asynchronous communication allows for ideas to be thoroughly formulated before posting and provides students with opportunities through meaningful feedback. (Communication)

Connectivity Issues in Online Courses

Focus group participants were also asked to discuss any connectivity issues they encountered during their online courses. If they encountered issues, they were asked to describe their troubleshooting strategies. The researcher identified two In Vivo codes related to Internet connectivity - FREEZINGS and LAG. These terms were used by participants in both focus groups. Participants described freezing as short disruptions which caused minor connectivity issues with limited loss of instructional continuity. Lag was articulated as creating longer-term issues that impeded the participants ability to fully participate in the online learning experience. Examples of issues attributed to lag included not being able to screen share during synchronous class sessions, being "kicked out" of the synchronous live class sessions, or loss of audio or video. Freezing and lag were noted as being most problematic during synchronous learning opportunities.

CLOSER TO ROUTER, ON AND OFF, and STREAMING were also identified as In Vivo codes after reviewing focus group transcripts. Pattern coding was used to explore and unpack these codes. CLOSER TO ROUTER describes a scenario where students as young as 12 are relocating their physical learning space, including their computer, to a location in their home that is physically closer to the wireless router. Students reported that decreasing the physical distance that the wireless signal traveled in their home appeared to reduce incidents of freezing and lag. A participant in the low Internet download speed group noted that last year he "started out with even more lag because I started out sitting at my table which is far away from the Internet router that I have" but he relocated his computer to be closer to the wireless router now. Participants were able to identify a strategy to "reset" their Internet connection by turning off and on

their wireless router, modem, computer, and/or wireless access on their computer. One participant in the low Internet download speed group said he will "usually restart the computer and then maybe ask my parents sometimes to check the Internet connection itself." Another participant in the same group said she "will disconnect from the Wi-Fi then reconnect. If that doesn't work, I will just turn the router off and back on because that's like a hard reboot for a computer that normally after that my Wi-Fi can run smooth for a while." Participants noted that when they had intermittent connectivity issues they would check to see if someone else in their home was STREAMING or using another bandwidth intense activity that could be interfering with their online experience. A participant in the low Internet download speed group said when things start to lag or freeze "the main thing I check is if nobody else is streaming anything in the house, nobody's using really high bandwidth and techy, or doing anything that takes a lot of bandwidth."

Summary

Participants in the study, regardless of Internet download speed, responded with favorable perceptions of their online courses. After separating the respondents into two independent groups based on their Internet download speed, an independent samples *t*-test and Mann-Whitney *U* test were conducted to see if there was a statistically significant difference in the perceptions of course quality on appeal, choice, challenge, self-efficacy, meaningfulness, and communication domains between the two groups. The results of the independent samples *t*-test and Mann-Whitney *U* test support retaining the null hypothesis (H_0) "The speed of a fully online student's home Internet connection has no impact on their perceptions of the quality of their English course" and rejecting the

alternative hypothesis (H_a) “The speed of a fully online student’s home Internet connection impacts their perceptions of the quality of their English course in at least one domain on a modified SPOCQ.”

Focus groups were conducted to better understand the students quantitative responses related to perceptions. Participants in both focus groups (low and high Internet download speeds) responded favorably about their online English courses. The comments during the focus groups supported the responses on the quantitative survey and further supports the finding that, for students participating in this study, the speed of an online student’s home Internet connection does not impact their overall perceptions of online English course quality on the appeal, choice, challenge, self-efficacy, meaningfulness, and communication domains. However, students in the low Internet download speed group seemed to express more appreciation for synchronous communication methods.

During the focus groups, participants also discussed how they responded to Internet connectivity issues. They have developed a number of basic tech skills and troubleshooting strategies, such as rebooting, moving closer to the router, or discouraging other household members from using high bandwidth applications on the Internet, to minimize disruptions to their online courses. Participants reported increased lag time due to more people being home and utilizing the Internet during COVID-19 quarantines. They used their troubleshooting strategies to minimize the impact this was having on the learning. Families have also taken measures (e.g. using mobile devices or going to a relative’s home) to ensure that students have access to their online courses even during Internet outages due to acts of God.

CHAPTER FIVE: DISCUSSION AND CONCLUSIONS

The purpose of this explanatory sequential design mixed methods study was to examine the role of Internet connectivity on the perceptions of highly gifted students on the quality of their fully online English course on six domains: (a) appeal, (b) challenge, (c) choice, (d) meaningfulness, (e) self-efficacy, and (f) communication. The research for this study took place in two distinct phases, with the quantitative (QUAN) data collection occurring first, followed by focus groups (qual). The author sought to answer three primary research questions with this study, one for each phase of the study (QUAN, QUAN + qual, qual).

This chapter contains discussion and future research considerations related to the research questions representing the quantitative (Q1), mixed methods (Q2), and qualitative (Q3 with sub-questions Q3a and Q3b) aspects of this study:

Q1. Is there a significant difference in the perceptions of fully online, gifted students' on the quality of their online English course as measured by a modified version of the SPOCQ between students with high and low Internet download speeds?

Q2. In what ways does data from focus groups comprised of fully online, gifted students with high and low Internet download speeds help explain the results of the quantitative survey related to their perceptions of the quality of their English course as measured on modified SPOCQ constructs?

Q3. What themes emerge from focus group interviews with fully online, gifted students about their perceptions of the quality of their English course?

Q3a. How do the participants perceive the quality of their English course by the constructs in the modified SPOCQ?

Q3b. How do participants discuss the connectivity issues they may have encountered?

This chapter concludes with a discussion of the limitations of the study, areas for future research, and a brief summary.

Interpretation of the Findings

An independent samples *t*-test found no statistically significant difference in the perceptions of online gifted students related to their perceptions of course quality as measured on challenge, choice, self-efficacy, and communication domains between students with low and high Internet download speeds. A Mann-Whitney *U* test also found no statistically significant difference in the perceptions of online gifted students related to their perceptions of course quality as measured on the same four domains. Additionally, the Mann-Whitney *U* test found no statistically significant difference in the perceptions of online gifted students related to their perceptions of course quality as measured on the appeal and meaningfulness domains between students with low and high Internet download speeds. Based on the results of the quantitative analysis, the null hypothesis could not be rejected. Participants were asked to discuss their perceptions on the six different domains during two independent focus groups. The discussion from the focus groups supported retaining the null hypothesis, "The speed of a fully online student's home Internet connection has no impact on their perceptions of the quality of their English course." However, the focus group discussion also helped to identify some nuances between the two groups, specifically as they discussed their perceptions of

communication with students in the low Internet download speed group expressing more appreciation for synchronous communication methods. In an effort to better understand the results from this study, a detailed look at responses between groups on the modified SPOCQ is included in this chapter.

A total of twelve themes related to the perceptions of online course quality were identified from the focus groups: (a) engaging discussions, (b) focus on specific skills, (c) options for bigger essays, (d) appropriate level of challenge, (e) think I can do well, (f) many chances, (g) less fear of failure, (h) apply to life, (i) very meaningful, (j) no shortage, (k) lots of synchronous, and (l) asynchronous communication. Lastly, the focus group participants discussed their Internet connectivity which led to uncovering techniques the online students have developed to troubleshoot and resolve Internet connectivity issues on their own. These findings are discussed in this chapter.

Research Questions One and Two

The first research question sought to understand if there was a significant difference in the perceptions of fully online, gifted students on the quality of their online English course as measured by a modified version of the SPOCQ between students with high and low Internet download speeds. Based on the results of the independent samples *t*-test and Mann-Whitney *U* test, the researcher found no statistically significant difference in perceptions between the two groups. However, there were differences, specifically on individual questions, between the two groups, which, when reviewed in context of the focus groups, warrants discussion.

The second research question, "In what ways does data from focus groups comprised of fully online, gifted students with high and low Internet download speeds

help explain the results of the quantitative survey related to their perceptions of the quality of their English course as measured on modified SPOCQ constructs?" was designed to better understand the quantitative results by allowing participants to explain their survey responses during the qualitative phase of the study. During the focus group discussions, participants were asked to review, consider, and discuss their answers on the survey related to each of the constructs in the context of their online English course. Each construct was discussed independently of other constructs.

