

PREDICTING ACADEMIC ACHIEVEMENT BASED ON SENSE OF COMMUNITY
AMONG ONLINE PUBLIC HIGH SCHOOL STUDENTS

by

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Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

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ABSTRACT

Limited research has investigated the relationship between sense of community and academic achievement, as determined by students' self-reported Preliminary Scholastic Aptitude Test (PSAT)/National Merit Scholarship Qualifying Test (NMSQT) scores. The purpose of this correlational study was to determine the extent by which sense of community can predict academic achievement among online public high school students. The predictor variables were social community and learning community. The criterion variable was academic achievement using student's PSAT/NMSQT scores. The school form of the Classroom and School Community Inventory was given to 98 online high school students to complete. They represented a major suburban public school district comprised of 12 high schools. The students were also asked to self-report their overall PSAT/NMSQT scores. Using a predictive correlational design, a multiple regression analysis was performed to test the hypothesis that there was no statistically significant relationship between the predictor variables and the criterion variable. Results of the analysis failed to reject the null hypothesis. The study also contrasted with the results of a previous study. Recommendations for future research include using a much larger sample size and using student participants who are enrolled in online classes, traditional, or even blended instructional programs. The research should also include areas with population demographics in different environments or in different regions of the country.

Keywords: academic achievement, sense of community, social community, learning community

Dedication

This work was not possible without the love and support of my Lord and Savior Jesus Christ, my wife Elaine, and our two sons: Boydie Aaron and Joseph Adam. Throughout this long journey, they have been at my side encouraging me to keep the end in sight and have always provided me with unshakeable love and inspiration. Elaine has been the backbone of our family, taking care of things big and small, and always ensuring our sons were supported while I pursued this long, difficult, but fulfilling journey. She has been the inspiration for me, always encouraging me to persevere and standing by my side throughout all adversity. In our 30-plus years of marriage, I love her more and more each day and I know that God brought us together as one. For that I will always be grateful to Him and for his love, guidance, and unwavering support to me and my family. Without Him, my life and this work would not be possible.

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List of Abbreviations

Classroom and School Community Inventory (CSCI)

Institutional Review Board (IRB)

National Merit Scholarship Corporation (NMSC)

National Merit Scholarship Qualifying Test (NMSQT)

No Child Left Behind Act (NCLB)

Preliminary Scholastic Aptitude Test (PSAT)

Scholastic Aptitude Test (SAT)

Zone of Proximal Development (ZPD)

CHAPTER ONE: INTRODUCTION

Overview

The purpose of this correlational study was to determine the extent by which sense of community can predict academic achievement among online public high school students. Chapter One will discuss the background, which will include a brief historical overview of the topic and the theory underpinning the issue. The problem statement will be discussed, including recommended research from previous studies. The purpose of this study will be discussed, as well as the significance of the current study. Finally, the research question will be introduced, and important definitions will be provided.

Background

Overall sense of community and academic achievement are both important to students of all ages, backgrounds, and socio-economic status. In high school, students want to be able to do well academically and to prepare themselves for success in college (College Board, 2018a); at the same time, they also want to have a sense of belonging and feel part of the school and the community of students (Capone, Donizzetti, & Petrillo, 2018; Petrillo, Capone, & Donizzetti, 2016; Rovai, Wighting, & Lucking, 2004; Schaber, McGee, & Jones, 2015; Wighting, Nisbet, & Spaulding, 2009).

The first component to helping predict academic achievement is based on the concept of a student's overall sense of community (Rovai et al., 2004; Tinto, 1997; Wighting et al., 2009). There are several important reasons why sense of community is important in academic settings, including both virtually and in traditional settings, and with students from all grades and demographics, including those in college (Nistor, Daxecker, Stanciu, & Diekamp, 2015; Overbaugh & Lin, 2006). Overall sense of community is defined as an environment whereby

teamwork and diversity are prevalent, members care about one another, and they form a bond of trust and respect for each other (Rovai et al., 2004; Royal & Rossi, 1997; Wighting et. al., 2009). Sense of community is also similar to group cohesion that is usually found in small groups (Nistor et al., 2015, p. 257). For example, sense of community within an academic community of practice can help “sustain participants’ knowledge sharing, which in turn substantiates the socio-cognitive structures” (p. 257) that can make up teacher or scholar identities, or even the relationships between colleagues.

In looking at the original concept surrounding psychological sense of community, researchers referred to a construct developed by psychologist Sarason (1974), who viewed it as a critical all-important value. He defined it as “the perception of similarities to others, an acknowledged interdependence by giving to or doing for others what one expects from them [and] the feeling that one is part of a larger dependable and stable structure” (Sarason, 1974, p. 157, as cited in Rovai et al., 2004, p. 266). Following this, and based on other studies regarding group cohesion, the sense of community theory was formulated by McMillan and Chavis (1986). They defined sense of community as “a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members’ needs will be met through their commitment to be together” (McMillan & Chavis, 1986, p. 9). In other research, Rovai (2002b) theorized that sense of community in an educational environment consists of two underlying dimensions or layers which can be classified as social community and learning community.

The dimension of social community looks at how the overall body of students feel with regards to “...their spirit, cohesion, trust, safety, trade, interdependence, and sense of belonging” (Rovai et al., 2004, p. 267). While the dimension of learning community represents the feelings

of community members regarding interaction with each other as they pursue the construct of understanding and the degree to which they share values and beliefs concerning the extent to which their educational goals and expectations are being satisfied (Glynn, 1981; McMillan, 1996; McMillan & Chavis, 1986; Rovai et al., 2004; Royal & Rossi, 1997; Wighting et al., 2009).

Determining academic achievement has been measured in different ways over the years, and as such, it makes it difficult to compare how well students are doing in comparison to each other given this variation (Wighting et al., 2009). These variations in measurements include grade point averages, performance on school-designed tests, performance in advanced placement tests, honors programs, and many others (Milewski & Sawtell, 2006). Milewski and Sawtell (2006) also found that one of the most important predictors of academic achievement is the Preliminary Scholastic Aptitude Test (PSAT)/National Merit Scholarship Qualifying Test (NMSQT) taken by both 10th- and 11th-grade students (but primarily by 11th-grade students).

The PSAT/NMSQT is a comprehensive assessment program helping students to determine their readiness for college and provides them with tools to help plan their future. According to the College Board (2018b), the PSAT/NMSQT evaluates critical reasoning skills and includes three academic areas important to determining the potential for success in college: reading, writing and language, and math. One of the major studies on the PSAT/NMSQT found a moderate to strong correlation between the PSAT/NMSQT and several key measures of academic success including high school grade-point average, years of study, academic intensity, and other measures (Milewski & Sawtell, 2006, p.14). Another strong relationship was evident: students who took “more than four years of study in an academic area or participat[ed] in an

honors course” (Milewski & Sawtell, 2006, p. 14) had higher scores on the composite PSAT/NMSQT score scale.

In summary, overall sense of community and academic achievement are important to students. They want to have a sense of belonging and feel part of the school and community of students. They also want to feel well prepared for success in college. From a historical perspective, the sense of community construct was first defined by psychologist Seymour Sarason in 1974; additional research help brought forth the definition by McMillan and Chavis (1986) we know today. Sense of community is also defined by an environment where both diversity and teamwork are prevalent, members care about one another, and they form a bond of trust with each other (McMillan & Chavis, 1986, p. 9; Rovai et al., 2004; Wighting et. al., 2009). Additionally, sense of community also includes the dimensions of social community and learning community (Rovai, 2002b; Rovai et al., 2004). The construct of sense of community will be used to predict academic achievement, which has been measured in many different ways (such as grade point averages, performance on school designed tests, etc.); as a result, it is difficult to measure how well students are doing in comparison to each other given this variation. New research is therefore needed to shed light on the relationship between sense of community and academic achievement. For this study, the sense of community’s two subscales of social and learning community were used to predict a student’s academic achievement as measured by their self-reported PSAT/NMSQT scores.

Problem Statement

The research literature relating sense of community and academic achievement, as measured by a student’s PSAT/NMSQT scores, is dated, with two of the more significant studies being done by Wighting et al. (2009) and Milewski and Sawtell (2006). Research by Wighting

et al. (2009) focused on independent high school students from an urban region who took the PSAT/NMSQT. In their studies, they found that a relationship did exist between sense of community and academic achievement, and that “overall a slight positive correlation exists between the two constructs” (Wighting et al., 2009, p. 69). They concluded that the relationship may be linked to student learning and offered that educators may want to look at measuring different levels of community at their schools in order to help teachers improve their practices (Wighting et al., 2009, p. 70). The researchers recommended that future research look at public high school students instead of those who attend independent high schools, use a larger sample size, and to choose a more diverse environment, as compared to their study (Wighting et al., 2009, p. 70).

Milewski and Sawtell (2006) found that a moderate to strong correlation existed between the PSAT/NMSQT and several key measures of academic success including but not limited to high school grade-point average, years of study, academic intensity, and participation in Advanced Placement (AP) courses. They concluded that the relationships between “indicators of academic achievement and PSAT/NMSQT scores can be demonstrated empirically” (Milewski & Sawtell, 2006, p. 14). They theorized that it was possible higher academic achievement in high school can cause higher PSAT/NMSQT scores, and it was also possible that both higher academic achievement and high PSAT/NMSQT scores can be caused by another variable. They recommended future studies examine whether the relationship between the two constructs (high school achievement and PSAT/NMSQT scores) can change significantly if the variance of one of the measures was partially removed (Milewski & Sawtell, 2006, p. 14).

This study attempted to answer the recommendations from these two research studies. This study focused, not on traditional high school students, but instead on online student

participants from public high schools, who come from a more diverse environment; this study also used a sample size more appropriate to the study. The overall sense of community's two subscales of social community and learning community were used to determine academic achievement as measured by a student's self-reported PSAT/NMSQT scores. The problem is that previous research has used different measures to predict academic achievement in high school, with fewer studies using online participants and the subscales of social and learning community as the predictors. Therefore, updated research is needed to shed light on the relationship between the subscales of sense of community and academic achievement among online public high school students.

Purpose Statement

The purpose of this study was to determine the extent by which sense of community can predict academic achievement among online public high school students. A predictive correlational design was used to test the relationship between the predictor variables (social community and learning community), and the criterion variable (academic achievement), as determined by students' self-reported PSAT/NMSQT scores.

Overall sense of community is defined as a "feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together" (McMillan & Chavis, 1986, p. 9). The predictor subscale variable, social community, refers to how the overall body of students feel with regard to their sense of belonging within the school and classroom communities, their sense of trust and safety, as well as how they can interact with each other, and their interdependence (McMillan, 1996; McMillan & Chavis, 1986; Rovai et al., 2004; Wighting et al., 2009). The second predictor subscale variable, learning community, represents the feelings

of community members regarding interactions with each other as they pursue the construction of understanding; and the degree to which they share values and beliefs concerning the extent to which their educational goals and expectations are being satisfied (Glynn, 1981; McMillan & Chavis, 1986; Rovai et al., 2004; Royal & Rossi, 1997; Wighting et al., 2009). The criterion variable academic achievement, as determined by students' self-reported PSAT/NMSQT scores, assesses critical reasoning skills and encompasses three areas that are important for success in college: reading, mathematics, and writing skills (College Board, 2008). The study will be based on a convenience sample of online public high school students from a suburban school division in northern Virginia. The convenience sample is representative of the population demographics in this region.

Significance of the Study

Academic achievement as measured by a student's PSAT/NMSQT scores is important to students, parents, and educators alike. Students and parents find the PSAT/NMSQT test scores important because both the composite and individual sectional scores in math and evidence-based reading and writing are an early predictor of the Scholastic Aptitude Test (SAT), which can be used to more competitively place students in college (College Board, 2018a, 2018b). The PSAT/NMSQT can also help students get scholarships such as those offered by the National Merit Scholarship Corporation (NMSC). The PSAT/NMSQT is co-sponsored by the College Board and the NMSC, and it provides students with an opportunity to enter NMSC scholarship competitions (Milewski & Sawtell, 2006). The "NMSC uses a Selection Index score based on PSAT/NMSQT scores as an initial screen of students who enter its scholarship programs" (College Board, 2018b).

Educators find the PSAT/NMSQT important because they can be used to determine how well they are preparing their students for the SAT and for possible entry into college. This study provides research affecting a different population sample (public high school students versus independent high school students), an adequate sample size of students who are enrolled in one or more online classes (as compared to traditional students), and for a new geographic region (suburban versus urban area). This study is important because it not only bridges the gap between the last major studies conducted on this topic, but it also provides new research on the relationship between online high school students' sense of community and academic achievement, which can be used to help them become better prepared for college.

Research Question

RQ: To what extent does sense of community predict academic achievement among online public high school students?

Definitions

1. *Digital Immigrants* – Refers to those of us “who were not born into the digital world, but have, at some later point in our lives, become fascinated by and adopted many or most aspects of the new technology” (Prensky, 2001, p. 2).
2. *Digital Natives* – Refers to today’s students who “are all ‘native speakers’ of the digital language of computers, video games and the internet” (Prensky, 2001, p. 2).
3. *Disruption Innovation Theory* – “Explains why organizations struggle with certain kinds of innovation and how organizations can predictably succeed in innovation” (Christensen, Horn, & Johnson, 2011, p. 45).

4. *Learning Community* – “Consists of the feelings of community members regarding the degree to which they share group norms and values and the extent to which their educational goals and expectations are satisfied by group membership” (Rovai et al., 2004, p. 267).
5. *Preliminary Scholastic Aptitude Test/National Merit Scholarship Qualifying Test (PSAT/NMSQT)* – A comprehensive test which assesses critical reasoning skills and encompasses three areas that are important for success in college: reading, mathematics and writing skills (College Board, 2018a).
6. *School Connectedness* – A student’s sense of belonging within the school environment, which leads to positive reactions to teachers and peers and engagement in school activities (Thompson, Iachan, Overpeck, Ross, & Gross, 2006).
7. *Sense of Community* – Defined as a “feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members’ needs will be met through their commitment to be together” (McMillan & Chavis, 1986, p. 9).
8. *Social Community* – Refers to the feelings of the broad “community of students regarding their spirit, cohesion, trust, safety, trade, interdependence, and sense of belonging” (Rovai et al., 2004, p. 267).
9. *Social Development Theory* – Individuals learn through the influence of others and through their social interactions with others (Vygotsky, 1978).
10. *Student Engagement* – How involved or interested students appear to be in their learning and how connected they are to their classes, their institutions, and each other (Axelson & Flick, 2011).

