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THE IMPORTANCE OF SELF-REGULATORY LEARNING SKILLS AND COLLABORATION IN 7TH - 12TH GRADE ONLINE CLASSES

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ABSTRACT

THE IMPORTANCE OF SELF-REGULATORY LEARNING SKILLS AND

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Tonja Detwiler

Research at the college and graduate levels indicates that the use of self-regulatory learning skills (such as time management, asking for help and setting goals) and collaboration with teachers and peers to be vital components of online learning. Little research in online learning has been done at the 7th - 12th grade levels (Barbour, 2019). Through the theoretical frameworks of Zimmerman & Moylan (2009) and Garrison et al. (2000), this non-experimental study examined the correlation of grade level, gender, and modality of instruction to students' scores on the Online Self-Regulated Learning Questionnaire and their end of year grade point averages. Additionally, descriptive statistics analyzed the 7th - 12th graders' perceptions of what worked and did not work in their online learning experience. The results showed students of this age group needed to feel known as a person by their teacher and peers, to be engaged in meaningful learning activities with their peers and to have their teachers be active in making sure both of those things happened. Results that were unique to this age group involved technology, self-regulatory learning skills (SRLS) and variety in lessons, and the 9th grade year was of particular interest. The present study offers recommendations on how to make online classes for 7th – 12th grade age group more effective. Based on the findings, suggestions for specific teacher training for online teaching of the 7th – 12th grades were also included.

DEDICATION

I dedicate this dissertation first and foremost to my Lord and Savior Jesus Christ. He placed within me a desire to study in order to help others, and it is He who sustained me through the years of studying and writing. My heart's desire is to use what He has given me to support and encourage those around me and to honor and glorify His name in all that I do.

I dedicate this dissertation to my husband, Patrick, without whose steadfastness I could never have completed this degree. Patrick, you have given me the time and space to be able to study and write, you have shouldered the heavy load of cleaning, cooking and caring for our children on many weekends so that I could continue to study, and you have believed in me and encouraged me on this entire journey. I am so grateful for all you have done to make this possible. I love you.

I dedicate this to my three children: Hannah, Rebekah, and Joshua. You have watched me study for years, you have cheered with me when things were going well, and you prayed with and for me when things were difficult. You gave me the space and time to pursue my dream of a doctorate, and for that I am deeply grateful. I love each of you, I thank the Lord He chose me to be your mom, and I pray that you always will pursue the dreams the Lord has put in each one of you.

I dedicate this to my mom and dad. Mom, when you got your doctorate, you planted in me the dream to get mine one day. Dad, you are forever encouraging. I could not have done this without both of your lifelong love, support and wonderfully quiet house. I love you. And, to all of my extended family and friends, thank you for your love, support and prayers. You have been the hands and feet of the Lord. Thank you.

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CHAPTER 1: INTRODUCTION

With the onset of the worldwide COVID-19 pandemic, every area of our lives was affected, including our schools. While the colleges and universities in the United States had been offering online education for many years, according to the National Center for Education Statistics, in 2017 - 2018 only 19% of all elementary and secondary schools offered at least one course entirely online (PK-12 Distance Learning, 2020). Yet, in the Spring of 2020, almost all schools nationwide were forced to go completely online due to the onset of COVID-19. Teachers overnight had to learn how to teach and assess students through the medium of technology. Students had to figure out how to attend classes, submit homework and complete assessments online.

Because online learning has been a longer-standing practice and option in colleges and universities, most research in the area of online learning has likewise been focused on the courses and students in postsecondary education (Barbour, 2019). Progress in adopting online learning as an integral part of all levels of education in the US has been slow due to individual teacher's willingness, aptitude and attitude regarding technology (Brandao, 2015; Ruggiero & Mong, 2015; Farjeon et al., 2019). With many students in grades 7 - 12 choosing to remain online in at least a partial status, research at these grade levels must increase to determine how students in middle and high school can learn effectively in the online environment.

Self-regulation is the ability both to understand and to manage your behavior and emotions. It is the process of being able to organize thoughts, feelings, and actions in order to reach specific goals (Usher & Schunk, 2018). The development of self-regulation begins in early childhood as babies and toddlers observe others around them and imitate

their behavior. Self-regulation continues to develop and grow through early adulthood as children learn to wait their turn, play with other children, imagine things from other people's perspectives and stick with difficult tasks. As children get older, the ability to self-regulate is imperative to be able to learn and participate effectively in school (Blair & Diamond, 2008). Students need to be able to sit still, listen to others, interact with different ideas, manage their time and tackle different problems. While many of these skills are more developed by the time students reach college (Chen & Panda, 2014), there is still a wide variation of where college students are in the self-regulatory spectrum.