The appeal domain measured student perceptions of general interest and enjoyment in their courses (Gentry & Owen, 2004). There were seven questions in the appeal domain (Table 5.1). Questions A3 and A4 had a low response rate as the participants indicated they did not have a formal "textbook" for their English course. Some participants adopted a liberal definition of "textbook" and considered all of the curricular materials in their course when answering the question while others interpreted the question more literally. With only one participant answering A3 and A4 from the low Internet download speed group, comparing differences in responses is not useful for these two questions. Participants from both groups responded similarly to questions A1 and A7. Participants in the low Internet download speed group responded slightly (between .16 and .17) more favorably to questions A2, A5, and A6. Overall, students in the low Internet download speed group expressed slightly higher perceptions of the content and reading materials in their online English course than the participants in the high Internet download speed group. These differences were not statistically significant and a closer analysis of the individual questions validates the results of the independent samples *t*-test and Mann-Whitney *U* test. Overall (N=19), the appeal domain had a mean response of

3.34 with a standard deviation of .577 indicating that most respondents had a favorable view of the appeal of their online English course.

Table 5.1 Differences in Appeal

	Low Mean	High Mean	Mean	Difference[a]
A1. I find the contents of my class interesting.	3.67	3.67	3.67	0
A2. The assigned reading material for my class is interesting.	3.83	3.67	3.75	.16
A3. The material covered in my textbook is interesting.	3.00[b]	3.00[c]	3.00	0
A4. The textbook provides examples of how the material relates to society and daily living.	2.00[b]	3.00[c]	2.67	-1.00
A5. I look forward to learning new things in this class.	3.67	3.5	3.58	.17
A6. I find the reading material for my class a pleasure to read.	3.33	3.17	3.25	.16
A7. I like going to my class each day.	3.67	3.67	3.67	0
Appeal	3.57	3.44	3.51	.13

[a] positive difference indicates low group had a higher mean
[b] one respondent
[c] two respondents

The challenge domain focuses on the level of rigor in a course (Gentry & Owen, 2004). There were seven questions on the modified SPOCQ that targeted perceptions of the level of challenge (Table 5.2). All focus group participants responded to all of the questions related to the level of challenge. Students in the low Internet download speed

group responded more favorably to five of the seven questions, with the largest difference coming in class content being appropriately challenging (R4 = .50), followed by class assignments being a good challenge (R2 = .34). Questions R1, R5, and R7 were only slightly more positive (.17) for participants in the low Internet download speed group. Students in the high Internet download speed group responded more favorably (.50) that they believe they learn best when they are challenged (R3) and are able to use their critical thinking skills in their courses (R6).

Table 5.2 Differences in Challenge

	Low Mean	High Mean	Mean	Difference[a]
R1. I find my class time instruction appropriately challenges my intellectual abilities.	3.67	3.50	3.58	.17
R2. I find my class assignments a good challenge.	3.67	3.33	3.50	.34
R3. I learn best when I am challenged.	3.17	3.67	3.42	-.50
R4. This class content is an appropriate challenge for me.	3.67	3.17	3.42	.50
R5. I like the challenge of the projects in this class.	3.50	3.33	3.42	.17
R6. I use my critical thinking skills in my class.	3.67	3.83	3.75	-.16
R7. I like the way my teacher challenges me in this class.	3.67	3.50	3.58	.17
Challenge	3.57	3.47	3.53	.10

[a] positive difference indicates low group had a higher mean

Overall (N=19), the challenge domain had a mean response of 3.50 with a standard deviation of .430, indicating that most respondents had a favorable view of the level of challenge of their online English course. The challenge domain had the highest mean score and lowest standard deviation of any of the measures of perception on the survey. The difference between the means on the questions in the challenge domain for all participants was less than .1. This supports the results of the independent samples *t*-test and Mann-Whitney *U* test that Internet download speed was not a contributing factor to students' perceptions of the level of challenge in their course and also indicates that students at this site had high perceptions about the level of challenge in their online English courses.

The choice dimension measures perceptions about a student's ability to make decisions about their learning. There were seven questions on the modified SPOCQ asking participants about their perceptions related to the level of choice they have in their online English course (Table 5.3). One participant from the high group responded "not applicable" to C3. Students from both groups responded similarly to C5 and C6 (no difference in means). Participants from the high Internet download speed group responded more favorable to three (C1, C2, and C4) of the four remaining questions, with the largest differences in perspectives around the teacher allowing choice in resources for projects (C2 = .67) and being given lots of choice in their course (C4 = .50). Participants in the low Internet download speed group responded slightly more favorably (.17) than participants in the high Internet download speed group when asked if they believed they could pick a good way to show what they have learned when they have options.

Table 5.3 Differences in Choice

	Low Mean	High Mean	Mean	Difference[a]
C1. I am given choices regarding how to show the teacher what I have learned.	2.67	2.83	2.75	-.16
C2. My teacher lets me choose the resources that I use for projects.	2.33	3.00	2.67	-.67
C3. When there are different ways to show what I have learned, I can usually pick a good way.	3.17	3.00[b]	3.09	.17
C4. I am given lots of choices in my class.	2.33	2.83	2.58	-.50
C5. I feel responsible for my learning because I am allowed to make choices in my class.	2.83	2.83	2.83	0
C6. The teacher uses a variety of instructional techniques that make the class enjoyable.	3.33	3.33	3.33	0
C7. I am encouraged to pursue subjects that interest me in my class.	2.67	3.00	2.83	-.33
Choice	2.76	2.98	2.86	-.22

[a] positive difference indicates low group had a higher mean
[b] five respondents

Overall (N=19), the choice domain had a mean response of 2.77, the lowest mean for any domain in the study, with a standard deviation of .716. The difference between the means on all the questions in the choice domain for all participants was .22. This supports the results of the independent samples *t*-test and Mann-Whitney *U* test that Internet download speed was not a contributing factor to students' perceptions of the level of choice in their course.

Course content is meaningful to students when they believe the content that they are learning is relevant to their lives outside of school (Gentry & Owen, 2004). There were five questions on the modified SPCOQ designed to understand how meaningful students perceive their course content to be (Table 5.4). Participants in the low Internet download speed group responded more favorably to four (M1, M2, M3, and M4) of the five questions with the largest difference (M4 = 1) reported in student perceptions about their ability to explore real issues that affect the world around them in their class. Students in the high Internet download speed group responded more favorably (M5 = .33) when asked about their perceptions of their ability to relate the material discussed in class to their daily life.

Table 5.4 Differences in Meaningfulness

	Low Mean	High Mean	Mean	Difference[a]
M1. The teacher applies the lessons to practical experiences.	3.00	2.83	2.92	.17
M2. My teacher makes connections between the course materials and society.	3.33	3.17	3.25	.16
M3. In my class, my teacher relates current issues to the material we are learning.	2.67	2.50	2.58	.17
M4. In my class I explore real issues that affect the world around me.	3.00	2.00	2.50	1
M5. I can relate the material discussed in my class to my daily life.	3.00	3.33	3.17	-.33
Meaningfulness	3.00	2.77	2.88	.23

[a] positive difference indicates low group had a higher mean

Overall (N=19), the meaningfulness domain had a mean response of 2.80, the second lowest mean for any domain in the study, with a standard deviation of .751, the

largest standard deviation. The difference between the means on all of the questions on the meaningfulness domain for all participants was .23. The independent samples *t*-test and Mann-Whitney *U* test indicated that Internet download speed was not a contributing factor in student perceptions around the meaningfulness of their online English course.

There were eight questions on the modified SPOCQ designed to understand student perceptions of self-efficacy (Table 5.5). Gentry and Owen (2004) define self-efficacy as the ability to perform well on assessments and confidence in completing learning tasks. Half of the students answered "not applicable" when asked about being good at taking tests (S5). Students explained that they typically do not have actual tests in their English courses. Of the remaining seven questions, participants in the low Internet download speed group responded more favorably to 86% of them. The largest difference was in their ability to easily understand reading material for their course (S6 = .66). Three questions (S1, S2, and S7) had a difference of .33, indicating that students in the low Internet download speed group had marginally stronger perceptions of their self-efficacy when asked about being good at helping others understand things, connecting material from their class to the real world, and discovering interesting things to learn about in the class. Students in the high Internet download speed group expressed slightly higher perceptions of self-efficacy (S3 = .16) related to feeling good about answering questions in their class.

Table 5.5 Differences in Self-Efficacy

	Low Mean	High Mean	Mean	Difference[a]
S1. I am good at helping other students understand things.	3.00	2.67	2.83	.33
S2. I am good at connecting material from this class with the real world.	3.33	3.00	3.17	.33
S3. I am good at answering questions in this class.	3.17	3.33	3.25	-.16
S4. It is pretty easy for me to earn good grades.	2.33	2.17	2.25	.16
S5. I am good at taking tests in this class.	2.67[b]	3.33[b]	3.00	-.66
S6. I can easily understand reading assignments for this class.	3.33	2.83	3.08	.66
S7. I can usually discover interesting things to learn about in this class.	3.50	3.17	3.33	.33
S8. I can express my opinions clearly in this class.	3.67	3.50	3.58	.17
Self-efficacy	3.16	2.96	3.06	.20

[a] positive difference indicates low group had a higher mean
[b] three respondents

Overall (N=19), the self-efficacy domain had a mean response of 2.92, the third lowest mean for any domain in the study, with a standard deviation of .500. The difference between the means on the questions related to the self-efficacy domain for all participants was .20. The independent samples *t*-test and Mann-Whitney *U* test indicated that Internet download speed was not a contributing factor in student perceptions around self-efficacy in their online English course.