11. *Traditional Learning Environment* – An educational environment that contains teacher talk, student talk, student interaction, cooperative learning, teacher-to-student interaction, and student-to-student interaction (Ahern & Repman, 1994).
12. *Virtual Learning Environment* – An educational environment that is delivered via an online format that provides students with equal access to learning resources and communication with teachers, students, and other support services (Palmer & Holt, 2010).

CHAPTER TWO: LITERATURE REVIEW

Overview

Chapter Two will discuss the theoretical framework for this study and the related research. The overall sense of community theory together with the related underlying dimensions of social community and learning community will be discussed, as well as a brief look at the social development theory regarding interactions in online learning environments. Research related to the 21st century online classroom, digital learners, impact of technology, student motivation and engagement, and academic achievement will be discussed in the context of online student learning and engagement. These discussions will show that further research is needed to help fill the gap in the current literature; that is, to determine the extent by which the sense of community subscales of social and learning community can predict academic achievement among online public high school students.

Theoretical Framework

The theoretical framework guiding this study comes from two different theories: McMillan and Chavis' (1986) sense of community theory, and Vygotsky's (1978) social development theory.

Sense of Community Theory

The original concept surrounding the psychological sense of community theory was put forth by psychologist Seymour Sarason in 1974. He defined it as "the perception of similarities to others, an acknowledged interdependence by giving to or doing for others what one expects from them [and] the feeling that one is part of a larger dependable and stable structure" (Sarason, 1974, p. 157, as cited in Rovai et al., 2004, p. 266). Other researchers have since built upon this original definition. For example, Glynn (1981) tried to determine some of the critical elements

to sense of community and identified the following as most relevant: homogeneity, interdependence, shared responsibility, and common goals and values. Sarason, Glynn, and other researchers' early contributions to the concept of sense of community were then further assessed by others (Doolittle & MacDonald, 1978; Riger & Lavrakas, 1981); however, it was not until McMillan and Chavis (1986) presented an updated model using a working paper that McMillan (1976) had previously developed, and based on the current literature, that a more formal definition of the concept was posited.

Using the previous assessments as a framework in their studies involving group cohesion, McMillan and Chavis (1986) were then able to define a generalized sense of community as “a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together” (p. 9). McMillan and Chavis further identified some of the key characteristics of sense of community, which included influence, membership, reinforcement (fulfillment of needs and integration), and shared emotional connection (1986, p. 9).

Additional research into these four key characteristics of sense of community further substantiated McMillan and Chavis' work. Influence is defined as how one feels with regards to making a difference to the group; or of mattering to the group and how the group matters to the individual; or the individual's perceived impact on the group, and of the groups perceived impact on the individual (Abfalter, Zaglia, & Mueller, 2012; Boyd & Nowell, 2014; McMillan & Chavis, 1986). Membership is defined as a sense of belonging or fitting in with others of a particular group; it can also be viewed as how one personally feels as they relate to the rest of the group (Abfalter et al., 2012; Boyd & Nowell, 2014; McMillan & Chavis, 1986; Palloff & Pratt, 1999). Integration and fulfillment of needs are defined as how members feel that their needs will

be met through their membership in the group (Boyd & Nowell, 2014; McMillan & Chavis, 1986). Shared emotional connection is defined as how members believe their common experiences, history, time together and commonality will be shared by the community (Abfalter et al., 2012; Boyd & Nowell, 2014; McMillan & Chavis, 1986).

McMillan later refined his views on sense of community based on research following the publication of his work with Chavis (Rovai, Wighting, & Liu, 2005). He now looked at sense of community in a more personal and mutual context, and emphasized the “spark of friendship that becomes the Spirit of Sense of Community” (McMillan, 1996, p. 315). This type of community was described by Royal and Rossi (1997) as a learning environment where all members work together as a team, diversity is a key component in all areas, and members generally care for, trust, and respect one another. In this type of community, “members share a vision for the future of the school, a common sense of purpose, and a common set of values” (Rovai et al., 2005, p. 374). Sense of community is also similar to group cohesion that is usually found in small groups. For example, sense of community within an academic community of practice can help “sustain participants’ knowledge sharing, which in turn substantiates the socio-cognitive structures” (Nistor et al., 2015, p. 257) that can make up teacher or scholar identities, or even the relationships between colleagues.

In other research, Rovai (2002b) theorized that within an educational environment, sense of community consists of two underlying layers or “dimensions” which can be referred to as social community and learning community. The dimension of social community comes primarily from the work of McMillan and Chavis (1986) and McMillan (1996) and looks at how the overall body of students feel with regards to “...their spirit, cohesion, trust, safety, trade, interdependence, and sense of belonging” (Rovai et al., 2004, p. 267). The dimension of

learning community represents the feelings of community members regarding interaction with each other as they pursue the construction of understanding; and the degree to which they share values and beliefs concerning the extent to which their educational goals and expectations are being satisfied (Rovai et al., 2004, p. 267). “Learning community, therefore, is closely related to the work of Glynn (1981) and Royal and Rossi (1997), who argue that common goals and values are essential elements of community” (Rovai et al., 2004, p. 267).

Social Development Theory

According to Wenger (1998) and Wenger, White, and Smith (2009), social interactions form the foundation of social learning theory, through which the process of learning can be achieved. Social development theory suggests that individuals learn through the influence of others and through their social interactions with others (Vygotsky, 1978). The central idea behind this theory is that students learn not just through authentic activities (a constructivist approach whereby learners can construct their own knowledge), but also “through social activities (Vygotsky, 1978; Yang & Chang, 2012) that require the engagement of dialogue to assist in problem solving” (Wendt, 2013, p. 34). In such environments, students “can develop through the process of collaborative learning (Vygotsky, 1978),” (Wendt, 2013, p. 34). Baker-Doyle and Yoon (2011) and Minocha (2009) posited that learning or instructional strategy that fosters increased collaboration, including technological, may also encourage the development of social relationships (as cited in Wendt, 2013).

In online environments, it is possible that students will be able to experience a strong sense of community even if their social interactions are technologically mediated (Rovai et al., 2005). This experience can be created by pedagogies based on Vygotsky’s (1978) learning

framework, suggesting that social interaction plays a fundamental role in the development of cognition. According to Vygotsky (1978):

Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals. (p. 57)

Another key aspect of Vygotsky's theory focuses on what he terms the "zone of proximal development" (ZPD), which is a level of development achieved on the basis of a child's social behavior engagement. Thus, to achieve the full development of the ZPD depends upon the child's full social interaction (Vygotsky, 1978). A child's range of skills, including his or her learning and social development, can be developed much more if there is proper adult or peer guidance (Culatta, n.d.). Vygotsky's theory tries to explain the development of a child's consciousness based on his or her social interactions. "For example, in the learning of language, our first utterances with peers or adults are for the purpose of communication but once mastered they become internalized and allow 'inner speech'" (Culatta, n.d.).

Thus, social interaction, regardless of the instructional medium or learning environment, is important for individualized learning. Also, the use of social constructivism such as teaching methods unique to individuals or selected groups of students, class discussions, and small-group collaborations and projects can help enhance a sense of community between students and their instructors or the institution itself (Rovai et al., 2005, p. 365).

How Both Theories Inform the Study

Both the sense of community theory and the social development theory inform this study because if their components are not present in the online school environment, then the likelihood of student academic achievement and success diminishes. For example, online students need to feel a strong sense of belonging to the school and to their online environments. Rovai (2002a) found that perceived higher levels of learning in an online learning environment can be positively impacted by a student's stronger sense of community. Students need to feel both socially and educationally connected in order to have positive learning outcomes (Thompson et al., 2006). As part of the social interactions, they must be involved collaboratively with their instructors, as well as with their peers, and in close coordination throughout the learning experience in order to maintain a strong sense of community (Rovai et al., 2004; Schaber et al., 2015; Wighting et al., 2009).

Conclusion

The specific research involved in this study was on online high school students' sense of community and the extent to which it impacted their academic achievement. This research sought to advance the existing literature and theories on students' overall sense of community through the underlying dimensions of social and learning community. With social community, the research sought to advance the literature by looking at the feelings of the community of online students regarding their sense of belonging and the impact on academic achievement. With learning community, the research sought to advance the literature regarding the degree to which online students feel satisfied by their learning experiences and the impact on academic achievement. In online environments, it is possible that students who exhibit a strong sense of

social and learning community may also have a strong sense of belonging and cognition, which can lead to higher academic achievement.

Related Literature

Research related to the 21st century classroom, disruptive innovation theory, impact of technology, academic achievement, relationship between sense of community and academic performance, teaching and learning environments, social control theory, and student motivation, engagement, and the teaching process will be discussed in the context of online student learning and social engagement.

The 21st Century Classroom

In today's high school classrooms, students are learning in a much more technologically-enhanced environment, whether using technology at home or in combination with the school system. Many of them are increasingly taking online classes in combination with their traditional classes. They are therefore now entering the new virtual learning environment, that is, an educational environment delivered online while providing access to learning resources and interactive communication with their teachers, students, and others (Palmer & Holt, 2010). These students are part of the 21st century classroom which allows them to take online classes either in combination with their regular "face-to-face" classmates or virtually on their own. These students can be referred to as "digital natives" and are generally considered younger consumers of information having more experience with interactive products than our "digital immigrants," or older consumers (Prensky, 2001). The "digital immigrants" students and educators are those who grew up within the traditional learning environment and "who were not born into the digital world" (Prensky, 2001, p. 2). The traditional learning environment is one

that contains teacher-led discussions and interactions between students and teachers (Ahern & Repman, 1994) in a more teacher-centric, “face-to-face” manner.

As a result of the growth of technology and the easy accessibility of online information, today’s 21st century learners are no longer the students our educational system was designed to teach (Prensky, 2001). Thus, it is imperative that as we move forward into the 21st century, that the educational “system” must adapt to the changing dynamics of today’s students and their use of technology in the classrooms. The “system” as a whole will need to find ways to allow more engagement with our students; to help motivate them to learn, whether extrinsically or intrinsically, thus creating a strong student-centric learning environment; and allow educators to become more of a coach, mentor and facilitator who can adapt one or more instructional methods to ensure our students are learning at their highest capacities (Christensen et al., 2011; Prensky, 2001; Wimberley, 2016).

Even with the advent of technology in the classroom, the 21st century teacher is still needed, because technology will not totally replace him or her (A. Wimberley, personal communication, June 22, 2016). As technology continue to evolve and become more advanced, online learning together with individualized instruction will be the norm; thus, teachers must be trained on the use of these technological platforms. Such platforms will also lead towards more user-generated content, and modules that can be customized for each student, or the overall class; thus, the 21st century teacher will now become a part of a more robust facilitated network designed to help enhance the learning outcomes of each student (Christensen et al., 2011, p. 134).

Within this context, our 21st century digital natives must possess an overall sense of community or belonging, and this must positively affect their academic achievement in

preparation for their future. In high school, students want to be able to do well academically and to prepare themselves for success in college (College Board, 2018a); at the same time, they also want to have a sense of belonging and feel part of the school and the community of students (Capone et al., 2018; Petrillo et al., 2016; Rovai, et al., 2004, 2005; Schaber et al., 2015; Wighting et al., 2009).

Digital learners. In today's technological learning environment, the digital learners or "digital natives" are generally more experienced with interactive products than "digital immigrants," or older consumers of information (Prensky, 2001; Thompson, 2013). Other names this group is sometimes referred to include Generation Z, net generation, and web-savvy generation (Rosenfeld & Loertscher, 2007). "These learners have benefited from a background inundated with the advancement of a digital world that keeps it fresh, engaging, and changing, so much so that change has become an expected and normal perspective of almost everything" (Wimberley, 2016, p. 21). In other contexts, such as with high cognitive load or mental processing requirements, "the positive effect of perceived interactivity may be stronger for digital natives than for digital immigrants" (Kirk, Chiagouris, Lala, & Thomas, 2015, p. 82).

These students have not just changed incrementally from students of the past, but in a more significant manner such that a big discontinuity has occurred. This discontinuity—also considered a "singularity"—has fundamentally changed things such that "there is absolutely no going back" (Prensky, 2001, p. 1). "This so-called 'singularity' is the arrival and rapid dissemination of digital technology in the last decades of the twentieth century" (Prensky, 2001, p. 1). Because of this singularity, today's digital natives are able to transmit and receive information on a much faster scale than the traditional learner, or digital immigrant. As a result,

they are able to “think and process information fundamentally differently from their predecessors” (Prensky, 2001, p. 1).

The digital natives enjoy multi-tasking and parallel processing; they prefer graphics before text; they prefer random access (like hypertext); they function best as part of a network, and they enjoy instant gratification and frequent rewards; they also have a preference towards gaming rather than on “serious” work (Prensky, 2001, pp. 3–4). They are further characterized as being “creative, innovative, self-confident, highly educated, and educationally minded” (Autry & Berge, 2011, p. 465). As a result, the digital native is more dependent on technology to access information and to conduct individualized learning. This technological change or disruptive classroom innovation (Christensen et al., 2011) is a huge paradigm shift that the traditional teacher or digital immigrant educator must embrace or adapt to in the 21st century classroom (Prensky, 2001; Wimberley, 2016).