The modified SPOCQ also sought to understand student perceptions about the communication, both synchronous (live, real-time) and asynchronous (e.g. discussion boards, Microsoft Teams), in their course. There were four questions on the survey related to perceptions of communication (Table 5.6). Participants in the high Internet download speed group only responded more favorably than the low Internet download speed group when asked if the course used an appropriate level of synchronous communication (T2 = .16). Participants in the low Internet download speed group responded more favorably when asked about communication methods in the class contributing to their understanding of the content (T3 = .34), the course using an appropriate amount of asynchronous communication (T1 = .17), and the communication methods in the course helping them to feel connected to their classmates (T4 = .17).

Table 5.6 Differences in Communication

	Low Mean	High Mean	Mean	Diff.[a]
T1. I feel the course uses an appropriate amount of asynchronous (e.g., discussion boards, email, instant messaging) communication.	3.17	3.00	3.08	.17
T2. I feel the course uses an appropriate amount of synchronous (e.g., live online class session with audio and/or video enabled) communication.	3.67	3.83	3.75	-.16
T3. I think the communication methods in this class contribute to my understanding of the content.	3.67	3.33	3.50	.34
T4. I think the communication methods in the course help me feel connected to my classmates.	3.50	3.33	3.42	.17
Communication	3.50	3.38	3.44	.12

[a] positive difference indicates low group had a higher mean

Overall (N=19), the communication domain had a mean response of 3.26, the third highest mean for any domain in the study, with a standard deviation of .579. The difference between the means on all the questions related to the communication domain for all participants was .12. The independent samples *t*-test and Mann-Whitney *U* test indicated that Internet download speed was not a contributing factor in student perceptions about communication in their online English course.

Research Question Three

The qualitative phase of the study was designed to better understand themes that emerged as participants discussed their perceptions of their online English courses. In addition to the primary qualitative research question, "What themes emerge from focus group interviews with fully online, gifted students about their perceptions of the quality of their English course?" there were two research sub-questions that were posed: (a) "How do the participants perceive the quality of their English course by the constructs in the modified SPOCQ?" and (b) "How do participants discuss the connectivity issues they may have encountered?"

Perceptions of Online Courses

Focus group participants in this study spoke positively of their online courses, specifically related to the six domains of perceptions under review. When participants were asked to discuss the appeal of their online courses, they described a sense of "enjoyment" from their online English course, having "interesting discussions," and the opportunity to "grow mentally" as adding to the appeal of the course. Participant comments align with Gentry et al. (2011) definition of appeal which "combines elements of interest and enjoyment to create a satisfying and pleasant learning environment" (p.

113). The results of this study are supported by previous research, which has shown that providing learning experiences that are enjoyable to students is essential in gifted education (Csikszentmihalyi, 1990; Dewey, 1933; Renzulli, 1994). Focus group participants in this study support this finding.

Focus group participants discussed having less choice as they advanced in their English course sequence. Participants who had been at the school the longest commented that, as they progressed through the English sequence, the level of choice they had over curricular decisions "decreased because [they] were going from more generalized subjects to specific subjects" where they were expected to utilize techniques and skills they had honed in early courses with increasingly more difficult texts. One student reported that this was a positive for her as having responsibility for identifying complex texts would cause her stress. Participants reported appreciating having choice when it came to how they compose their essays but indicated that they were comfortable with the instructor choosing specific pieces of literature for them to review. They described this as "choice within assignments rather than choice between assignments." Previous research has identified choice as being a motivating factor in student engagement (Deci, 1995; Glaser, 1996). However, participants in this study expressed appreciation for choice coming within their final product (e.g. essay) rather than in the curricular materials, which is supported by the findings of Csikszentmihalyi et al. (1993) as the participants perceived their choice as intrinsically rewarding.

Focus group participants in this study reported that their classes had the "appropriate," "correct," and "perfect" level of challenge. They specifically reported that they are presented with "good questions" from their instructors and classmates and that

they have the opportunity to “pose really good questions when we get into discussions.” They described their ability to question as contributing to their ability to manage the level of challenge in their online English course. Gentry and Owen (2004) describe the optimal challenge as being individual to the learner and present when the learner is engaged in effective learning. The participants in this study reported that their courses were at the optimal level of challenge for them.

Focus group participants expressed that they felt confident in their ability to do well in their online English courses. Academic performances are highly influenced and predicted by self-efficacy or students’ perceptions of what they believe they can accomplish (Pajares, 1996). Participants attributed their self-efficacy to a “supportive environment” that “removes the fear of failure.” One indicated that her instructor’s ability “to make sure we ... understand everything that's happening” in the course as contributing positively to her self-efficacy. Multiple students mentioned having “many chances” to make their writing stronger with “first draft, second draft, and then final drafts” as improving their academic self-efficacy. High levels of self-efficacy are important as “self-efficacy beliefs act as determinants of behavior by influencing the choices that individuals make, the effort they expend, the perseverance they exert in the face of difficulties, and the thought patterns and emotional reactions they experience” (Pajares, 1996, p. 325).

Meaningfulness is achieved when “content and methods have relevance to students’ lives and are significant, important, connected, and worth caring about” to students (Gentry & Owen, 2004, p. 21). Meaningfulness is a “critical element” for increasing motivation to learn in gifted students (Little, 2012). Focus group participants

in this study reported that their course content helped them with “connecting things to the real world,” had “a lot of practical applications,” and presented “themes that apply to the larger world.” One student stated that her course content was “meaningful because it's helping me understand how I can relate this fiction to the real world.” Additionally, participants reported being able to use the content they were learning in their online English course in “their own life.” Participants across both groups in this study expressed appreciation for meaningful content.

Participants described communication in the online English courses as being “really important” and emphasized having as “much communication as possible” was important to them as online students. They discussed communication from both an asynchronous and synchronous perspective. Asynchronous communication (e.g. discussion boards and peer reviewing) were not as important to the participants as synchronous communication. Participants, particularly those with low Internet download speeds, felt the lag time with asynchronous communication was not ideal, especially when they were waiting on someone else to respond. Frustration over the lack of spontaneity in asynchronous communication has been noted in previous research (Lowenthal et al., 2017). Synchronous communication during live, online sessions was preferred over asynchronous communication. Synchronous communication was preferred as it allows for “ideas to be shared and develop quickly.” Participants described their “live session discussions” as “very important” because the “analysis of the text happens when we are talking to each other.” They enjoyed being able to “form arguments with each other basically, and kind of discuss it and kind of work it out” during synchronous discussions, which happen “every class period.” The participants' comments on

synchronous communication support Murphy and Coffin's (2003) finding that synchronous online communication supports a more student-centered experience. The participants in this group highly valued the synchronous portions of their online English class.

Connectivity Issues in Online Courses

Participants in the focus groups discussed multiple strategies for addressing short- and long-term Internet connectivity issues. Short-term solutions included rebooting, disconnecting and reconnecting to Wi-Fi, and ensuring that no one else in the household was streaming or "doing anything that takes a lot of bandwidth." One 12-year-old participant described his Internet connectivity troubleshooting technique, which included using a "command prompt on Windows computer" to "ping a website to check if the Internet is working and at what speed." If that did not work he would "restart the computer" and, if necessary, "ask [his] parents to check the Internet connection itself." He even noted that he was "using Ethernet so this usually doesn't pose a problem." Another student reported that he moved his desk this year to be closer to the Wi-Fi router in his home to minimize connectivity issues. Participants reported frustration when they froze or lost bits of time during their synchronous online classes, a finding that is supported by Li et al. (2010) who found students had "little tolerance for technical difficulties in the [virtual] classroom" (p.746). All of the synchronous online classes at the research site are recorded, which was noted as a source of comfort by several participants. Having access to recordings gave them an option to catch-up if they missed time during a synchronous session due to intermittent Internet issues. However, they also

discussed that watching the recordings was not a suitable alternative to actively participating in the discussions.

Most of the data collection for this study happened during 2020 COVID-19 lockdowns. Governments across the globe initiated social distancing measures and lockdowns that closed businesses and schools, leaving over 1.6 billion students worldwide without regular access to schooling (Sheikh et al., 2020). Since the research site was already designed as a fully online campus, there was no disruption to the existing school calendar or schedule due to the lockdowns. However, participants reported that having more people home and accessing the Internet during the school day was impacting their Internet speeds. Most participants reported increased lag during synchronous online learning once the U.S. shutdowns started occurring in early 2020. Since shutdowns were initiated by state and local governments in the U.S., participants experienced the increase in bandwidth demands based on when their locality was shut down.

One focus group participant from the low Internet download speed group had her video freeze during the focus group and momentarily lost the connection. When she returned to the focus group she stated that she had to go ask a family member to stop streaming video so she could finish the focus group. A focus group participant from the high Internet download speed group was quarantining in a different state than her home state. She reported that the Internet speed at her quarantine site was faster than her regular home Internet speed. She commented that “faster Internet definitely helps keep the connection, if you will, between the teacher and the student more consistent during class.” This made her believe that it is “way easier to kind of follow the discussion and pose more questions” with the higher Internet speed.

A few focus group participants had been impacted by widespread Internet outages from tornados or major storms at some point over the course of the academic year. In one case, a participant from the high Internet download speed group opted to use a mobile device for a full week to access his online learning rather than miss out on the synchronous sessions. A participant from the low Internet download speed group said that his parents drove through a snowstorm to take him to his grandparents' home where they still had an active Internet connection. The student with the lowest Internet download speed in the study developed a long-term strategy to help compensate for his low bandwidth. He downloads any documents, presentations, or videos that he may need to access during a synchronous online class before the live session begins. He keeps these on his desktop for easy access. He noted that by having them downloaded, he was able to minimize the demand he was placing on his Internet connection during a synchronous online class. He implemented this strategy when he realized that "having both a document autosaving and Zoom [open] does not work that well" for him.

Implications

The findings of this study found no statistically significant difference between the perceptions of online English course quality as measured by a modified version of the SPOCQ for participants in low and high Internet download speed groups at a fully online campus of a public school for highly gifted students. While this finding may be surprising, it has promising implications for online education. Students at this school had high perceptions of their course quality as measured by perceptions of challenge (M = 3.5037), communication (M = 3.3552), appeal (M = 3.3368), self-efficacy (M = 2.9257), meaningfulness (M = 2.8000), and choice (M = 2.7731). Five of these domains -

challenge, appeal, self-efficacy, meaningfulness, and choice - are deeply rooted as essential for gifted students (Gentry & Owen, 2004). The sixth domain, communication, which includes asynchronous and synchronous communication between teacher and students, is of significant importance in online learning (Shearer et al., 2019). Communication is so integral to online learning that Moore (1993, 2019) found the level of a dialogue impacts the perceived transactional distance.

One promising implication of this study is that highly gifted students may be more willing to overcome technical difficulties to engage in online learning. The research site was designed from its genesis to be a fully online school for highly gifted students and students who enrolled in this school made a deliberate choice to do so. Ng and Nicholas (2007) found that gifted students often enjoy and are motivated to learn with technology while Periathiruvadi and Rinn (2012) noted many gifted students already use technology in their daily lives. The specific model of online learning implemented at the research site follows research-based best practices in online gifted education as discussed by Adams and Cross (1999), Mann (1994), Periathiruvadi and Rinn (2012), Potts and Potts (2017), and Thomson (2010). This implication may be beneficial for schools as they rapidly increase the use of online learning as a social distancing tool.

The technical experience is essential to the online classroom experience (Li et al., 2010). Additionally, there is a previously noted disparity in the quality and availability of home Internet access for U.S. students that is impacted by geography, race, English language acquisition, and family income (KewalRamani et al., 2018). In this study, a total of 57 Speedtests (www.speedtest.net) were conducted by 19 participants. Seventeen (29.8%) of those Speedtests recorded Internet download speeds of less than 25Mbps (.33

to 24.94 Mbps), the threshold identified by the FCC (2018) as suitable for transmission of high-quality audio, video, data, and graphics. Six of the students averaged less than 25Mbps over three independent Speedtests with a total of seven unique students having at least one Speedtest below 25Mbps. Participants in this study implemented a variety of methods to troubleshoot and minimize Internet connectivity issues. The research site did not provide students with implicit instruction in troubleshooting connectivity, but students did have online access to the Online Technology Manager as needed. No participant specifically mentioned seeking support from the Online Technology Manager for resolving connectivity issues. A second implication of this study is that online schools and course providers may want to consider explicitly teaching or providing readily accessible offline resources for students who are experiencing Internet connectivity issues. The participants in this study were highly motivated to stay connected to their online classes and found ways to make that work, including relocating their workstation to be closer to a wireless router, discouraging other family members from using high bandwidth applications during their synchronous learning sessions, and even downloading online materials to access offline in the event of connectivity issues. Explicitly teaching these types of troubleshooting strategies and providing additional resources to support students (a strategy also recommended by Menchaca & Bekele, (2008)), particularly younger students or those who may be less tech savvy, may encourage online learners, especially those who have had online learning thrust upon them due to COVID-19 related school closures, to try to stay engaged in their online learning.

Gifted students, like the ones in this study, are motivated to learn with technology and often have experience using technology to access learning (Ng & Nicholas, 2007; Periathiruvadi & Rinn, 2012). The motivation of gifted students to complete learning activities is a key component of their success in online courses (Ng & Nicholas, 2010). Additionally, gifted students have a high level of confidence when completing computer-based tasks (Housand & Housand, 2012). Participants in this study opted to apply for admissions and enroll after being assessed and accepted in a fully online public school for gifted students rather than accessing a freely available local public school or other local educational options (e.g. home school or independent schools). This speaks to their motivation to succeed, despite technological challenges. This is an important understanding and implies that less motivated students, particularly those with online learning thrust upon them (e.g. due to COVID-19 lockdowns and social distancing measures, credit recovery, at-risk students) may not be as apt to overcome technological challenges.

Recommendations for Future Research

The researcher for this study was interested in understanding how the speed of a fully online gifted student's home Internet connection might have impacted the student's perception of online course quality. While this study found no statistically significant difference between the perceptions of highly gifted students with low and high Internet download speeds as measured by a modified version of the SPOCQ, the researcher recommends others continue to study the potential impact of home Internet connections on the perceptions of course quality on larger populations of online learners. Additionally, the online learning model in this study relied heavily on synchronous

communication, this is not the norm for online learning (Lowenthal et al., 2017). This study could easily be expanded to other models of online learning, especially those with less synchronicity such as self-paced online learning, blended learning models such as flipped learning that rely heavily on video-based instruction, or other models that rely heavily on asynchronous communication as described by Lowenthal et al. Additionally, this study could be replicated with schools that offer rolling admissions or open enrollment as students may differ in their reasons and motivations for enrolling and succeeding. Since this study was designed, COVID-19 has changed the modality in which many students across the globe are learning (Sheikh et al., 2020). Some researchers have noted that the mass change to online learning during COVID-19 is impacting the quality of education available to students (Chen et al., 2020). With the increased presence and continued growth in online learning, there is a deepening need to understand how technology may help explain online students' perceptions of course quality. The technical experience is the primary determinant of students' online classroom experience (Li et al., 2010) and there was already a noted disparity in the availability and quality of home Internet access for U.S. students (KewalRamani et al., 2018) before COVID-19 increased the use of online learning in K-12. Research on the impact of home Internet connectivity has the potential to contribute to policy decisions related to issues of equity in public education.

Limitations

The research site for this study is the online campus of a public school for highly gifted students. To be accepted for admission in the school, students must submit an application that shows a qualifying score (at least 99.9^{th} percentile) on an individually-

administered intelligence (IQ) or achievement test. Applicants with qualifying test scores are invited to complete a curriculum-based assessment. The admissions team uses the results of the curriculum-based assessment to determine goodness-of-fit for admission. Even with all qualified applicants being assessed, the admissions team reports an acceptance rate of approximately 50%. This means that all students in the school are highly gifted ($\geq 99.9^{th}$ percentile as defined by IQ and achievement testing) and have shown, at least to the satisfaction of the admissions team, that they are working at an academic level in all subjects that is on par with their intellectual abilities. Additionally, all students at the research site are placed in courses based on their ability levels in each subject, rather than by grade or age. The admissions practices and course placement policies create an optimal learning experience for students at the research site (Davidson et al., 2004). However, they constitute a limitation for this study as there is no evidence that all online K-12 students are appropriately placed in their courses, nor is there evidence to support that they are as academically capable or as motivated to succeed.

Previous research has shown that gifted students are more likely to use technology in their daily lives (Periathiruvadi & Rinn, 2012). This may mean that the students in the sample have more experience with technology, and thus are more likely to persevere through Internet connectivity issues as they are motivated and interested in their online learning experience.