Digital immigrant educators. The non-digital or digital immigrant educator is one who did not grow up in a digital world (Prensky, 2001). Many of our current teachers and educators fall into this classification, as they grew up without technology all around them. Many of the digital immigrant educators, also known as Pre-Generation Y (Pre-Gen Y), nevertheless have adapted to the new technological advancements, and many use technologies in both their personal and professional lives (Autry & Berge, 2011). However, there are still many who continue to resist the technological advancements being made for use in education, and as a result they hold onto the old paradigm of the traditional classroom, which is heavily focused on a teacher-centric environment (Prensky, 2001; Wimberley, 2016).

According to Prensky (2001), “Digital Immigrants don’t believe that their students can learn successfully while watching TV or listening to music, because they (the Immigrants) can’t”

(p. 4). This is a key difference as compared to the students of the 21st century. The digital immigrant educator did not grow up practicing and preparing to learn in such an environment. Many of them studied using books from the library to conduct research and study at home, reading and memorizing material ad-nauseum, working through assignments that were heavily task oriented, and attended classrooms with the traditional teacher delivering instruction to students in a very structured and time-dependent atmosphere. Many of today's digital immigrant educators mistakenly "assume that learners are the same as they have always been, and that the same methods that worked for the teachers when they were students will work for their students now" (Prensky, 2001, p. 4).

This is another key difference that the digital immigrant teacher must learn to overcome. The learners of today are more heavily involved in technology, and therefore are not the same learners of the past (Prensky, 2001; Wimberley, 2016). Today's students are in fact learning faster online. They have almost instantaneous access to multiple online databases, social media sites, games, interactive role-playing simulations, numerous applications, and a trove of online sources of educational material (Prensky, 2001). Thus, the digital immigrant educator must adapt to the new paradigm shift that is occurring in the homes and classrooms of the 21st century. The digital natives have perfected new skills through years of practice and interaction with technology. "These skills are almost totally foreign to the Immigrants, who themselves learned – and so choose to teach – slowly, step-by-step, one thing at a time, individually, and above all seriously" (Prensky, 2001, p. 4).

Bridging the divide between both groups. Given some of the differences between the digital immigrants and digital learners, it is easy to see a division between both groups regarding the ability to educate. This occurs primarily from the digital immigrants' perspective rather than

from the digital natives. “Unfortunately, no matter how much the Immigrants may wish it, it is highly unlikely that the Digital Natives will go backwards” (Prensky, 2001, p. 4). The digital immigrants must therefore adapt to technological advancements in the classrooms and be open to learning new ways of being an educator in the 21st century. Many of them who choose to adapt, can and do supplement traditional methods of research with online access to renowned databases, thus obtaining the latest data on particular subject matter. Their learning of the digital domain may not be as rapid or spectacular as the vast majority of digital natives, but they do have the capacity to adapt and learn in the new technological environment (Prensky, 2001).

The digital learners, on the other hand, do have some limitations they must overcome in order to become better learners. Many of them can fall into the trap of not properly vetting online databases or articles; thus, their research may not be truly “academic” as the information in digital spaces can be written by almost anyone. They must also learn to slow down somewhat from the rapid and fast-paced technological learning environment and embrace the teacher who is more of a facilitator, mentor, and guide (Christensen et al., 2011). Both of these groups must learn to strike a balance between the knowledge provided by the teacher and the learning taking place by the student in a new student-centric environment with technology at its center (Christensen et al., 2011).

The Disruptive Innovation Theory

The disruptive innovation theory is based on the concept that some organizations struggle with certain kinds of innovations, and how some can predictably succeed (Christensen et al., 2011, p. 45). In educational organizations, the new innovation is making the “switch to a student-centric learning mode, too, through a disruptive implementation of computer-based learning” (Christensen et al., 2011, p. 45). This new learning model can provide the right

framework for the entire school system, including teachers, administrators, students, parents, and others to move towards a more student-centric classroom.

In this new system, learning opportunities will be presented as the teacher becomes more of a facilitator and helps guide students in sensitive but influential ways to promote personal growth and understand knowledge (Van Brummelen, 2002, p. 108). By being sensitive to students' learning abilities, strengths, and weaknesses, teachers are thus able to "plan diverse learning activities and encourage students to respond in unique ways" (Van Brummelen, 2002, p. 109). Students should then be able to maximize their learning effectiveness in such an environment, and thus their outcomes should become more positive.

Having more positive outcomes will also reflect positively on the school system and the teachers involved. Even though teaching is especially important towards imparting knowledge, learning can be the key to understanding and using that knowledge to make life's decisions. Teachers and training programs (actually the entire school system of the future), must undergo a fundamental systemic transformation (Wimberley, 2016, p. 12). This transformation must allow the educational system to adapt and change to the many different ways that students are now learning via a student-centered approach or run the risk of being left behind (Wimberley, 2016, p. 12). In too many schools today, teachers are passing on knowledge based on a rigid schedule and structure with little flexibility to really understand whether or not their students are actually learning. Students who do well on tightly structured tasks may thrive on these traditional approaches, but these approaches can be very frustrating to others who learn better in different ways (Van Brummelen, 2009, p. 69). Because of efficiency, these approaches "tend to treat students as less-than-human objects. As a result, they may train technically competent persons

who lack the commitments needed to foster a just and compassionate society” (Van Brummelen, 2002, p. 30).

In this new environment, 21st century teachers should focus on their students to ensure each one is able to learn on his or her own. They should ask, for example, did each student learn what they were supposed to learn? (A. Wimberley, personal communication, June 22, 2016). They should also try to maintain a much more positive student-teacher learning experience and, through such growth, help students to adapt the learning experiences to fit their life’s purpose. The 21st century teacher must also set parameters or boundaries for their students in a student-centric learning environment (A. Wimberley, personal communication, June 22, 2016). The teacher cannot allow students to be self-paced in this environment. Many of them simply do not know the extent of what they need to know, and therefore the teacher must set boundaries and be able to help guide and mentor them towards success. The 21st century teachers must instead allow their students to be self-directed and self-determined in the classroom; they must feel empowered to make decisions about their own learning and to act on those decisions through their tutors, mentors, and guides (Wimberley, 2016, pp. 28–30).

Impact of Technology

With the continuing growth of technology in the 21st century, the traditional teacher or digital immigrant educator must be able to adapt and embrace technology for learning in the classroom. The digital natives, or 21st century digital learners, have fully embraced technology and use it for both their personal and professional lives; they have grown up with it all around them (Prensky, 2001, p. 1; Wimberley, 2016, p. 23). As a result, it is difficult to think of them going backwards to embrace the traditional school model of a teacher-centric environment (Prensky, 2001, p. 3; Wimberley, 2016, p. 23). They are far more attuned to new technological

devices and applications, and therefore have an edge over the traditional or non-digital educator (Wimberley, 2016, pp. 24–25). The new disruptive innovation—technology—is here to stay in our classrooms, and teachers must use it towards fostering greater learning within a student-centric environment. If not, the vast expanse of computer equipment lining the walls of classrooms will continue to tell the story of the negative impact of the digital age on education (Wimberley, 2016). That is, “computers have not increased student-centered learning and project-based teaching practices . . . [and] not caused any measurable improvements in achievement scores” (Christensen et al., 2011, p. 83). Furthermore, computers will continue to have little impact on the most important thing they have the potential to fix: Helping students learn based on their individual learning style in a student-centric environment (Christensen et al., 2011, pp. 84–85; Wimberley, 2016).

It is for this reason, together with full student-teacher engagement and motivation, that educators must embrace the innovations in technology and use such advancements to help foster a stronger learning environment. According to Baldwin (1998), technology continues to transform education in both traditional and online settings. This transformation continues with advancements in technology-driven educational solutions including software applications, and the increasingly widespread availability of the internet across vast distances. The disruptive innovation theory with technology at its core thus provides the necessary framework to migrate towards such a system in the 21st century classroom (Christensen et al., 2011, p. 65).

Strategies for planning technology-enhanced learning experiences. With continuing technological advances in the classroom, teachers and students will have access to “platforms that facilitate the creation of user-generated content . . . [and] the emergence of a facilitated network” (Christensen et al., 2011, p. 134). As a result, many teachers will be able to customize

learning modules and instructional tools to help the diverse learners and digital natives in their classrooms. With this in mind, new technology-enhanced strategies are introduced to aid teachers in developing and delivering new content or supplement existing content into their lesson plans. Technology has been identified as a critical component to education in the 21st century; thus, within the classroom, teachers need to be armed with the right strategies in the “design of effective and successful technology-enhanced learning experiences” (Cowan, 2008, p. 55).

The following are six strategies that can help deliver successful technology-enhanced learning in the digital classroom. According to Cowan (2008, pp. 55–58), these include:

- Understanding the larger context of technology, curriculum, and education reform.
- Understanding the basic modes and appropriateness of computer use.
- Conducting reconnaissance.
- Creating a detailed plan.
- Not reinventing the wheel.
- Planning for alternative assessment.

According to Cowan (2008), Strategy 1 is important because it allows the teacher/educator to think about and explore some of the best uses of technology to help create new ideas for lesson planning; Strategy 2 focuses on the three basic modes the author identified (tutor, tool, tutee), and in terms of a cost-benefit analysis, a positive evaluation needs to be done regarding instructional delivery; Strategy 3 requires the teacher to conduct reconnaissance to help determine the level of technological competence of the teacher and students, as well as to determine the resources needed to deliver these new enhancements; Strategy 4 is critical because it requires a detailed plan to address a wide variety of issues in securing, designing, and

delivering new technology-enhanced material to the class; Strategy 5 is not to reinvent the wheel as the teacher should take advantage of the existing technological resources already available in the classroom; and Strategy 6 completes the process through evaluation (pp. 55–58).

To see if the new technology-enhanced initiatives work as needed, teachers need to design different testing methods. This should properly gauge the success of the new initiatives, and also allow modifications as needed. By following these six strategies, teachers in the new 21st century classroom environment will be able to keep education fun and exciting, thus keeping the students positively engaged in the new technology-driven learning environment (Cowan, 2008).

Academic Achievement

Determining academic achievement has been measured in different ways over the years, and as such, it makes it difficult to compare how well students are doing in comparison to each other given this variation (Wighting et al., 2009). These variations in measurements include grade point averages, performance on school-designed tests, performance in advanced placement tests, honors programs, and many others (Milewski & Sawtell, 2006). According to Milewski and Sawtell (2006), it was found that one of the most important predictors of academic achievement is the Preliminary Scholastic Aptitude Test (PSAT)/National Merit Scholarship Qualifying Test (NMSQT) taken by both 10th- and 11th-grade students (but predominantly by 11th-grade students).

The PSAT/NMSQT is a comprehensive assessment program helping students to determine their readiness for college and provides them with tools to help plan their future. According to the College Board (2018b), the PSAT/NMSQT evaluates critical reasoning skills and includes three academic areas important to determining the potential for success in college:

reading, writing and language, and math. The PSAT/NMSQT can also help students get scholarships such as those offered by the National Merit Scholarship Corporation (NMSC). The PSAT/NMSQT is cosponsored by the College Board and the NMSC, and it provides students with an opportunity to enter NMSC scholarship competitions (College Board, 2018b; Milewski & Sawtell, 2006). The “NMSC uses a Selection Index score based on PSAT/NMSQT scores as an initial screen of students who enter its scholarship programs” (College Board, 2018b).

Milewski and Sawtell (2006) conducted a comprehensive study that was composed of 857,375 students who took the PSAT/NMSQT in October 2000 and the SAT before graduating. They found that a moderate to strong correlation existed between the PSAT/NMSQT and several key measures of academic success including but not limited to high school grade-point average, years of study, academic intensity, and participation in Advanced Placement (AP) courses (p. 14). They concluded that the relationships between “indicators of academic achievement and PSAT/NMSQT scores can be demonstrated empirically” (Milewski & Sawtell, 2006, p. 14).

Milewski and Sawtell (2006) theorized that it was possible higher academic achievement in high school can cause higher PSAT/NMSQT scores, and it was also possible that both higher academic achievement and high PSAT/NMSQT scores can be caused by another variable (p. 14). They also recommend future studies examine whether the relationship between the two constructs (high school achievement and PSAT/NMSQT scores) can change significantly if the variance of one of the measures was partially removed (p. 14). Another strong relationship they found was that students who took “more than four years of study in an academic area or participating in an honors course” (Milewski & Sawtell, 2006, p. 14) had higher scores on the composite PSAT/NMSQT score scale.

Sense of Community and Academic Performance

The research literature relating sense of community and academic achievement, as measured by a student's PSAT/NMSQT scores, is dated, with two of the more significant studies being done by Wighting et al. (2009) and Milewski and Sawtell (2006). Research by Wighting et al. (2009) focused on a non-random sample of 150 students from three independent high schools who took the PSAT/NMSQT. In their studies, they found that a relationship did exist between sense of community and academic achievement, and that overall there was "a slight positive correlation" (Wighting et al., 2009, p. 69). They concluded that the relationship may be linked to student learning and offered that educators may want to look at measuring different levels of community at their schools in order to help teachers improve their practices (p. 70). The researchers recommended that future research look at public high school students instead of those who attend independent high schools, use a larger sample size, and choose a more diverse environment (p. 70).

Lee (2014) examined the relationship between student engagement and academic performance using data from a sample consisting of 3,268 15-year-old students from 121 American schools. This study included behavioral and emotional components as part of student engagement, with reading literacy representing academic performance (p. 177). This study verified that student engagement amongst the various schools was a significant predictor of academic performance, thus providing a better understanding of the relationships involved (p. 184).

Rovai et al. (2005) conducted a study involving 279 university students enrolled in both undergraduate and graduate programs, and taking classes either virtually or on-campus. They examined sense of community among these students in both classroom and school settings, and

the relationship regarding perceived learning. They found that online students scored lower on both classroom social community and school social community than their on-campus peers. Results suggested that online students feel a weaker sense of connectedness and belonging than on-campus students who attend face-to-face classes.

Rovai et al. (2005) also revealed no difference in perceived learning between the online and on-campus groups, which suggests that online and face-to-face classroom students appear to be equally satisfied with their learning when courses and pedagogy make use of social constructivism. It was also determined that distance education students generally consider themselves as outsiders and not members of the school community. It was also discussed that these students are not content with this status and suggested they have an interest in having stronger ties with the school community, which could lead to higher persistence rates and learning satisfaction. These results relate to the hypothesis which concludes that students have a strong sense of social community with fellow students, faculty, and staff and that the school setting can be positive. Regarding online students, they want to be included in the social and academic discourse, and want to feel part of the school community, and not left feeling isolated and disregarded (Rovai et al., 2005, p. 372).

In another study, Rovai (2002a) examined whether or not a significant relationship existed between sense of community and cognitive learning in an online learning setting, as well as the strength and direction of the relationship. Using a convenience sample of 314 students enrolled in 26 online courses, the study provided evidence that (a) online graduate students can feel connected to their virtual classroom community, (b) students with a stronger sense of community tend to possess greater perceived levels of cognitive learning, (c) female online students tend to have a greater sense of connectedness and perceived cognitive learning than

their male counterparts, suggesting that gender-related differences, such as communication patterns may be involved, and (d) ethnicity and course content do not appear to affect sense of community and perceived cognitive learning in an online environment as expected, (pp. 329–330). These findings all indicate that perceived higher levels of learning in an online learning environment, can be impacted by a student’s stronger sense of community Rovai (2002a).

“Teaching” and “Learning” Environments

The traditional approach to teaching is usually centered on teachers using carefully structured, step-by-step strategies to help students improve test scores, normally for short answers and convergent thinking; however, this approach can lead to difficulties, such as wrongly assuming that students learn passively and in a more linear fashion (Van Brummelen, 2009, p. 68). Students who work well in highly structured tasks may enjoy the traditional approach; however, this “one-size-fits-all” approach to teaching may end up frustrating many students who learn better in many other ways (Van Brummelen, 2009, p. 69).

In the digital classroom environment, both teaching and learning can occur with a focus on the individual learner (Van Brummelen, 2009). The role of the teacher must be that of a guide, a mentor, and/or a facilitator (Van Brummelen, 2002, p. 108). For too long, the traditional role of the teacher has been based on a monolithic process, such that the teacher provided direct instruction or drove the entire learning process (Van Brummelen, 2002, 2009). In this teacher-centric learning environment, students would have to try and figure out the teacher, and to learn the teacher rather than learn the content; thus, the students would have to give the teacher what they want when they want it (Wimberley, 2016). Many schools today focus teaching and instruction on the outcomes of standardized tests and not necessarily on measuring actual student learning. The traditional model of instruction is based on teachers carefully sequencing,

presenting, and transmitting knowledge to their students; students are then expected to store such knowledge and use it for rational thought (Van Brummelen, 2002, p. 26). This traditional model can be frustrating to many students who can learn better in different ways, such as with computer-based training, blended programs, and other hands-on applications. These students may do best in the student-centric classroom of the future (Christensen et al., 2011, p. 38).

A “teaching” environment. A “teaching” environment can be defined as one that has the overall support of the school system, that is, school administrators, board members, supervisors, principals, parents, community, fellow teachers, and to some extent, the actual students involved. This environment promotes the teaching of certain core subjects, such as mathematics, reading, and writing, and prepares students to take on standardized assessments. The results of these assessments are then used to evaluate the overall effectiveness of the school, which falls under certain laws and guidelines such as the No Child Left Behind Act (NCLB). The NCLB not only requires public schools to raise the average test scores in their schools but also to ensure that every student in every demographic improves his or her test scores (Christensen, et al., 2011, pp. 62–63).

In support of the NCLB, the “teaching” environment requires educators to “begin with specific objectives for which they can measure student attainment” (Van Brummelen, 2002, p. 28). As a result, many schools today focus teaching and instruction on the outcomes of standardized tests to satisfy the NCLB requirements and not necessarily on measuring actual student learning. Many of these environments use the traditional model of instruction, with students expected to store such knowledge and use it for rational thought (Van Brummelen, 2002, p. 26). Furthermore, the “teaching” environment requires teachers to pass on knowledge based on a rigid schedule and structure with little flexibility to really understand whether or not

their students are actually learning. Students who do well on tightly structured tasks may enjoy these traditional approaches, but other students who learn better in different ways may find such approaches very frustrating (Van Brummelen, 2009, p. 69).

When we view the school environment as a system, we must realize that it is “only one of society’s agents for learning, education, and training. The family, media, peer group, and church are some of the other institutions that share this responsibility” (Knight, 2006, p. 11). Thus, relying solely on the traditional teaching environment to educate the student is not the ideal. Van Brummelen (2002) stated that because of the efficiency required in these environments, such teaching approaches “tend to treat students as less-than-human objects. As a result, they may train technically competent persons who lack the commitments needed to foster a just and compassionate society” (p. 30).

A “learning” environment. A “learning” environment is one that recognizes that each student is unique and learns differently, and thus, is open to accommodating and helping guide a student towards understanding of knowledge. “All students are special, created with singular traits, gifts, and abilities they unwrap in the classroom” (Van Brummelen, 2002, p. 109). By creating a positive learning environment, teachers can become guides and facilitators who seek to help students use their newfound knowledge towards their life’s purpose. In a “learning” environment, the teachers should strive to also become trustworthy mentors and to be present for students in sensitive but influential ways (Van Brummelen, 2002, p. 108). By being sensitive to students learning abilities, strengths, and weaknesses, teachers are thus able to “plan diverse learning activities and encourage students to respond in unique ways” (p. 109).

This customization of instructional material would be ideal, however, as the learning environment moves towards a more student-centric system, based on the disruptive innovation

theory (Christensen et al., 2011, p. 65). Doing so will not be easy as the existing interdependent public-school system will continue to require standardization of both instruction and assessment. Despite this, “what we know to be true – students learn in different ways” (Christensen et al., 2011, p. 34) would require teachers to be more accommodating and to help tailor the learning environment towards the needs of the students. Furthermore, “because students have different types of intelligence, learning styles, paces, and starting points, all students have special learning needs” (Christensen et al., 2011, p. 34). As a result, teacher planning of activities can be in the form of individualized instruction tailored around one or more of the eight intelligences identified by Harvard psychologist Howard Gardner based on his theory of multiple intelligences (Christensen et al., 2011, pp. 25–26).

A list of Gardner’s eight intelligences, with a brief definition of each and an example of someone who might best exemplify it, is shown below:

- Linguistic: Ability to think in words and to use language to express complex meanings: Walt Whitman.
- Logical-mathematical: Ability to calculate, quantify, consider propositions and hypotheses, and perform complex mathematical operations: Albert Einstein.
- Spatial: Ability to think in three-dimensional ways; perceive external and internal imagery; recreate, transform, or modify images; navigate oneself and objects through space; and produce or decode graphic information: Frank Lloyd Wright.
- Bodily-kinesthetic: Ability to manipulate objects and fine-tune physical skills: Michael Jordan.
- Musical: Ability to distinguish and create pitch, melody, rhythm, and tone: Wolfgang Amadeus Mozart.

- Interpersonal: Ability to understand and interact effectively with others: Mother Teresa.
- Intrapersonal: Ability to construct an accurate self-perception and to use this knowledge in planning and directing one's life: Sigmund Freud.
- Naturalist: Ability to observe patterns in nature, identify and classify objects, and understand natural and human-made systems: Rachel Carson. (Campbell, Campbell, & Dickinson, 2004, p. xxi, as cited in Christensen et al., 2011, pp. 26–27)

Based on Gardner's pioneering work in multiple intelligences, students can and do have the innate ability to learn in many different ways. They can use one or more of these intelligences and thus become competent in learning new things (Christensen et al., 2011, pp. 25–26). For example, mastery of content using a strictly traditional approach may not be best suited to all students since many of them learn differently and at their own pace (Christensen et al., 2011). Thus, an educational approach that is more aligned with a student's one or more stronger intelligences or aptitudes can help enable an easier understanding of the subject-matter and greater enthusiasm for the experience (Christensen et al., 2011, p. 27).

In this disruptive innovation “learning” environment, teachers must be able to discuss basic values common to western societies such as integrity and compassion, to have students compare different worldviews from within literary works, to review and discuss the religious roots of cultures and motivations of people, and to help foster personal beliefs and values in their students, whether religiously based or not (Van Brummelen, 2002, p. 26). Thus, one of the most important and powerful differences between the “teaching” and “learning” environments is that teachers can now “serve as professional learning coaches and content architects to help individual students progress—and they can be a guide on the side, not a sage on the stage”

(Christensen et al., 2011, p. 39). This will lead to a more student-centric classroom, whereby the teacher acts as a guide, facilitator, and mentor (Van Brummelen, 2002, p. 108).

Social Control Theory

The concept of social control theory, which is characterized by commitment, beliefs, attachment, and engagement, was found to have greatly influenced student engagement as well as theories of student dropout (Hirshi, 1969, as cited in Archambault, Janosz, Fallu, & Pagani, 2009, p. 652). According to this theory, student engagement was found to have placed “a great deal of emphasis on individual feelings of attachment and belongingness to social institutions” (Archambault et al., 2009, p. 652). In a separate mediation model, it was further found that “school dropout represents an ongoing and unfolding process” (Archambault et al., 2009, p. 652). According to this model, from the moment school begins many students engage in interactions with both the academic and the social system in place. Their personal backgrounds including individual, family, and social-economic situation help determine the level of commitment each will make towards the school system, including their overall academic goals.

“Individual commitments to specific academic goals directly influence involvement in school-related tasks and activities. In turn, commitment to school influences the time invested toward this institution” (Archambault et al., 2009, p. 652). Thus, student goals and their individual commitment to the school system help set in motion their level of engagement moving forward. These two characteristics help determine and influence their academic and social experiences in the school environment, and if these two become less important over time, they can play a definite role towards leaving the system before completing high school (Archambault et al., 2009, p. 652). The main distinction between “dropout” and “disengaged” students comes down to “dropouts” who completely leave school based on their individual socio-economic or

environmental situation, while “disengaged” students remain in school, though disinterested in the educational process (Archambault et al., 2009).

In helping to prepare students to become more engaged in the education process, teachers must first understand that at a very young age, many of them are put into unique social situations that help shape their personalities. Many, unfortunately, have also developed what is termed “learned helplessness,” where they actually start learning how to be helpless—that is, they realize or feel they cannot do much about their own situation (Wimberley, 2016, p. 39). As such, some may start saying they cannot solve a particular problem, or cannot learn a new process, because they already began to be disengaged (Wimberley, 2016, pp. 38–44).

To better prepare them for school, researchers have found “that a significant portion of a person’s intellectual capacity is determined in his or her first 36 months” (Christensen et al., 2011, p. 149). Thus, engaging with them using the concept of “language dancing” before kindergarten is the ideal time to get them prepared for the learning process; this includes while they are infants and up through the preschool years. Proper implementation of “language dancing”—that is, face to face engagement in adult, sophisticated, chatty language with infants in such a manner as if they are listening, understanding and responding positively to this engagement (Christensen et al., 2011, p. 151)—should be a top priority. Language dancing boils down to an interchange between parents and their children; it brings about curiosity in infants and gets them to think deeply about what is happening around them (Christensen et al., 2011, p. 151). Furthermore, this will help ensure that infants and preschoolers will be on the path towards becoming more confident, engaged, and articulate once they begin the learning process.

Student Motivation, Engagement, and the Teaching Process

Today's modern educator must focus on creating an environment whereby students feel self-directed and self-determined and are thus able to become equally engaged in the learning process (Wimberley, 2016). According to Axelson and Flick (2011), student engagement is defined as "how involved or interested students appear to be in their learning and how connected they are to their classes, their institutions, and each other" (p. 38). Many of today's students also seek a sense of belonging with the school environment which can lead to positive reactions to teachers and peers and increase engagement in school activities (Thompson et al., 2006). There is no need to worry about students being engaged in a teaching process; the classroom environment has changed due to disruptive innovations in technology and now calls for a new approach to educating students in a student-centric manner (Christensen et al., 2011; Wimberley, 2016).

If we seek students to be engaged and motivated to learn, then the traditional approach to educating students is no longer a viable option in today's classroom environment. The traditional "face-to-face interaction is being increasingly replaced by virtual, synchronous and asynchronous, blended, and hybrid interaction" (Groccia, 2018, p. 16). With technology at home and in the classroom, students today can become very easily disengaged in the education process as they focus on other more captivating issues, or they simply bide their time to do the minimum or drop-out as soon as its feasible. To get them to continue with the learning process, they must be motivated. They can be motivated either extrinsically or intrinsically; if not, then learning will not happen (Christensen et al., 2011, p. 7). Students become extrinsically motivated because they seek a reward or try to avoid negative consequences; they become intrinsically motivated because it is part of their character and they want to learn (A. Wimberley, personal

communication, June 26, 2016). Whatever the reason, motivation must be present for the student to learn.

According to Kachel, Henry, and Keller (2005) and Reid, Aqiu, and Putney (2009), a student who displays the following characteristics is one who can be considered motivated and most suitable for online learning:

- A positive self-image
- A strong work ethic
- Determination
- Self-discipline
- A fairly strong knowledge of technology
- A feeling that they can control their outcomes in academics
- Comfort with taking risks and experimentation
- The ability to set his or her own goals
- The motivation to learn and succeed

But motivation alone is not enough. Engagement must be present in both the learner and the teacher. Only when the learner engages with the content can learning happen

(A. Wimberley, personal communication, June 25, 2016). In a study of a new online school, it was found that communication and interactions between students and their instructors were limited, creating a sense of isolation for some students (Reid et al., 2009). Additionally, the study found that some students felt there was no accountability from instructors for them to perform, which resulted in some of them falling behind or dropping the class. Instructors who were proactive with their students, via clear and open communications as well as setting a welcoming and engaging environment, were able to keep their online students interested in the

course, and as a result, many were able to successfully finish (Hawkins, Graham, Sudweeks, & Barbour, 2013).