Participants were asked to focus on their perceptions of their online English course when responding to the survey and the focus group discussions. All online courses at the research site were developed by staff members with specific training and expertise in gifted education. The course curriculum is specifically designed to engage and

challenge the students at the research site. This study relied on a modified version of the SPOCQ to measure student perceptions of course quality. The SPOCQ is specifically designed to measure gifted students' perceptions of classroom quality, which made it an appropriate measure for this study. However, since all of the curriculum at the research site is specifically designed based on research-based best practices in curriculum for gifted students, using the SPOCQ as the quantitative data collection method also imposes a limitation on this study. The curriculum at the research site was deliberately designed to be appealing, challenging, meaningful, promote self-efficacy, and foster effective online communication, five of the six domains from which this research studies perceptions. The high average scores on the SPOCQ, specifically in the challenge (3.50), communications (3.35), and appeal (3.36) domains support that students at the research site have positive perceptions of their online courses, but these high overall perceptions may limit the transferability of the results of this study (Table 5.7).

Table 5.7 Perception Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Dev.
Appeal	19	2.4285	4.0000	3.3368	.5768
Choice	19	1.5714	4.0000	2.7731	.7165
Challenge	19	2.7142	4.0000	3.5037	.4295
Self-Efficacy	19	2.1428	3.6250	2.9257	.4997
Meaningfulness	19	1.4000	3.8000	2.8000	.7512
Communication	19	2.0000	4.0000	3.3552	.5792
Valid N	19				

Because the research site was a small school and two levels of consent (one for parents and one for students after receiving parental consent) were required, the total number of participants was small (N = 19). Of the 19 participants, six had Internet download speeds below 25 Mbps, the threshold identified by the FCC (2018) as suitable for transmission of high-quality audio, video, data, and graphics. This meant that 68% of the participants fell into the high Internet download speed group. Having a small number of participants, with the majority of them skewed to one of two groups creates a potential limitation of this study.

Lastly, the survey was administered largely before federal and state governments ordered lockdowns to combat COVID-19 and the additional Speedtests (www.speedtest.net) and focus groups occurred during the lockdowns. As a fully online campus, the research site did not experience any interruption to the academic calendar. However, this does not mean that the students and faculty were not experiencing disruptions in their personal lives. Many students were faced with situations where siblings and parents were suddenly home and competing for bandwidth as they adjusted to learning and working online. This may have contributed to the low participation (50% of invited students participated) in the focus groups. Additionally, it is possible that Speedtests conducted during the COVID-19 lockdowns showed lower Internet download speeds as more family members were likely accessing the Internet on the same connection than was the case before the lockdowns.

Conclusions

The findings in this study found no statistically significant difference between perception of online course quality as measured by a modified version of the SPOCQ

based on the speed of highly gifted students' home Internet download speed. Participants in both low and high Internet download speed groups reported favorable perceptions of the quality of their online English course at the research site, a fully online campus of a public school for highly gifted students. The sample size (n = 12) available for quantitative analysis in this study should be acknowledged when considering this finding. The quantitative scores on the modified SPOCQ were supported by comments from participants during the focus groups and the null hypothesis (H_0) "The speed of a fully online student's home Internet connection has no impact on their perceptions of the quality of their English course" could not be rejected. Participants in both focus groups (low and high Internet download speeds) repeatedly spoke positively about their online English courses, leading the researcher to believe that online courses designed with research-based best practices may be able to alleviate student frustration caused by Internet connectivity and similar technical issues, at least for highly gifted students.

During the focus groups, participants also discussed a number of basic Internet troubleshooting strategies, such as rebooting, moving closer to the router, or discouraging other household members from using high bandwidth applications on the Internet, to minimize disruptions to their online courses. Participants noted that these troubleshooting skills, including minimizing bandwidth heavy activities by others, had increased importance as COVID-19 quarantines and lockdowns increased the number of people home during the school day and increased the load on their home Internet connections. They used their troubleshooting strategies to minimize the impact this was having on their learning. As online learning continues to grow, teaching online learners, regardless

of age, basic troubleshooting techniques could help to keep students connected and engaged in their online classes.

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APPENDIX A

Research Site Core Values

The Online Campus courses must incorporate certain core values so that they will be reflective of the quality and caliber of the School's face-to-face classes. All classes will be (a) rigorous, (b) personalized, (c) collaborative, (d) flexible, (e) offer opportunities for rich discourse, and (f) provide supportive opportunities for critical thinking.

A. Rigorous – Courses will have an appropriate level of rigor that will challenge participants to achieve in a supportive online classroom that encourages academic risk and growth.
B. Personalized – Courses will be personalized to the needs of individual learners and provide ample opportunities for student voice and critical thinking.
C. Collaborative/Synchronous – Courses will contain synchronous instructional elements that require collaboration among participants. While the courses will be online, it is important that the participants do not feel isolated in their learning experience.
D. Flexible – Courses will have a flexible learning plan so that they are responsive to the needs of the students, just like a face-to-face course at the School.
E. Rich Discourse – Courses will rely on a rich and authentic two-way discourse between all participants.
F. Critical Thinking – Courses will provide opportunities for participants to think critically, form and support opinions, and experience a variety of perspectives.

Additionally, all online courses will provide students with a highly supportive learning environment that will address the needs of individual learners and provide opportunities for student voice in learning.

APPENDIX B

Recruitment Emails

Parent Recruitment Email

Greetings Parents,

Have slow Internet speeds ever bummed you out? Have you ever considered how your Internet connection may play a role in impacting your student's perceptions of their online courses? Well, I can certainly answer "YES" to both those questions so I'm doing my part to understand the relationship between Internet connections and online courses.

My name is Stacy Hawthorne and I am a doctoral candidate at Boise State University. I am conducting a research study about how the speed of home Internet connection impacts students' perceptions of their online courses. I am emailing to ask if you would be willing to have your student participate in this research. A full Informed Consent Form is attached to this email and pasted below for your review.

Students who participate will be expected to spend about 30 minutes completing an anonymous online survey about their perceptions of their English course. A select number of students will be invited to participate in a focus group to discuss their survey responses. Students who participate in the focus group will spend an additional 60 to 90 minutes for this study. Focus group participants will be videotaped and direct quotes from the focus groups may be used in the final report. Direct quotes will not be attributed to individual students. There are no foreseeable risks to participating in this study; however, students should see their personal physician should they experience any discomfort. Participation will conclude by July 2020. Participation is completely voluntary and your answers will be anonymous.

This study is completely voluntary and there is no consequence to your student if you or your student elect not to participate. The decision whether or not to participate does not have any relationship to student standing, academic or otherwise.

If you have any questions, please do not hesitate to contact me (stacyhawthorne@u.boisestate.edu) or Dr. Kerry Rice, my dissertation committee chair (krice@boisestate.edu).

Thank you for your time.

Stacy Hawthorne

Doctoral Candidate

Boise State University

Student Survey Recruitment Email

Dear Student,

Have slow Internet speeds ever bummed you out? Have you ever considered how your Internet connection may play a role in impacting your perceptions of your online courses? Well, I can certainly answer "YES" to both those questions so I'm doing my part to understand the relationship between our Internet connections and our online courses.

My name is Stacy Hawthorne and I am a doctoral candidate at Boise State University. I am conducting a research study about how the speed of home Internet connection impacts your perceptions of your online courses and I hope you are interested in being a part of this study. One of your parents has already given permission for your participation, but you still have the right to choose whether or not you would like to participate. I've attached a full Informed Consent Form is attached to this email and

pasted below for your review. This is an important document so take some time to read it carefully.

Participation in this study will likely take between 30 and 90 minutes between now and June 2020. You'll be asked to complete an anonymous online survey to start. You may be selected to participate in a focus group after the survey. If you are selected for and participate in a focus group, you will be videotaped and direct quotes from the focus groups may be used in the final report. Direct quotes will not be attributed to individual students. There are no foreseeable risks to participating in this study; however, you should see your personal physician should you experience any discomfort. Participation is completely voluntary and your answers will be anonymous.

If you have any questions, please do not hesitate to contact me (stacyhawthorne@u.boisestate.edu) or Dr. Kerry Rice, my dissertation committee chair (krice@boisestate.edu).

Your parent has consented to your participation in this study, but you must still consent on your behalf. Please reply by Monday, March 16 with your decision. If you consent to participate you must return the attached Informed-Consent-Students Signature page with your signature.