In a separate study on student motivation and peer feedback in an online environment, Xie (2013) found that those students who were proactive in class, supported their peers, and perceived the course as being of high quality were found to be more motivated and thus more likely to successfully complete the course. Student learning, whether virtual, blended, or in a traditional setting, still requires the instructor to “create a sense of presence and engage students in the learning process” (Groccia, 2018, pp. 16–17). Thus, one of the keys to successful online engagement for student learners is for them “to be engaged and supported to take increased responsibility for their own learning” (Groccia, 2018, p. 17).

Cultivating an environment in today’s classrooms where the students are self-motivated and engaged is the key towards achieving personalized learning (Christensen et al., 2011; Wimberley, 2016). There are also opportunities available to re-engage educators and students given the technological innovations available. In today’s technologically innovative classrooms, there is no reason for teachers not to personalize, differentiate, or customize the educational environment. Using a customized model, teachers can tailor instruction and/or the curriculum to help deliver greater student-centered teaching (Christensen et al., 2011). With technology in the classrooms, teachers can become more engaged in the learning process such that it moves them away from doing the “job” of teaching and helps them to truly engage and motivate their students towards personalized learning “Leveraging technology as a means to deliver content opens up an entire new frontier for educators to become what they wanted to be when they wanted to be a teacher” (A. Wimberley, personal communication, June 25, 2016). Thus, having engaged teachers with emerging technology can help build a more robust student-centric

environment where mastery of content can occur and teachers can help guide and shepherd their students through the learning process (Christensen et al., 2011; Wimberley, 2016).

Summary

In summary, Chapter Two included a discussion of the theoretical underpinnings of this study, sense of community and social development theory. The related literature shows that student engagement through their social interactions with teachers and peers in an online environment leads to a stronger sense of community, including both social and learning connectedness, and has a positive impact on their academic performance. It was also determined that students in the new 21st century classroom want to be more self-directed, with a student-centered model and increased social interaction using technological innovations. The digital learners of today want to be more in control of their education, as evident in the new disruptive innovations taking place in many traditional and virtual classrooms across the country. Today's educators must also play an important role in helping to create an open, welcoming, and collaborative online learning environment for their students. Doing so will help them to more positively engage students in the learning process and lead to more students successfully completing their classes instead of dropping out or becoming disengaged. Thus, one of the keys to successful online engagement is for students to be engaged, motivated, and to take increased responsibility for their own learning.

CHAPTER THREE: METHODS

Overview

The purpose of this correlational study was to determine the extent by which sense of community can predict academic achievement among online public high school students. A multiple linear regression was used to examine the relationships between the predictor variables (social community and learning community), and the criterion variable (academic achievement) as determined by students' self-reported Preliminary Scholastic Aptitude Test (PSAT)/National Merit Scholarship Qualifying Test (NMSQT) scores. This chapter will include a discussion of the study's design, the research question and hypothesis, participants and setting, instrumentation, procedures, and data analysis.

Design

The research design used in this study was a quantitative predictive correlational design. Correlational design studies serve two purposes. They can be used to “(1) explore causal relationships between variables and (2) to predict scores on one variable from research participants' scores on other variables” (Gall, Gall, & Borg, 2007, p. 337). The primary advantage of using a correlational design is that it allows researchers to analyze the relationships among multiple variables evident within a single study (Gall et al., 2007). In this study, a predictive correlational design was used to predict academic achievement (student's PSAT/NMSQT scores) based on their social community and learning community. A predictive correlational design is an appropriate research technique for this study because it can help determine “the extent to which a criterion behavior pattern can be predicted” (Gall et al., 2007, p. 342). This design is also appropriate because the predictor variables (social community and

learning community) were measured separately and before the criterion variable (academic achievement), which is necessary in predictive correlational designs (Gall et al., 2007).

The predictor variables in this study are the sense of community's subscales of social community and learning community (Rovai, 2002b; Rovai et al., 2004). Sense of community is defined as a "feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together" (McMillan & Chavis, 1986, p. 9). Social community is defined as feelings of the broad "community of students regarding their spirit, cohesion, trust, safety, trade, interdependence, and sense of belonging" (Rovai et al., 2004, p. 267). Learning community is defined as the "feelings of community members regarding the degree to which they share group norms and values and the extent to which their educational goals and expectations are satisfied by group membership" (Rovai et al., 2004, p. 267).

The criterion variable in this study was students' academic achievement based on their self-reported PSAT/NMSQT scores. The PSAT/NMSQT is a comprehensive test which assesses critical reasoning skills and encompasses three areas that are important for success in college: reading, writing and language skills, and math (College Board, 2018a). According to the College Board (2018b), the scores on the PSAT/NMSQT are the composite score and the two section scores. The composite score is the total score of the two section scores: Evidence-Based Reading and Writing section score and the Math section score. The Evidence-Based Reading and Writing section score combines the scores for the Reading Test and the Writing and Language Test. The Math section score is derived from the Math Test score.

Research Question

RQ: To what extent does sense of community predict academic achievement among online public high school students?

Hypothesis

H₀: There is no statistically significant relationship between the predictor variables (social community and learning community) and the criterion variable (academic achievement) among online public high school students.

Participants and Setting

The participants for the study were drawn from a population of high school students within a large school division in northern Virginia during the 2019–2020 school years. The school district is in a middle-to-upper income suburb outside of Washington, DC. The school division has a total enrollment of 27,261 students in 12 high schools. The student demographics include 34.06% Hispanic/Latino, 30.61% White, 20.40% Black or African American, 8.60% Asian, 5.90% two or more races, 0.23% American Indian/Alaska Native, and 0.20% Native Hawaiian or Pacific Islander. English learners make up 26.11% of the students, while 12.24% of the students are special education students, and 45.32% of the students are economically disadvantaged. The average class size for high school is 29 students, while the average pupil-to-teacher ratio is 15:1.

Sample

For this study, a convenience sample was collected. A convenience sample was chosen because it refers to a group based on their availability and ease of access (Gall et al., 2007). The number of participants sampled was 98 online high school students, which exceeded the required minimum for a medium effect size. According to Gall et al. (2007), 66 students are the required

minimum for a medium effect size with statistical power of .7 at the .05 alpha level. The sample size of 98 online high school students also exceeds the minimum sample size for multiple correlations. When testing for multiple correlations, a sample size of at least $50 + 8m$ (where m is the number of predictor variables) is required (Tabachnick & Fidell, 2012). In this study, there were two predictor variables (learning community and social community); therefore, the minimum number of students required was $50 + 16$, or 66.

There was a total of 98 online high school students from a convenience sample who participated in the survey. This sample of online high school students came from across 12 public high schools, which represents the population demographics and is a naturally occurring group. The sample included 33 males and 65 females from northern Virginia public high schools. The ethnic breakdown was 41 Caucasians, 20 African Americans, 20 Asians, 10 Mixed Ethnicity/Others, and seven Hispanics. The average age of the sample was 16 years old.

Instrumentations

The purpose of this predictive correlational study was to determine the extent by which sense of community can predict academic achievement among online public high school students. Two instruments were used in this study. The first instrument was the Classroom and School Community Inventory, developed by Rovai et al. (2004), which measured the predictor variables. The second instrument was a self-report of students' PSAT/NMSQT scores, which measured the criterion variable.

Classroom and School Community Inventory

The first instrument used in this study was the Classroom and School Community Inventory (CSCI), developed by Rovai et al. (2004). The purpose of this instrument was to measure the construct of sense of community in both classroom and school settings and to

further discriminate between classroom and schoolwide communities (Rovai et al., 2004, p. 268). The instrument was used in numerous studies (e.g., Nistor et al., 2015; Olson & McCracken, 2015; Petrillo et al., 2016; Prati, Cicognani, & Albanesi, 2017; Schaber, et al., 2015; West & Williams, 2017). This instrument was used to measure the predictor variables. Written permission to use this instrument was granted by the author (see Appendix A). See Appendix H for the instrument and Appendix K for permission to reprint.

The development of the instrument was based on research that sought to fully understand the construct of sense of community in both classrooms and schools and to build upon previous research regarding sense of community in distance education programs (Rovai et al., 2004). Many researchers had already identified the need for extensive research in this area (Calvino, 1998; Hill, 1996; Sonn, Bishop, & Drew, 1999). Accordingly, Rovai et al. (2004) used the Classroom Community Scale (CCS) and its two subscales (social community and learning community) developed by Rovai (2002b) and the Campus Atmosphere Scale (Lounsbury & DeNeui, 1995) to develop the CSCI. They embarked upon developing and validating the CSCI which included two forms: “(a) a classroom form largely derived from the CCS (Rovai, 2002), and (b) a school form” (Rovai et al., 2004, p. 268). It was determined that “student persistence (e.g., Carr, 2000; Frankola, 2001), and learning (e.g., Abrami & Bures, 1996; Dellana et al., 2000; Noble, 2002)” (Rovai et al., 2004, p. 268) were some of the more important issues.

After testing, the CSCI was found to be a valid and reliable instrument. It not only measured the construct of psychological sense of community across a school but it was also able to discriminate between both classroom and school communities. An examination of the 10 CSCI items for both the school form and the classroom form reveal they substantiated what was needed to measure the construct of sense of community. “Stability estimates were calculated

using Pearson r correlation coefficients and a 2-week interval between pretest and posttest measurements. Stability for each CSCI form was .91” (Rovai et al., 2004, p. 273). The items on the survey were appropriately worded for the target population, with a Flesch Reading Ease score of 81.1 on a 100-point scale (the higher the score, the easier it is to understand).

Additionally, the procedures used to develop the CSCI provided high confidence that the test instrument also possessed high content and construct validities. Internal consistency estimates of reliabilities using Cronbach’s coefficient alpha were .84 (classroom form), and .83 (school form), respectively. Additionally, internal consistency coefficients for the subscales of social community and learning community were .90 and .87 (classroom form), and .85 and .82 (for the school form), respectively (Rovai et al., 2004, p. 273).

The CSCI self-report questionnaire consisted of 20 items using a five-point Likert scale divided into two forms: 10 items for the classroom community form and 10 items for the school community form. The five-point Likert scale ranged from Strongly Agree to Strongly Disagree. Responses were as follows: Strongly Agree = 4, Agree = 3, Neutral = 2, Disagree = 1, and Strongly Disagree = 0. The students checked the response on the Likert scale that best reflected their feelings about the item. Scores were computed by adding points assigned to each of the items. Items were reverse-scored where appropriate to ensure the least favorable choice was always assigned a value of 0 and the most favorable choice was assigned a value of 4.

The combined possible score on the CSCI ranged from 0 to 80 points (0 to 40 points per form). Subscale scores on each form for social and leaning community can range from 0 to 20 points (Rovai, et al., 2004, p. 270). A score of 0 points is the lowest possible score meaning that the student(s) feel no sense of community, including little to no social and learning

connectedness with their class. A score of 40 points is the highest meaning that student(s) feel a stronger sense of community, including strong social and learning connectedness with their class.

The classroom community form and the school community form each consist of 10 questions. These are spread equally among the subscales of social community and learning community, with odd number questions applying to social community and even numbered questions applying to learning community. The results from the CSCI tests show that most of the test items correlated with each other (Rovai et al., 2004, p. 273). The instrument was scored by the researcher from responses provided by students via the online survey. Rater training was not required.

For this study, only the 10 items school community form was used. Data was collected beginning in January 2019 after students had a chance to take the PSAT/NMSQT offered in the fall 2018 term. Data continued to be collected until January 2020 due to limited student responses in the spring, summer, and fall of 2019. This also allowed students either to retake the PSAT/NMSQT or take it for the first time and provide their scores to the researcher. The CSCI, along with a request for students' self-reported PSAT/NMSQT scores and demographic questions regarding gender, ethnicity, and age, were made available to students via the online survey at SurveyMonkey.com. The instrument and related questionnaire took approximately three to six minutes each to complete.

PSAT/NMSQT Scores

For the criterion variable, academic achievement, students' self-reported PSAT/NMSQT scores were used. According to the College Board (2018a), both 10th- and 11th-grade students can take the PSAT/NMSQT, while only 10th-grade students can take the PSAT 10. Each is offered at different times of the year. The PSAT/NMSQT test is offered in the fall, while the

PSAT 10 is offered in the spring. The PSAT/NMSQT is a comprehensive assessment program helping students to determine their readiness for college and provides them with tools to help plan their future.

The PSAT/NMSQT evaluates critical reasoning skills and includes three academic areas important to determining the potential for success in college: Reading, writing and language skills, and math (College Board, 2018a). According to the College Board (2018b), the scores on the PSAT/NMSQT are the composite score and the two section scores. The composite score is the total score of the two section scores: Evidence-Based Reading and Writing section score and the Math section score. Its range is between 320 to 1520. The Evidence-Based Reading and Writing section score combines the scores for the Reading Test and the Writing and Language Test. The Math section score is derived from the Math Test score. The range of the two section scores are between 160–760 each.

One of the most extensive studies to establish the validity of the PSAT/NMSQT as a measure of high school academic success involved 857,375 students who took the PSAT during their junior year of high school (Milewski & Sawtell, 2006). This study found that a moderate to strong correlation existed between the PSAT/NMSQT and several key measures of academic success including but not limited to high school grade-point average, years of study, academic intensity, and participation in Advanced Placement (AP) courses (Milewski & Sawtell, 2006, p.14). Ewing, Camara, and Millsap (2006) also found similar correlations. Areas of strongest correlation included “PSAT/NMSQT composite scores and academic intensity in math/science and humanities/social science ($r = .62$) and high school GPA ($r = .53$)” (Milewski & Sawtell, 2006, p. 14, as cited in Wighting et al., 2009). Another strong relationship was evident: students who took “more than four years of study in an academic area or participating in an honors

course” (Milewski & Sawtell, 2006, p. 14) had higher scores on the composite PSAT/NMSQT score scale.

Procedures

Prior to obtaining Institutional Review Board (IRB) approval, the researcher contacted the primary author of the Classroom and School Community Inventory (CSCI) for approval, and it was granted (see Appendix A). The researcher then contacted the school district’s supervisor of program evaluation and was directed to complete a formal online application to request approval. Following approval by the school district (see Appendix B), the student received IRB approval (see Appendix C). The researcher worked with the district’s supervisor of program evaluation to provide them with both a hard-copy and an email version of the required parental consent forms, student assent forms, and a description of the study (see Appendix D for the hard-copy form and Appendix E for the email version). The researcher also provided the school district with a parental recruitment letter to be sent via email. It included a link to the survey via the SurveyMonkey.com website and an online copy of the informed consent approved form (see Appendix F).

The supervisor of program evaluation sent the hard-copy forms to each of the 12 high schools to gather signatures. Additionally, they also emailed the online version of the parental permission/child assent form and the parental recruitment letter to the parents of the high school students who were enrolled in the district’s online programs. They were asked to provide permission and to have their students take the online survey as quickly as possible.

Parents of students attending online classes did not return any of the hard-copy permission forms; however, they replied to the email that the school district sent, giving permission for their student to participate in the study. To protect the privacy of the parents and

students, those emails were not shared with the researcher, as per the school district's policy. The students were then able to click on the SurveyMonkey.com link via the parental recruitment email to access the online survey and complete the questions. Prior to the student taking the online survey, they acknowledged their assent to take the survey, as provided in the instructions on the SurveyMonkey.com website (see Appendix G). The instructions on the website also included the approximate length of time to complete both the school form of the CSCI survey (see Appendix H) and the demographic questionnaire (see Appendix I).

After completing the CSCI, each student was asked to provide their demographic data such as age, ethnicity, sex, and to provide their overall composite PSAT/NMSQT score and scores for the two sub-sections: Evidence-Based Reading and Writing and Mathematics (see Appendix I). Due to late student response (late fall 2019 into January 2020), the researcher requested an extension of the research study in order to complete the analysis, and it was granted through the end of June 2020 (see Appendix J). Once the surveys were completed, the results were downloaded from the SurveyMonkey.com website. Surveys were reviewed for completeness, and any found with missing items were discarded. The remaining surveys were then calculated and analyzed using the composite scores for the PSAT/NMSQT, and the scores on the sense of community's two subscales: social community and learning community. The researcher then contacted the author of the CSCI for permission to publish, and it was granted (see Appendix K).

Data Analysis

The null hypothesis was tested using a multiple linear regression. Multiple linear regression was chosen because it is used to determine the correlation between a set of predictor variables and a criterion variable, given the hypothesis that correlations are to be linear (Gall et

al., 2007, p. 354). In this study, there were two predictor variables and one criterion variable. The predictor variables and criterion variable were not manipulated. The predictor variables were the sense of community's two subscales of social community and learning community. The criterion variable was students' academic achievement based on their self-reported PSAT/NMSQT scores.

The data were screened for inconsistencies and errors using a series of scatter plots. Scatter plots were used because they visually represent the relationship between the predictor variables (social community and learning community) and the criterion variable (academic achievement) as measured by students' PSAT/NMSQT scores, and they are also best used in the assumptions testing (Warner, 2013, pp. 261–271). The assumptions for multiple regression are bivariate outliers, multivariate normal distribution, and the absence of multicollinearity among the predictor variables (Gall et al., 2007; Warner, 2013).

To test the assumption of bivariate outliers, scatter plots were used between all pairs of the independent variables (x, x), *Social Community* and *Learning Community*, and also the predictor variables (x) and criterion variable (y), *Academic Achievement*, as measured by students' PSAT/NMSQT scores. A visual examination of the scatter plots was done to test that the assumption was met for each relationship (that is, to ensure there were no extreme bivariate outliers; Warner, 2013, p. 164).

The assumption of multivariate normal distribution was tested by running a scatter plot between each pair of the predictor variables (x, x), *Social Community* and *Learning Community*, and between the predictor variables (x) and the criterion variable (y) *Academic Achievement* as measured by students' PSAT/NMSQT scores. A visual examination of the scatter plots was conducted to determine if there was a linear relationship between each pair of variables. If the

variables are not linearly related, the power of the test is reduced. This was determined by visually verifying that the classic “cigar shape” around the vast majority of (x, y) plots for each relationship exists (Green & Salkind, 2014; Warner, 2013).

To test for the absence of multicollinearity among the predictor variables, collinearity diagnostics was conducted to test this assumption among the predictor variables (x, x) *Social Community and Learning Community*. If a predictor variable (x) is highly correlated with another predictor variable (x) , they essentially provide the same information about the criterion variable (Gall et al., 2007; Warner, 2013). The Variance Inflation Factor (VIF) was examined to determine if a predictor variable (x) was highly correlated with another predictor variable (x) . If VIF is too high (greater than 10), multicollinearity exists, and this assumption would be violated. Acceptable values of the VIF are between 1 and 5.

Results for the null hypothesis were based on a multiple regression analysis. A multiple regression was used to determine the extent by which the predictor variables (x, x) *Social Community and Learning Community* can predict the criterion variable (y) *Academic Achievement* as measured by students’ PSAT/NMSQT scores. The multiple regression was tested at the 95% confidence interval. The ANOVA generated table was reviewed to determine if the predictor variables were statistically significant to predict the criterion variable. This was determined by the significance value shown for alpha $(\alpha) = .05$. The Model Summary generated table was reviewed to determine the effect size for multiple correlation (R) , a squared multiple correlation (R^2) , and an adjusted squared multiple correlation (R^2_{adj}) ; Green & Salkind, 2014, p. 260). Finally, if the null hypothesis is rejected, then an examination of the coefficients generated table would be conducted to determine the t (t values) and the significance (p values) to evaluate

the significance of the predictors and the partial correlations (Green & Salkind, 2014, pp. 263–264; Warner, 2013).

Summary

In Chapter Three, the predictive correlational design was discussed. The research question and null hypothesis were listed, the participants and setting were discussed, and 98 online public high school students from northern Virginia were described. The instrumentations, which included the CSCI and students' self-reported PSAT/NMSQT scores, were explained. The procedures of the study were also described, including how the sample was selected and how the information from the survey was collected. Finally, the data analysis was described, including the multiple linear regression and the predictor and criterion variables.

CHAPTER FOUR: FINDINGS

Overview

The purpose of this correlational study was to determine the extent by which sense of community can predict academic achievement among online public high school students. The predictor variables were social community and learning community. The criterion variable was academic achievement as determined by students' self-reported Preliminary Scholastic Aptitude Test (PSAT)/National Merit Scholarship Qualifying Test (NMSQT) scores. A multiple regression was used to test the hypothesis. The Findings section includes the research question, null hypothesis, data screening, descriptive statistics, assumption testing, and results.

Research Question

RQ: To what extent does sense of community predict academic achievement among online public high school students?

Null Hypothesis

H₀: There is no statistically significant relationship between the predictor variables (social community and learning community) and the criterion variable (academic achievement) among online public high school students.

Data Screening

The researcher sorted the data and scanned for inconsistencies on each variable. No data errors or inconsistencies were identified. A matrix scatter plot was used to detect bivariate outliers between predictor variables and the criterion variable. No bivariate outliers were identified. See Figure 1 for the matrix scatter plot.

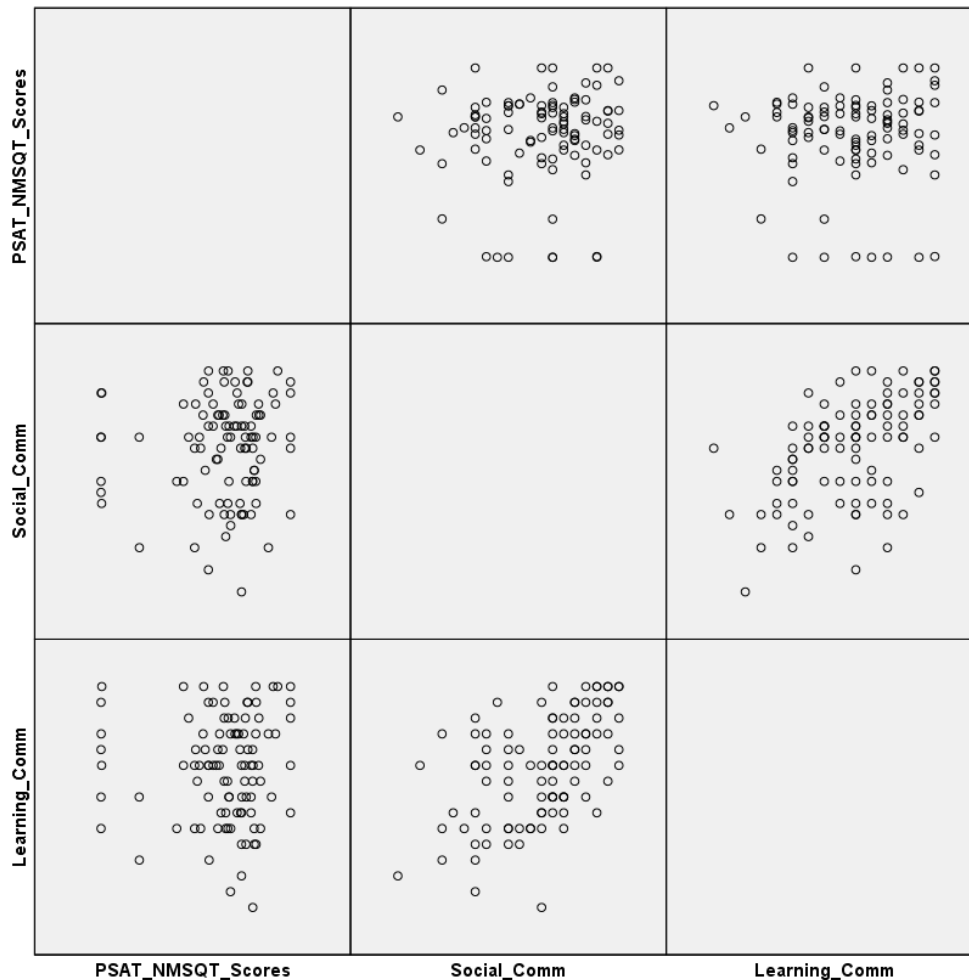


Figure 1. Matrix scatter plot.

Descriptive Statistics

Descriptive statistics were obtained on each of the variables. The sample consisted of 98 participants who self-reported their PSAT/NMSQT scores. Academic achievement was measured using the student's self-reported composite scores on the PSAT/NMSQT exams. The scores range from 320 to 1520. The composite score is the total score of the two section scores: evidence-based reading and writing section and the math section (each with a range between 160–760). A high composite score of 1520 is a perfect score on the exams and means that the student has demonstrated critical reasoning skills, is well positioned to take the Scholastic Aptitude Test (SAT), and may obtain scholarships as offered through the National Merit

Scholarship Corporation (NMSC). A low score of 320 means that the student has not demonstrated the critical reasoning skills needed to be successful on the SAT, and therefore may have difficulty getting into college.

Social community and learning community were measured using the school form of the Classroom and School Community Inventory (CSCI). Each had a range from 0–20. A high score of 20 on each community subscale means that the student has strong feelings and commitment towards learning and a strong sense of community (or belonging) to the school. A low score of 0 means that the student does not feel any sense of community or belonging to the school nor a sense of commitment to learn. Descriptive statistics can be found in Table 1.

Table 1

Descriptive Statistics

	<i>N</i>	Minimum	Maximum	<i>M</i>	<i>SD</i>
Social_Comm	98	.00	20.00	13.03	4.58
Learning_Comm	98	6.00	20.00	14.82	3.32
PSAT_NMSQT_Scores	98	320	1520	1097.87	281.80
Valid <i>N</i> (listwise)	98				

Assumption Testing

Assumption of Linearity

Multiple regression requires that the assumption of linearity be met. Linearity was examined using a matrix scatter plot. The assumption of linearity was met. See Figure 1 for the matrix scatter plot.

Assumption of Bivariate Normal Distribution

Multiple regression requires that the assumption of bivariate normal distribution be met. The assumption of bivariate normal distribution was examined using a matrix scatter plot. The assumption of bivariate normal distribution was met. See Figure 1 for the matrix scatter plot.

Assumption of Multicollinearity

A Variance Inflation Factor (VIF) test was conducted to ensure the absence of multicollinearity. This test was run because if a predictor variable (x) is highly correlated with another predictor variable (x), they essentially provide the same information about the criterion variable (Gall et al., 2007, p. 358). If the Variance Inflation Factor (VIF) is too high (greater than 10), then multicollinearity is present. Acceptable values are between 1 and 5. The absence of multicollinearity was met between the variables in this study. See Table 2 collinearity statistics.

Table 2

Collinearity Statistics from Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Social_Comm	.728	1.374
	Learning_Comm	.728	1.374

^aDependent Variable: PSAT_NMSQT_Scores

Results

A multiple regression was conducted to see if there was a relationship between sense of community and academic achievement among online public high school students. The predictor variables were social community and learning community. The criterion variable was student's

self-reported PSAT/NMSQT scores. The researcher failed to reject the null hypothesis at the 95% confidence level where $F(2, 95) = .35, p = .71$. There was not a statistical relationship between the predictor variables (social and learning community) and the criterion variable (academic achievement), as measured by the students' PSAT/NMSQT scores. Because the researcher failed to reject the null, analysis of the coefficients was not required. See Table 3 for regression model results.

Table 3

Regression Model Results from ANOVA^a

Model		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.
1	Regression	56282.666	2	28141.333	.350	.706 ^b
	Residual	7646144.609	95	80485.733		
	Total	7702427.276	97			

^aDependent Variable: PSAT_NMSQT_Scores

^bPredictors: (Constant), Learning_Comm, Social_Comm

The model's effect size was small where $R = .085$. Furthermore, $R^2 = .007$ indicating that approximately .7% of the variance of criterion variable can be explained by the linear combination of predictor variables (Green & Salkind, 2014, p. 260). See Table 4 for model summary.