Thank you for your consideration,

Stacy Hawthorne

Doctoral Candidate

Boise State University

Student Focus Group Recruitment Email

Dear Participant,

Thank you for helping me with my research study, I'm very excited to be getting close to the end of my doctoral studies. Based on the results of the surveys, you have one of the lowest/highest Internet speeds in the whole school. I would like to invite you to a focus group with up to three other students with similar Internet speeds to ask a few qualitative questions. I suspect that the focus group will take about 60 minutes, but I will not let it go past 90 minutes. Are you willing to participate in the focus group? While I would definitely like to have you included you are certainly under no obligation to participate. If you are able to participate, what is a good day and time (with time zone) for you? I will work to find a time that is convenient for everyone. I am happy to do the focus group on a weekend if that is helpful.

Thank you so much for your help up to this point. I really appreciate it and you.

Best,

Stacy

APPENDIX C

Research Site Course Standards

The following course standards were developed to help maintain quality and evaluate online courses at the research site. The standards are aligned to the six core values that must be present in all online courses.

Rating Scale

0 Absent

1 Unsatisfactory – needs significant improvement

2 Somewhat satisfactory – needs targeted improvements

3 Satisfactory – discretionary improvement needed

4 Very satisfactory – no improvement needed

Core Values - Rigorous and Critical Thinking

Courses will have an appropriate level of rigor that will challenge participants to achieve in a supportive online classroom that encourages academic risk and growth. Courses will provide opportunities for participants to think critically, form and support opinions, and experience a variety of perspectives.

1. Rigorous goals and objectives clearly state what the participants will know or be able to do at the end of the course. The goals and objectives are measurable in multiple ways.
2. The course provides ample opportunities for students to engage in higher-order thinking, critical reasoning activities, and thinking in increasingly complex ways.
3. Student evaluation strategies are consistent with course goals and objectives, are representative of the scope of the course, and are clearly stated.
4. The course is evaluated for effectiveness using a continuous improvement cycle and the findings are used as the basis for continuous improvement.

5. The course requires learners to demonstrate advanced and complex learning as a result of using multiple, appropriate, and ongoing assessments.
6. The course is designed with differentiated curricula that incorporate advanced, conceptually challenging, in-depth, distinctive, and complex content for students.
7. The course contains curricula in cognitive, affective, aesthetic, social, and leadership domains that are challenging and effective for students.
8. The course maintains high expectations for all students as evidenced in meaningful and challenging activities.
9. Asynchronous communication strategies promote critical reflection or other higher order thinking aligned with learning objectives.
10. The course provides learners with engaging learning experiences that promote their mastery of content and are aligned with the standards at the physical campus

Core Value – Personalized

Courses will be personalized to the needs of individual learners and provide ample opportunities for student voice and critical thinking.

1. The course and course instructor provide students with multiple learning paths, based on student needs, that engage students in a variety of ways.
2. The course provides options for the instructor to adapt learning activities to accommodate students' unique needs.
3. Course materials and activities are designed to provide appropriate access to all students. The course is developed with universal design principles in mind.

4. The course offers meaningful and challenging learning activities addressing the unique characteristics and needs of individual students.
5. The course offers a safe and welcoming climate for fostering discussion, addressing social issues, and developing personal responsibility.
6. The course offers opportunities for students to explore, develop, or research their areas of interest and/or talent.

Core Value - Rich Discourse

Courses will rely on a rich and authentic two-way discourse between all participants.

1. The course provides opportunities for appropriate instructor-student and student-student interactions to foster mastery and application of the material.
2. Information literacy and communication skills are incorporated and taught throughout the curriculum.
3. Students are required to use critical-thinking strategies throughout the course.
4. The course offers ample opportunities for feedback that focuses on effort, on evidence of potential to meet high standards, and on mistakes as learning opportunities.

Core Value - Collaborative/Synchronous

Courses will contain synchronous instructional elements that require collaboration among participants. While the courses will be online, it is important that the participants do not feel isolated in their learning experience.

1. Learning activities foster teacher-student, student-student, and student-content interactions that are authentic and meaningful.
2. Collaboration activities reinforce course content and learning outcomes while providing a learning community within the course.
3. Expectations regarding the quality of communications are clearly defined.
4. Communication activities are designed to help build a sense of community among learners.
5. There are plentiful opportunities for meaningful synchronous and asynchronous interaction.
6. Synchronous communication activities benefit from real-time interactions and facilitate “rapid response” communication.
7. Student-to-student interactions are required as part of the course. Students are encouraged to initiate communication with the instructor.
8. The instructor actively participates in communication activities, including providing feedback to students

Core Value – Flexible

Online courses will have a flexible learning plan so that they are responsive to the needs of the students, just like a face-to-face course at physical campus.

1. Ongoing, varied, and frequent assessments are conducted throughout the course to inform instruction.
2. The course architecture permits the online instructor to add content, activities and assessments to extend learning opportunities.

Course Design - Well-Supported Courses

Courses will provide students with a highly supportive learning environment that will address the needs of individual learners and provide opportunities for student voice in learning.

1. Students are offered an orientation for taking the course before starting the coursework.
2. A clear, complete course overview and syllabus are included in the course.
3. The instructor demonstrates an understanding of current best practices in the behavioral, social, and, when necessary, emotional aspects of the online learning environment.
4. The course ensures effective use of the courseware and various instructional media available.
5. The course shows evidence of supporting the social and emotional needs of students with exceptionalities.
6. The course allows for all members of the learning community to identify and address areas for personal growth.

Course Architecture

In addition to the six core values, there are certain fundamental qualities that must exist in all online classes to foster student success.

1. Expectations for academic integrity, use of copyrighted materials, plagiarism, and netiquette (Internet etiquette) regarding lesson activities, discussions, and e-mail communications are clearly stated.

2. Information is provided to students, parents, and mentors on how to communicate with the online instructor and course provider.
3. Privacy policies are clearly stated.
4. All technology requirements (including hardware, browser, software, etc.) are specified.
5. The course offers students a personal introduction to the instructor.
6. Course grading policy is clearly stated.
7. Navigation throughout the course is logical, consistent, and efficient.
8. The course contains appropriate resources for students with technical issues.
9. The course links to an explanation of how various student support systems can assist students in reaching their goals.

APPENDIX D

Research Site Teaching Standards

By developing online teaching standards around the six core values, the School ensures that teaching staff is selected and evaluated based on the experience that it is committed to providing students. The following standards are aligned to each core value.

Rigorous and Critical Thinking

1. Teacher knows and understands the professional responsibility to contribute to the effectiveness, vitality, and self-renewal of the teaching profession, as well as to their online school and community.
2. Teacher applies best practices and strategies in online teaching to create rich and meaningful experiences for students.
3. Teacher implements a variety of assessments that ensure the students are challenged to do their best work while maintaining the security of student assessment data and accurate measures of student ability.
4. Teacher creates, selects, and organizes the assignments and assessments with the appropriate rigor and aligns curricular content with associated and standards-based stretch learning goals.

Personalized

1. Teacher regularly uses student data to inform instruction, guide and monitor students' management of their time, monitor learner progress with available tools, and develop an intervention plan for unsuccessful learners.
2. Teacher uses a variety of methods and tools to reach and engage students who are struggling or need additional challenge.

3. Teacher orients students to teacher's instructional methods and goals and uses student input to enhance and adapt the instructional methods to meet individual student needs.
4. Teacher uses student data to plan instruction.
5. Teacher understands and respects the cognitive and affective characteristics of profoundly gifted students.
6. Teacher regularly invites students to provide feedback on their perceptions of how they are learning in a course and adjusts the course based on this feedback.

Rich Discourse

1. Teacher applies effective facilitation skills by creating a relationship of trust, establishes consistent and reliable expectations, and supports and encourages independence and creativity that promotes the development of a sense of community among the participants.
2. Teacher provides a variety of ongoing and frequent teacher-student interaction, student-student interaction, teacher-parent interaction, and teacher-mentor interaction opportunities.
3. Teacher designs learning opportunities for profoundly gifted students that promote self-awareness, positive peer relationships, leadership, and lifelong learning.
4. Teacher deliberately creates safe learning environments for profoundly gifted students that encourage active participation in individual and group activities to enhance independence, interdependence, and positive peer relationships.

5. Teacher uses communication technologies in a variety of mediums and contexts for teaching and learning.

Collaborative

1. Teacher continually builds learner capacity for collaboration in blended and online environments, and encourages students to participate.
2. Teacher uses student-centered instructional strategies that are connected to real-world applications to engage students in learning (e.g. peer-based learning, inquiry-based activities, collaborative learning, discussion groups, self-directed learning, case studies, small group work, and guided design).

Flexible

1. Teacher constructs flexible, digital and interactive learning experiences that are useful in a variety of delivery modes.
2. Teacher addresses learning styles and needs for accommodations and creates multiple paths to address diverse learning styles and abilities.