Table 4

Model Summary

Model	<i>R</i>	<i>R</i> ²	Adjusted <i>R</i> ²	<i>SE</i> of the Estimate
1	.085 ^a	.007	-.014	283.700

^aPredictors: (Constant), Learning_Comm, Social_Comm

Summary

Chapter Four provided a summary of the data collected and the procedures that were used for analyzing the data. The data consisted of the scores on the student's social and learning community subscales and their self-reported scores on the PSAT/NMSQT. The descriptive statistics were reported as well as the results from the multiple regression analysis. The statistical analysis found that the predictor variables of social and learning community were not statistically significant predictors of academic achievement, as measured by students' PSAT/NMSQT scores. The researcher therefore failed to reject the null hypothesis.

CHAPTER FIVE: CONCLUSIONS

Overview

Chapter Five will discuss the results of the statistical analysis and the implications of those results in light of related research. In addition, limitations of the study will be explored and suggestions for future research will be discussed.

Discussion

The purpose of this correlational study was to determine the extent by which sense of community can predict academic achievement among online public high school students. The predictor variables were social community and learning community. The criterion variable was academic achievement as determined by students' self-reported Preliminary Scholastic Aptitude Test (PSAT)/National Merit Scholarship Qualifying Test (NMSQT) scores. A multiple regression was used to test the hypothesis that there was no statistically significant relationship between the predictor variables and the criterion variable. The researcher failed to reject the null as a result of the analysis.

For this study, the research question was to determine the extent by which sense of community can predict academic achievement among online public high school students. There is much in the literature that points to the possibility of increased academic achievement associated with higher sense of community (Overbaugh & Lin, 2006; Rovai, 2002a; Wighting et al., 2009). However, the research literature relating sense of community and academic achievement, as measured by a student's PSAT/NMSQT scores, is dated with one of the more significant studies being done by Wighting et al. (2009). It was also further determined by a review of the literature (Wighting et al., 2009) that even fewer studies used standardized

measures (such as the PSAT), to determine the relationship between academic achievement and sense of community, especially involving online students.

One of the major studies exploring the relationship between academic achievement and the PSAT/NMSQT was conducted by Milewski and Sawtell (2006). They examined a data set consisting of 857,375 records from students who took the PSAT/NMSQT during their junior year of high school. They found that a moderate to strong correlation existed between the PSAT/NMSQT and several key measures of academic success such as grade-point average, academic intensity, and participation in Advanced Placement classes. They also concluded that the relationships can be demonstrated empirically (p. 14). They also theorized that it was possible higher academic achievement in high school can cause higher PSAT/NMSQT scores; and it was also possible that both higher academic achievement and high PSAT/NMSQT scores can be caused by another variable. They recommended that future studies examine whether the relationship between the two constructs (high school achievement and PSAT/NMSQT scores) can change significantly if the variance of one of the measures was partially removed (p. 14).

Research by Wighting et al. (2009) focused on independent high school students from an urban region who took the PSAT/NMSQT. In their studies, they found that a relationship did exist between sense of community and academic achievement, and that overall there was “a slight positive correlation” (Wighting et al., 2009, p. 69). They concluded that the relationship may be linked to student learning and recommended that educators look at measuring different levels of community at their schools in order to help teachers improve their practices (p. 70). This study recommended that future research should look at public high school students instead of those who attend independent high schools, use a larger sample size, and choose a more diverse environment (p. 70).

This study tried to explore the recommendations from both studies. The researcher looked at online students instead of traditional students and students from a major suburban public high school district consisting of 12 high schools. The study also looked at students' self-reported PSAT/NMSQT scores and their calculated scores on the CSCI subscales of social and learning community. The only recommended variable the researcher was unable to obtain was the higher sample size as recommended by Wighting et al. (2009). The sample of students who took part in this study ($N = 98$) was much smaller than the sample of students ($N = 150$) in the Wighting et al. study, and significantly less than the Milewski and Sawtell (2006) study.

Building upon the gap in the literature from the time these two previous studies were completed, this study examined two of the key predictors from the Classroom and School Community Inventory (CSCI) to determine the relationship with academic achievement, as measured by students' PSAT/NMSQT. It was found that the two subscale predictors of the CSCI (social community and learning community) did not show any statistically significant relationship with academic achievement ($p = .71$). See Table 3.

This result contrasts with the study by Wighting et al. (2009), which showed that for one of the schools studied, "there was a moderate positive correlation between the sub-scale of Learning Community and academic achievement" (p. 69). They also found that no significant correlations existed between self-reported PSAT scores and student measures of social community and learning community in the other two schools, which this study also supported. They also theorized that the differences in the correlations between the schools could be due to other social or educational factors not measured by their study (p. 69). In this study, it is also possible that the reason for no correlations between the subscales of social and learning

community and academic achievement may be due to educational, social, or other factors that were not accounted for.

Rovai et al. (2004) theorized that within an educational environment, sense of community consists of two underlying layers or “dimensions” referred to as social community and learning community. The dimension of social community comes primarily from the work of McMillan and Chavis (1986) and McMillan (1996) and looks at how the overall body of students feels with regard to “...their spirit, cohesion, trust, safety, trade, interdependence, and sense of belonging” (Rovai et al., 2004, p. 267). The dimension of learning community represents the feelings of community members regarding interaction with each other as they pursue the construction of understanding and the degree to which they share values and beliefs concerning the extent to which their educational goals and expectations are being satisfied (Rovai et al., 2004, p. 267). “Learning community, therefore, is closely related to the work of Glynn (1981) and Royal and Rossi (1997), who argue that common goals and values are essential elements of community” (Rovai et al., 2004, p. 267).

Social development theory suggests that individuals learn through the influence of others and through their social interactions with others (Vygotsky, 1978). The central idea behind this theory is that students learn not just through authentic activities (a constructivist approach whereby the learner can construct their own knowledge), but also “through social activities (Vygotsky, 1978; Yang & Chang, 2012) that require the engagement of dialogue to assist in problem solving” (Wendt, 2013, p. 34). In online environments, it is possible that students will be able to experience a strong sense of community even if their social interactions are technologically mediated (Rovai et al., 2005). This experience can be created by pedagogies based on Vygotsky’s (1978) learning framework, suggesting that social interaction plays a

fundamental role in the development of cognition.

Both the sense of community theory and the social development theory inform this study because, if their components are not present in the online school environment, the likelihood of student academic achievement and success diminishes. For example, online students need to feel a strong sense of belonging to the school and to their online environments. Rovai (2002a) found that perceived higher levels of learning in an online learning environment can be positively impacted by a student's stronger sense of community. Students need to feel both socially and educationally connected in order to have positive learning outcomes (Thompson et al., 2006). As part of the social interactions, they must be involved collaboratively with their instructors as well as with their peers and in close coordination throughout the learning experience in order to maintain a strong sense of community (Rovai, et al., 2004, 2005; Schaber et al., 2015; Wighting et al., 2009). The findings from this study did not further explore the social interactions component that is important for individuated learning and a sense of belonging; therefore, no conclusions can be made on its impact.

Implications

Results of this study are important to future research in education and practice. As an increasingly larger body of students adopt the disruptive technological innovations associated with online learning, they will become part of the new culture of digital natives who are self-directed, motivated, and engaged to learn in a student-centered environment. To better understand this new dynamic on student engagement and learning, the impact of a student's social and learning communities on his or her academic outcomes will need to be further explored. This study is an important early step in the ongoing effort to gather important data to investigate the sometimes complex relationship between online students' sense of community

and academic achievements in high school. Although no correlations were shown to exist in this study, it is still important to build upon this research to help teachers and school leadership improve classroom practices, especially relating to online instruction, and to prepare for the increasing wave of digital learners. This research can also help shape the improvements in educational policy, instruction, and delivery for decades to come.

Limitations

Several limitations of the current study are presented. Sample size was relatively small ($N = 98$). Even though the minimum sample size ($N = 66$) was met for the effect size threshold (Gall, et al., 2007), and for multiple correlations (Tabachnick & Fidell, 2012), it still did not yield results similar to a previous related study that show a positive correlation between academic achievement and sense of community (Wighting et al., 2009). The self-report of students' PSAT/NMSQT scores as well as their feelings as shown on the CSCI may not be accurate in every instance. Some students may be reluctant to report negative experiences, and some may not want to indicate lower scores on their measurements. It is also possible that some students may fall into both of these categories. Finally, the population in this sample may not be representative in many school districts across the country. Therefore, the results of this research can only be generalized to a similar population of students, and the findings may be different for students from other types of high schools (e.g., private schools) or in schools that may be located in different environments (e.g., rural or with less diverse demographics).

Recommendations for Future Research

Recommendations for future research should build upon this study by replicating the research with a larger sample size. The research should also consider comparing students who are enrolled in online classes with those taking traditional classes, or even with those in blended

instructional programs. The research should also include areas with population demographics in different environments or in different regions of the country, as well as with high schools that are both public and private. Statistical procedures such as multiple correlations may be used to help differentiate between the social and learning variables as well as the overall sense of community that may impact student outcomes.

Summary

Chapter Five discussed the findings of the study with regard to the research question and null hypothesis. The null hypothesis was not rejected, and there was no significant relationship between the predictor variables (social community and learning community), and the criterion variable (academic achievement) as measured by students' PSAT/NMSQT scores. The findings in the study were discussed including how it contrasted with a previous study regarding the correlation of learning community with academic achievement. It is also possible that the reason for no correlations between the subscales of social and learning community and academic achievement may be due to educational, social, or other factors that were not accounted for. Limitations of the study were discussed, including obtaining a bigger sample size and better reliability of students' self-reported scores on the PSAT/NMSQT. Finally, recommendations for future research in areas related to the study were suggested.

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APPENDIX A: Author Permission

Fred Rovai <[REDACTED]>

Fri 3/2/2018 4:21 PM

Maraj, Boydie.

[REDACTED]

Good afternoon,

You may use the CSCI for your research, provided you reference the source journal article in any report you write.

(Rovai, A.P., Wighting, M.J., & Lucking, R. (2004). The classroom and school community inventory: Development, refinement, and validation of a self-report measure for educational research. *Internet and Higher Education*, 7(4), 263-280).

Best wishes,

Alfred P Rovai, PhD

APPENDIX B: School District Approval

January 8, 2019

Mr. Randy Maraj
[REDACTED]

Dear Mr. Maraj,

The purpose of this letter is to let you know that your request to conduct doctoral level research in [REDACTED] titled "*Predicting Academic Achievement Based on Sense of Community Among Online Public High School Students*" has been reviewed and approved by [REDACTED] leadership. Please correspond with [REDACTED], the Director of the Office of Student Management and Alternative Programs. She, or her designee, will serve as the point of contact for the study.

Participation in the study is completely voluntary. Student and parent consent must be sought in all cases. Please be aware that [REDACTED] or individual participants can withdraw from the study at any time. In reporting the results please ensure anonymity of participants by removing all identifying information related to [REDACTED] and its staff. We look forward to reading your final results.

Thank you for your interest in [REDACTED] as a research site, and we wish you success!

Sincerely,

[REDACTED]
Supervisor of
Program Evaluation

c. [REDACTED]

APPENDIX C: IRB Approval**LIBERTY UNIVERSITY.**
INSTITUTIONAL REVIEW BOARD

February 6, 2019

Randy Boydie Maraj

IRB Approval 3620.020619: Predicting Academic Achievement Based on Sense of Community Among Online Public High School Students

Dear Randy Boydie Maraj,

We are pleased to inform you that your study has been approved by the Liberty University IRB. This approval is extended to you for one year from the date provided above with your protocol number. If data collection proceeds past one year or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. The forms for these cases were attached to your approval email.

Your study falls under the expedited review category (45 CFR 46.110), which is applicable to specific, minimal risk studies and minor changes to approved studies for the following reason(s):

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your study involves surveying or interviewing minors, or it involves observing the public behavior of minors, and you will participate in the activities being observed.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

G. Michele Baker, MA, CIP

Administrative Chair of Institutional Research

Research Ethics Office

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APPENDIX D: Informed Consent/Child Assent

PARENT/GUARDIAN CONSENT FORM

The Liberty University Institutional Review Board
has approved this document for use from
2/6/2019 to 2/5/2020 Protocol # 3620.020619

Predicting Academic Achievement Based on Sense of Community Among Online Public High School Students

This research study is being conducted by Randy B. Maraj, a doctoral candidate in the School of Education at Liberty University. Your child was selected as a possible participant because they were in 10th or 11th grade, enrolled in at least one online class, and took the Preliminary Scholastic Aptitude Test/National Merit Scholarship Qualifying Test (PSAT/NMSQT) during the 2018-2019 school year.

Please note that some students take both the PSAT/NMSQT (10th and 11th grade students) and the PSAT 10 (10th grade students) in the same year; if that's the case, only the PSAT/NMSQT scores will be used as the primary data source for this study.

Please read this form and ask any questions you may have before agreeing to allow him or her to be in the study.

Why is this study being done?

The purpose of this study is to determine the extent by which an online public high school student's sense of school community can predict their academic achievement, as determined by their self-reported PSAT/NMSQT scores.

What will my child/student be asked to do?

If you agree to allow your child to be in this study, he or she will be asked to do the following things:

1. Complete an anonymous 10 question survey using the School Form of the Classroom and School Community Inventory (CSCI). This survey should take approximately 3-5 minutes to complete, and no identifying information will be asked for or taken. The CSCI is a validated and reliable survey that has been well established over the years. This will be completed electronically on the SurveyMonkey.com web page.
2. Complete an anonymous demographic questionnaire on their gender, age, ethnicity, grade, and provide their most recent PSAT/NMSQT scores (composite and two sectional scores). These scores are critical to the study and must be provided. This form should take approximately 3-5 minutes to complete. This form will be completed electronically on the SurveyMonkey.com web page, following the first survey above.

What are the risks and benefits of this study?

Risks: The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

Benefits: Participants should not expect to receive a direct benefit from taking part in this study.

Benefits to society include providing educators with updated research that is needed to shed light on the relationship between sense of community and academic achievement as it pertains to high school students who take the PSAT/NMSQT. In addition, it will help parents and students to better prepare for college by providing information to help students do better with the Scholastic Aptitude Test (SAT), and provide insights into which Advanced Placement courses to take.

Will my child be compensated for participating?

Your child will not be compensated for participating in this study.

How will my child's personal information be protected?

The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely and only the researcher will have access to the records.

- No personally identifying information will be collected during this study.
- Data will be stored on a password locked computer and may be used in future presentations. After three years, all electronic records will be deleted.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether or not to allow your child to participate will not affect his or her current or future relations with Liberty University or his or her school district. If you decide to allow your child to participate, he or she is free to not answer any question or withdraw at any time without affecting those relationships.

What should I or my child do if I decide to withdraw him or her or if he or she decides to withdraw from the study?

If you choose to withdraw your child or if your child chooses to withdraw from the study, he or she should exit the survey and close his or her internet browser. Your child's responses will not be recorded or included in the study.

Whom do I contact if my child or I have questions or problems?

The researcher conducting this study is Randy B. Maraj. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact him at [REDACTED] and/or email at rmaraj@liberty.edu. You may also contact the researcher's faculty advisor,

Dr. Alan Wimberley, at adwimberley@liberty.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd, Green Hall 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

Please notify the researcher if you would like a copy of this information for your records.

Signature of Minor

Date

Signature of Parent or Guardian

Date

Signature of Investigator

Date

APPENDIX E: Informed Consent/Child Assent (Email)

PARENT/GUARDIAN CONSENT FORM

The Liberty University Institutional Review Board
has approved this document for use from
2/6/2019 to 2/5/2020 Protocol # 3620.020619

Predicting Academic Achievement Based on Sense of Community Among Online Public High School Students

This research study is being conducted by Randy B. Maraj, a doctoral candidate in the School of Education at Liberty University. Your child was selected as a possible participant because they were in 10th or 11th grade, enrolled in at least one online class, and took the Preliminary Scholastic Aptitude Test/National Merit Scholarship Qualifying Test (PSAT/NMSQT) during the 2018-2019 school year.

Please note that some students take both the PSAT/NMSQT (10th and 11th grade students) and the PSAT 10 (10th grade students) in the same year; if that's the case, only the PSAT/NMSQT scores will be used as the primary data source for this study.

Please read this form and ask any questions you may have before agreeing to allow him or her to be in the study.

Why is this study being done?

The purpose of this study is to determine the extent by which an online public high school student's sense of school community can predict their academic achievement, as determined by their self-reported PSAT/NMSQT scores.

What will my child/student be asked to do?

If you agree to allow your child to be in this study, he or she will be asked to do the following things:

1. Complete an anonymous 10 question survey using the School Form of the Classroom and School Community Inventory (CSCI). This survey should take approximately 2-3 minutes to complete, and no identifying information will be asked for or taken. The CSCI is a validated and reliable survey that has been well established over the years. This will be completed electronically on the SurveyMonkey.com web page.
2. Complete an anonymous demographic questionnaire on their gender, age, ethnicity, grade, and provide their most recent PSAT/NMSQT scores (composite and two sectional scores). These scores are critical to the study and must be provided. This form should take approximately 2-3 minutes to complete. This form will be completed electronically on the SurveyMonkey.com web page, following the first survey above.

What are the risks and benefits of this study?

Risks: The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

Benefits: Participants should not expect to receive a direct benefit from taking part in this study.

Benefits to society include providing educators with updated research that is needed to shed light on the relationship between sense of community and academic achievement as it pertains to high school students who take the PSAT/NMSQT. In addition, it will help parents and students to better prepare for college by providing information to help students do better with the Scholastic Aptitude Test (SAT), possibly qualify for National Merit Scholarships, and provide insights into which Advanced Placement courses to take.

Will my child be compensated for participating?

Your child will not be compensated for participating in this study.

How will my child's personal information be protected?

The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely and only the researcher will have access to the records.

- No personally identifying information will be collected during this study.
- Data will be stored on a password locked computer and may be used in future presentations. After three years, all electronic records will be deleted.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether or not to allow your child to participate will not affect his or her current or future relations with Liberty University or his or her school district. If you decide to allow your child to participate, he or she is free to not answer any question or withdraw at any time without affecting those relationships.

What should I or my child do if I decide to withdraw him or her or if he or she decides to withdraw from the study?

If you choose to withdraw your child or if your child chooses to withdraw from the study, he or she should exit the survey and close his or her internet browser. Your child's responses will not be recorded or included in the study.

Whom do I contact if my child or I have questions or problems?

The researcher conducting this study is Randy B. Maraj. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact him at [REDACTED] and/or email at rmaraj@liberty.edu. You may also contact the researcher's faculty advisor, Dr. Alan Wimberley, at adwimberley@liberty.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd, Green Hall 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

APPENDIX F: Parental Recruitment

Dear Parent/Guardian:

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a doctoral degree. The purpose of my research is to determine the extent by which a student's sense of school community (i.e., their High School community) can predict their academic achievement, and I am writing to invite your child to participate in my study.

Participants in this study will be 10th and 11th grade public high school students who were enrolled in at least one online class (via the Virginia Virtual High School, or other online program), and completed the Preliminary Scholastic Aptitude Test/National Merit Scholarship Qualifying Test (PSAT/NMSQT).

If you are willing to allow your child to participate, he or she will be asked to complete a 10 question survey. The survey is the School Form of the Classroom and School Community Inventory (CSCI). Your child will also be asked to fill out a demographic questionnaire asking about their gender, age, ethnicity, grade, and to provide their recent PSAT/NMSQT scores (both the composite and two sectional scores).

These scores are necessary to help determine how sense of school community can predict academic achievement for high school students. It should take approximately 3-6 minutes for your child to complete both the survey and the demographic questionnaire. They will be completed electronically on the SurveyMonkey.com website (a link to the survey is included below). Your child's participation will be completely anonymous, and no personal, identifying information will be collected.

Please review the attached consent document. The consent document contains additional information about my research.

The **SURVEY** is located at the following link: <https://www.surveymonkey.com/r/DMHML7R>

If your child needs to access their **PSAT/NMSQT scores**, they can login to the CollegeBoard at: <https://studentscores.collegeboard.org/home>

Please have them complete the survey as quickly as possible.

Thank you for supporting my study and allowing your child to take this survey.

Sincerely,

Randy B. Maraj

Researcher

Attachment: Consent Document



Maraj_3620CIPStam
pedConsent.pdf

APPENDIX G: Online Informed Consent/Student Assent Instructions

STUDENT AND PARENT/GUARDIAN CONSENT FORM

Study: Predicting Academic Achievement Based on Sense of (High School) Community Among Public High School Students

This research study is being conducted by Randy B. Maraj, a doctoral candidate in the School of Education at Liberty University. You/your child was selected as a possible participant because they were in 10th or 11th grade, enrolled in at least one online class, and took the Preliminary Scholastic Aptitude Test/National Merit Scholarship Qualifying Test (PSAT/NMSQT) during the 2018-2019 school year.

Please note that some students take both the PSAT/NMSQT (10th and 11th grade students) and the PSAT 10 (10th grade students) in the same year; if that's the case, only the PSAT/NMSQT scores will be used as the primary data source for this study.

Please read this form and ask any questions you may have before agreeing (or to allow your child) to be in the study.

Why is this study being done? The purpose of this study is to determine the extent by which an online public high school student's sense of school community can predict their academic achievement, as determined by their self-reported PSAT/NMSQT scores.

What will my child/student be asked to do? If you agree (or allow your child) to be in this study, he or she will be asked to do the following things:

1. Complete an anonymous 10 question survey using the School Form of the Classroom and School Community Inventory (CSCI). This survey should take approximately 2-3 minutes to complete, and no identifying information will be asked for or taken. The CSCI is a validated and reliable survey that has been well established over the years. This will be completed electronically on this site.
2. Complete an anonymous demographic questionnaire on their gender, age, ethnicity, grade, and to provide their most recent PSAT/NMSQT scores (composite and two sectional scores). These scores are critical to the study and must be provided. This form should take approximately 2-3 minutes to complete. This form will also be completed electronically on this site, following the first survey above.

What are the risks and benefits of this study? Risks: The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

Benefits: Participants should not expect to receive a direct benefit from taking part in this study.

Benefits to society:

- It will provide educators with updated research that is needed to shed light on the relationship between sense of school community and academic achievement as it pertains to students taking the PSAT/NMSQT.
- It will help parents and students to better prepare for college by providing information to help students do better with the Scholastic Aptitude Test (SAT).
- It may help with data collection for students seeking to qualify for National Merit Scholarships, and
- It may provide insights into which Advanced Placement courses students should take as they get ready for college.

Will my child be compensated for participating? Your child will not be compensated for participating in this study.

How will my child's personal information be protected? The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely and only the researcher will have access to the records.

No personally identifying information will be collected during this study.

Data will be stored on a password locked computer and may be used in future presentations. After three years, all electronic records will be deleted.

Is study participation voluntary? Participation in this study is voluntary. Your decision whether or not to allow your child to participate will not affect his or her current or future relations with Liberty University or his or her school district. If you decide to allow your child to participate, he or she is free to not answer any question or withdraw at any time without affecting those relationships.

What should I or my child do if I decide to withdraw him or her or if he or she decides to withdraw from the study? If you choose to withdraw your child or if your child chooses to withdraw from the study, he or she should exit the survey and close his or her internet browser. Your child's responses will not be recorded or included in the study.

Whom do I contact if my child or I have questions or problems? The researcher conducting this study is Randy B. Maraj. You may ask any questions you have now. If you have questions later, you are encouraged to contact him at [REDACTED] and/or email at rmaraj@liberty.edu. You may also contact the researcher's faculty advisor, Dr. Alan Wimberley, at adwimberley@liberty.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, you are encouraged to contact the Institutional Review Board, 1971 University Blvd, Green Hall 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

By proceeding to the survey, you acknowledge that:

- 1. You have permission to take the survey, and*
- 2. You have read the consent information and would like to take part in the survey.*

TO PROCEED TO THE SURVEY, PLEASE SELECT THE NEXT SECTION.

Otherwise, please exit the survey. You can return again after you obtain permission and provide your consent. Thank you.

APPENDIX H: Survey Instrument

Classroom and School Community Inventory (CSCI) – School Form

Directions: Below you will see a series of statements concerning life at your school at large.

Read each statement carefully. Select the response that comes closest to indicate how you feel about school life. There are no correct or incorrect responses. If you neither agree nor disagree with a response or are uncertain, select the Neutral (N) response. Do not spend too much time on any one statement, but give the response that seems to describe how you feel.

Please respond to all items. (SA) Strongly Agree; (A) Agree; (N) Neutral; (D) Disagree; (SD) Strongly Disagree

- (1) I have friends at this school to whom I can tell anything (SA) (A) (N) (D) (SD)
- (2) I feel that this school satisfies my educational goals (SA) (A) (N) (D) (SD)
- (3) I feel that I matter to other students at this school (SA) (A) (N) (D) (SD)
- (4) I feel that this school gives me ample opportunities to learn (SA) (A) (N) (D) (SD)
- (5) I feel close to others at this school (SA) (A) (N) (D) (SD)
- (6) I feel that this school does not promote a desire to learn (SA) (A) (N) (D) (SD)
- (7) I regularly talk to others at this school about personal matters (SA) (A) (N) (D) (SD)
- (8) I share the educational values of others at this school (SA) (A) (N) (D) (SD)
- (9) I feel that I can rely on others at this school (SA) (A) (N) (D) (SD)
- (10) I am satisfied with my learning at this school (SA) (A) (N) (D) (SD)

Source:

Rovai, A. P., Wighting, M. J., & Lucking, R. (2004). The classroom and school community inventory: Development, refinement, and validation of a self-report measure for educational research. *Internet and Higher Education*, 7(4), 263–280.

APPENDIX I: Demographic Questionnaire

Demographic Questionnaire

Directions: Please complete the following demographic questions, and include your most recent Preliminary Scholastic Aptitude Test/National Merit Scholarship Qualifying Test (PSAT/NMSQT) scores.

Please respond to all items.

P.S. If you need to access your scores, please login to the CollegeBoard at

<https://studentscores.collegeboard.org/home>

1. What is your gender?
 - Male
 - Female
 - Other (specify): _____

2. What is your age?
 - 14 and under
 - 15
 - 16
 - 17

3. What is your ethnicity?
 - American Indian or Alaska Native
 - Black or African American
 - Hispanic
 - Asian / Pacific Islander
 - White/Caucasian
 - Multiple ethnicity / Other (please specify): _____

4. Were you enrolled in one or more online classes in the 2018-2019 school year ?
 - Yes
 - No

5. Did you take the PSAT/NMSQT in the 2018-2019 school year?
 - Yes
 - No

6. What grade were you in when you took the PSAT/NMSQT?
- 10th
 - 11th
 - Other (please specify): _____
 - Did not take the PSAT/NMSQT
7. What was your **Composite PSAT/NMSQT score**? The range is between 320 to 1520 (please specify). P.S. This score is the total of the two section scores below.
- PSAT/NMSQT: _____
8. What was your **PSAT/NMSQT Math Section score**? The range is between 160 to 760 (please specify). P.S. This score plus the section score below equals the Composite score.
- PSAT/NMSQT: _____
9. What was your **PSAT/NMSQT Evidence-Based Reading and Writing Section score**? The range is between 160 to 760 (please specify). P.S. This score plus the section score above equals the Composite score.
- PSAT/NMSQT: _____

APPENDIX J: IRB Extension Approval

IRB

Tue 2/25/2020 9:37 AM

Good Morning Randy,

Thank you for submitting your annual review form for our review and documentation. As indicated on your completed form, data collection and analysis for your study will continue as approved until June 2020.

Please contact the IRB if you have any questions.

Best,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office

(434) 592-5530

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APPENDIX K: Permission to Reprint Instrument

Fred Rovai <[REDACTED]>
Fri 4/10/2020

Good afternoon,

You have permission to include the CSCI as an appendix to your study provided you include a reference to the source journal article.

Best wishes,
Alfred P Rovai, PhD