Well-Supported

1. Teacher facilitates and monitors appropriate interaction among students.
2. Teacher applies troubleshooting skills (e.g. change passwords, download plug-ins, etc.).
3. Teacher models and complies with intellectual property policies and fair use standards and reinforces their use with students.
4. Teacher regularly communicates with the appropriate school staff regarding specific accommodations, modifications or needs as listed in a student's IEP or

504 accommodations and works in collaboration with others to address student needs.

5. Teacher knows, understands and complies with the process for maintaining records of relevant communications.
6. Teacher provides consistent feedback and course materials in a timely manner and uses online tool functionality to improve instructional efficiency.
7. Teacher provides ongoing communication with parents concerning student learning.
8. Teacher modifies and adds rigorous and meaningful content and assessment using the Learning Management System (LMS)
9. Teacher arranges media and content to help transfer knowledge most effectively in the online environment.
10. Teacher knows, understands, and demonstrates the appropriate use of technologies to enhance learning.
11. Teacher identifies and continually explores new tools and tests their applicability to their content areas and students.
12. Teacher understands advanced developmental milestones of profoundly gifted students from early childhood through adolescence, as well as the expression of asynchronous development.

Rating Scale

0 Absent

1 Unsatisfactory – needs significant improvement

2 Somewhat satisfactory – needs targeted improvements

3 Satisfactory – discretionary improvement needed

4 Very satisfactory – no improvement needed

APPENDIX E

Research Site Semester Course Feedback Survey

1. How many hours a week do you spend working on this class? *Please include your live session time in your total.*
2. How many days a week do you think you should have a live session for your class?
3. On average, how many hours of parental involvement is required for you to be successful in this course?
4. Please rate your ability to manage this course independently. Use a scale of 1 to 5 where 1 is I need more support than expected and 5 is I manage the course independently.
5. Please use a 5-point scale where 1 is Strongly Disagree and 5 is Strongly Agree to rate your course materials in Blackboard for this course.
    a. The course materials are appropriately challenging.
    b. The course materials are well designed.
    c. The course materials allow for sufficient interaction with my peers.
    d. The course materials allow for sufficient interaction
6. Please use this space if you would like to add additional feedback about the course materials in Blackboard.
7. Please use a 5-point scale where 1 is Strongly Disagree and 5 is Strongly Agree to rate the live sessions for this course.
    a. The live sessions help me to think more deeply about the course content.
    b. The live sessions give me an opportunity to contribute to the class.
    c. The live sessions are important to me.
    d. The live sessions are well organized.

    e. The live sessions encourage meaningful interaction with my peers.

8. Please use this space if you would like to add additional feedback about the live sessions.
9. Please use a 5-point scale where 1 is Strongly Disagree and 5 is Strongly Agree to rate the teacher for this course.
    a. The teacher is responsive when I have questions.
    b. The teacher provides appropriate feedback in order for me to improve.
    c. The teacher knows and understands the content.
    d. The teacher knows and understands my learning needs.
10. Please use this space if you would like to add additional feedback about your teacher.
11. Have you experienced any technical issues with Blackboard in this class during this semester? If so, please describe.
12. Have you experienced any technical issues with Zoom in this class during this semester? If so, please describe.
13. Please use this space to add any general comments you would like to share.

APPENDIX F

Student Perceptions of Classroom Quality Survey

Student Survey About. . .

Student Perceptions of Classroom Quality

Secondary Version

Marcia Gentry, Steven V. Owen, and Penny Springer

We would like to know how you feel about your class activities. Read each statement and show how much you agree with it by filling in the circle. There are no right or wrong answers. Your answers will be kept confidential. Remember to mark an answer for each statement. In the example below, the person agreed that the class was enjoyable. Thank you for your help in this project!

Student ID				A	B	C	D
0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9

Name/ID (Optional)

Teacher School

Your Current Grade in this Course

○ A ○ B ○ C ○ D ○ F

SUBJECT AREA

(please choose the answer that most closely describes the type of class in which you are completing this survey)

- ○ Math
- ○ Foreign Language
- ○ Science
- ○ Art
- ○ Social Studies
- ○ Music
- ○ Language Arts
- ○ Physical Education
- ○ Other: _____

COMMUNITY

Which type of community best describes your school community?

- ○ Rural
- ○ Urban
- ○ Suburban

GENDER

○ Male ○ Female

ETHNIC GROUP

- ○ African-American
- ○ Asian-American
- ○ Caucasian-American
- ○ Hispanic-American
- ○ Native American
- ○ Other: _____

Do you receive any special services from your school district?

○ Yes ○ No

If yes, what services do you receive:

- ○ Gifted/talented
- ○ English as a second language
- ○ Speech
- ○ Hearing
- ○ Special education-learning disability
- ○ Special education-behavioral services
- ○ Compensatory services
- ○ Other: _____

Is this class an advanced level, Advanced Placement, or honors course?

○ Yes ○ No

GRADE

○ 7 ○ 9 ○ 11
○ 8 ○ 10 ○ 12

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Example: My class is enjoyable.	○	○	○	●	○
1. I am given choices regarding how to show the teacher what I have learned.	○	○	○	○	○
2. I'm good at helping other kids understand concepts.	○	○	○	○	○
3. I find the contents of my class interesting.	○	○	○	○	○
4. I find my class time instruction appropriately challenges my intellectual abilities.	○	○	○	○	○
5. My teacher lets me choose the resources I use for projects.	○	○	○	○	○
6. When there are different ways to show what I have learned, I can usually pick a good way.	○	○	○	○	○
7. The teacher applies the lessons to practical experiences.	○	○	○	○	○
8. I find my class assignments a good challenge.	○	○	○	○	○
9. The assigned reading material for my class is interesting.	○	○	○	○	○
10. My teacher makes connections between the course material and society.	○	○	○	○	○

Please continue on the back

Side 2

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
11. I learn best when I am challenged.	○	○	○	○	○
12. I am given lots of choices in my class.	○	○	○	○	○
13. In my class my teacher relates current issues to the material we are learning.	○	○	○	○	○
14. I am good at connecting material from this class with the real world.	○	○	○	○	○
15. This class content is an appropriate challenge for me.	○	○	○	○	○
16. I feel responsible for my learning because I am allowed to make choices in my class.	○	○	○	○	○
17. The teacher uses a variety of instructional techniques that make this class enjoyable.	○	○	○	○	○
18. I like the challenge of the projects in this class.	○	○	○	○	○
19. The material covered in my textbook is interesting.	○	○	○	○	○
20. The textbook provides examples of how the material relates to society and daily living.	○	○	○	○	○
21. I am good at answering questions in this class	○	○	○	○	○
22. I am encouraged to pursue subjects that interest me in my class.	○	○	○	○	○
23. It is pretty easy for me to earn good grades.	○	○	○	○	○
24. In my class I explore real issues that affect the world around me.	○	○	○	○	○
25. I look forward to learning new things in this class.	○	○	○	○	○
26. I find the reading material for my class a pleasure to read.	○	○	○	○	○
27. I use my critical thinking skills in my class.	○	○	○	○	○
28. I'm good at taking tests in this class.	○	○	○	○	○
29. I can relate the material discussed in my class to my daily life.	○	○	○	○	○
30. I can easily understand reading assignments for this class	○	○	○	○	○
31. I like going to my class each day.	○	○	○	○	○
32. I can usually discover interesting things to learn about in this class.	○	○	○	○	○
33. I like the way my teacher challenges me in this class.	○	○	○	○	○
34. I can express my opinions clearly in this class.	○	○	○	○	○
35. Good grades are mainly the result of my hard work.	○	○	○	○	○
36. Good grades are mainly the result of my ability.	○	○	○	○	○
37. I can improve my intelligence by working hard.	○	○	○	○	○
38. I plan to go to college.	○	○	○	○	○

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APPENDIX G

Quantitative Survey

Modified Student Perceptions of Classroom Quality Survey

We would like to know how you feel about your class activities. Your answers will be kept confidential. Thank you for your help with this research.

* Required

1. Please enter the code provided in the instruction email to open the survey. *

_____

Demographics

2. English Course *

Mark only one oval.

- ◯ Critical Reading and Writing
- ◯ Composition and Analysis
- ◯ Introduction to Literary Studies
- ◯ American Literature
- ◯ British Literature
- ◯ Other: _____

3. Community

Which type of community best describes where you live?

Mark only one oval.

- ◯ Rural
- ◯ Suburban
- ◯ Urban
- ◯ Other: _____

4. Gender

Mark only one oval.

- ◯ Female
- ◯ Male
- ◯ Prefer to self identify
- ◯ Other: _____

5. Ethnic Group

Mark only one oval.

- ◯ African-American
- ◯ Asian-American
- ◯ Caucasian-American
- ◯ Hispanic-American
- ◯ Native American
- ◯ Other: _____

6. Age

Please enter your current age in years only

_____

7. Read each statement and show how much you agree with it by selecting the best circle. There are no right or wrong answers. *

Remember to mark an answer for each question.

Mark only one oval per row.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	N/A
I am given choices regarding how to show the teacher what I have learned.	◯	◯	◯	◯	◯	◯
I am good at helping other students understand things.	◯	◯	◯	◯	◯	◯
I find the contents of my class interesting.	◯	◯	◯	◯	◯	◯
I find my class time instruction appropriately challenges my intellectual abilities.	◯	◯	◯	◯	◯	◯
My teacher lets me choose the resources that I use for projects.	◯	◯	◯	◯	◯	◯
When there are different ways to show what I have learned, I can usually pick a good way.	◯	◯	◯	◯	◯	◯
The teacher applies the lessons to practical experiences.	◯	◯	◯	◯	◯	◯
I find my class assignments a good challenge.	◯	◯	◯	◯	◯	◯
The assigned reading material for my class is interesting.	◯	◯	◯	◯	◯	◯

My teacher makes connections between the course materials and society.	⬭	⬭	⬭	⬭	⬭	⬭
I learn best when I am challenged.	⬭	⬭	⬭	⬭	⬭	⬭
I am given lots of choices in my class.	⬭	⬭	⬭	⬭	⬭	⬭
In my class, my teacher relates current issues to the material we are learning.	⬭	⬭	⬭	⬭	⬭	⬭
I am good at connecting material from this class with the real world.	⬭	⬭	⬭	⬭	⬭	⬭
This class content is an appropriate challenge for me.	⬭	⬭	⬭	⬭	⬭	⬭
I feel responsible for my learning because I am allowed to make choices in my class.	⬭	⬭	⬭	⬭	⬭	⬭
The teacher uses a variety of instructional techniques that make the class enjoyable.	⬭	⬭	⬭	⬭	⬭	⬭
I like the challenge of the projects in this class.	⬭	⬭	⬭	⬭	⬭	⬭
The material covered in my textbook is interesting.	⬭	⬭	⬭	⬭	⬭	⬭
The textbook provides examples of how the material relates to society and daily living.	⬭	⬭	⬭	⬭	⬭	⬭

I am good at answering questions in this class.						
I am encouraged to pursue subjects that interest me in my class.						
It is pretty easy for me to earn good grades.						
In my class I explore real issues that affect the world around me.						
I look forward to learning new things in this class.						
I find the reading material for my class a pleasure to read.						
I use my critical thinking skills in my class.						
I am good at taking tests in this class.						
I can relate the material discussed in my class to my daily life.						
I can easily understand reading assignments for this class.						
I like going to my class each day.						
I can usually discover interesting things to learn about in this class.						
I like the way my						

help me feel connected to my classmates.

8. Please use this space to leave any comments or explain any responses that you would.

Internet Speed Test

9. Please visit www.speedtest.net and click "begin test." *

Please enter the DOWNLOAD speed from your speed test.

I feel the course uses an appropriate amount of synchronous (e.g., live online class session with audio and/or video enabled) communication.						
I think the communication methods in this class contribute to my understanding of the content.						
I think the communication methods in the course						

APPENDIX H

Survey Constructs for Focus Groups

The survey you took was designed to measure your perceptions on six different topics related to your online English course: appeal, challenge, choice, meaningfulness, self-efficacy, and communication. Below is a definition of each of the constructs and the questions on the survey related to each construct.

Appeal

The appeal dimension seeks to understand your perceptions related to general interest and enjoyment in your courses.

Questions on the survey related to appeal:

1. I find the contents of my class interesting. (Perception #3)
2. The assigned reading material for my class is interesting. (Perception #9)
3. The material covered in my textbook is interesting. (Perception #19)
4. The textbook provides examples of how the material relates to society and daily living. (Perception #20)
5. I look forward to learning new things in this class. (Perception #25)
6. I find the reading material for my class a pleasure to read. (Perception #26)
7. I like going to my class each day. (Perception #31)

Challenge

The challenge construct seeks to understand your perception about the level of rigor in your course. Courses that are appropriately challenging encourage you to strive for more knowledge, but are not so challenging that you are discouraged.

Questions on the survey related to challenge:

1. I find my class time instruction appropriately challenges my intellectual abilities. (Perception #4)

2. I find my class assignments a good challenge. (Perception #8)
3. I learn best when I am challenged. (Perception #11)
4. This class content is an appropriate challenge for me. (Perception #15)
5. I like the challenge of the projects in this class. (Perception #18)
6. I use my critical thinking skills in my class. (Perception #27)
7. I like the way my teacher challenges me in this class. (Perception #33)

Choice

The choice dimension measures perceptions about your ability to make decisions about your learning.

Questions on the survey related to choice:

1. I am given choices regarding how to show the teacher what I have learned. (Perception #1)
2. My teacher lets me choose the resources that I use for projects. (Perception #5)
3. When there are different ways to show what I have learned, I can usually pick a good way. (Perception #6)
4. I am given lots of choices in my class. (Perception #12)
5. I feel responsible for my learning because I am allowed to make choices in my class. (Perception #16)
6. The teacher uses a variety of instructional techniques that make the class enjoyable. (Perception #17)
7. I am encouraged to pursue subjects that interest me in my class. (Perception #22)

Meaningfulness

The meaningfulness domain is asking about your perceptions related to how relevant the course content is to you.

Questions on the survey related to meaningfulness:

1. The teacher applies the lessons to practical experiences. (Perception #7)
2. My teacher makes connections between the course materials and society. (Perception #10)
3. In my class, my teacher relates current issues to the material we are learning. (Perception #13)
4. In my class I explore real issues that affect the world around me. (Perception #24)
5. I can relate the material discussed in my class to my daily life. (Perception #29)

Self-efficacy

Self-efficacy questions are measuring your perceptions about your ability to score well on assessments and your confidence in completing learning tasks.

Questions on the survey related to self-efficacy:

1. I am good at helping other students understand things. (Perception #2)
2. I am good at connecting material from this class with the real world. (Perception #14)
3. I am good at answering questions in this class. (Perception #21)
4. It is pretty easy for me to earn good grades. (Perception #23)
5. I am good at taking tests in this class. (Perception #28)
6. I can easily understand reading assignments for this class. (Perception #30)

7. I can usually discover interesting things to learn about in this class. (Perception #32)
8. I can express my opinions clearly in this class. (Perception #34)

Communication

Communication questions address your perceptions of the synchronous (live, real-time) and asynchronous (e.g. discussion boards, Teams) opportunities for interaction in your course.

Questions on the survey related to communication:

1. I feel the course uses an appropriate amount of asynchronous (e.g., discussion boards, email, instant messaging) communication. (Perception #39)
2. I feel the course uses an appropriate amount of synchronous (e.g., live online class session with audio and/or video enabled) communication. (Perception #40)
3. I think the communication methods in this class contribute to my understanding of the content. (Perception #41)
4. I think the communication methods in the course help me feel connected to my classmates. (Perception #42)

Focus Group Format and Questions

The focus group is an opportunity for me to better understand your opinions and values around the six constructs on the survey. During the focus group you will be asked the following questions:

F1. Please review and consider your answers on the survey related to the appeal construct. Discuss your thoughts about the appeal of your online English course.

F2. Please review and consider your answers on the survey related to the challenge construct. Discuss your thoughts about the challenge of your online English course.

F3. Please review and consider your answers on the survey related to the choice construct. Discuss your thoughts about the choice construct of your online English course.

F4. Please review and consider your answers on the survey related to the meaning construct. Discuss your thoughts about the meaningfulness of your online English course.

F5. Please review and consider your answers on the survey related to the self-efficacy construct. Discuss your thoughts about your self-efficacy in your online English course.

F6. Please review and consider your answers on the survey related to the communication construct. Discuss your thoughts about communication in your online English course.

Through the focus group I will also have an opportunity to better understand how Internet speed impacts your experience and behavior. I will use three guiding questions for this part of the focus group.

F7. How did Internet speed impact your learning?

F8. How did you troubleshoot any Internet connectivity issues?

F9. How was your learning impacted by any temporary Internet outages? If applicable, how did you resolve for temporary Internet outages?

You are welcome to add any additional thoughts or comments that you have at any time during the focus group.

APPENDIX I

IRB Approval

This research was conducted with the approval of the Institutional Review Board, Boise State University, protocol #101-SB20-030.