Chief academic officers at colleges and universities in the US indicated in the 2006 annual Sloan-C online survey that one of the barriers to an earlier, widespread adoption of online learning even at the collegiate level was the fact that any student who is studying online needs more discipline than students in face-to-face school (Allen & Seaman, 2006). Discipline, in this context, means the ability to take charge of one's own learning. Students need to be able to plan, monitor and assess their own learning (Barnard-Brak et al., 2010). Those skills that students need in order to be able to do that are a part of self-regulation and are called self-regulatory learning skills (SRLS). SRLS include being able to set goals and then to reach those goals, being able to manage your own time, being willing and knowing how to ask teachers and peers for help and having the ability to set up your study environment in a way that it is free of distractions.

Beginning in the early 2000s, researchers began to hypothesize that poor SRLS could be linked to low academic and behavioral achievement (Isquith et al., 2004; Masten et al., 2005). Whether implicitly or explicitly, self-regulatory learning skills and behaviors influence both the achievement and performance of students (Barnard, Paton &

Lan, 2008). SRLS are viewed as a needed discipline of any student in their learning, whether in person or online (Bernard, Paton, & Lan, 2008). Dabbagh and Kitsantas (2004), however, suggest that SRLS is of even greater importance in online learning due to the fact that the students have to be more autonomous.

According to Pelikan et al. (2021), online learning requires strong self-regulation and high intrinsic motivation. Given that developmentally not all students in 7th – 12th grade have developed strong self-regulatory learning skills, the effectiveness of online learning for this age group must be examined. Online classes have a longer history in colleges and graduate schools; therefore, many studies have been conducted at these levels to examine the extent to which SRLS affects online class perception and achievement in those classes (Barnard et al., 2008). However, the effect that self-regulatory skills have on both middle and high school students' achievement in online classes is at this point largely unknown.

Historically, SRLS has been taught in school with the teachers modeling and teaching self-regulation skills to their students while conducting in-person instruction (Sawyer, Graham, & Harris, 1992). Students do not go into learning environments already knowing SRLS nor how to employ them. This is especially true of young learners since most of their self-regulation skills are modeled from the adults who are their primary caregivers (Bernier, Carlson, & Whipple, 2010). Historically, teachers have modeled and taught SRLS to their students in the classroom. Ways in which they have done this include: (a) teachers keeping the classroom quiet so that the students can focus (environment structuring), (b) teachers giving students folders and telling them what to label each folder and what papers to put into each folder (task strategy), and (c) teachers

asking the students to share what they learned out loud after an activity (self-evaluation) (Carter, Rice, Yang, & Jackson, 2020).

In the online learning platform where the instructor is not physically present, students are much more on their own to learn SRLS and to implement them in their studies. Students learning online are less likely to finish their coursework than their peers in physical schools (de la Verre et al., 2014). Students learning online must have a stronger ability to regulate their own learning than students who are physically present with their teachers (Fryer & Bovee, 2016). The younger a child is when they begin online learning, the less likely they are to develop strong SRLS unless the adults at home or their online teachers intentionally instruct them in SRLS training (Zimmerman & Matinez-Pons, 1990).

According to Levy (2007), attrition rates at the college level in online learning courses can be twice as high as in the traditional classroom format. Lee and Choi (2011) discovered that the lack of ability to self-regulate was a significant reason for college students dropping out of online courses. Cho and Shen (2013) identified limited self-regulated skills as a possible contributing factor to the high dropout rates of college students from online courses. The research of Pelikan et al. (2020) indicated that students who felt very competent in a subject were more likely to develop the needed SRLS on their own. The students who perceived themselves as not competent in a subject needed help in learning how to develop the needed SRLS in order to succeed.

The bulk of all research conducted in the area of student satisfaction, retention and achievement in online classes has been completed at the postsecondary level (Barbour, 2019). Yet, as a result of the COVID-19 pandemic, online classes and school

have become a reality for K-12 students across the country. The current study begins to fill the gap of research at the K-12 level in online learning. It examined the use of SRLS in 7th - 12th graders and the perceived importance of collaboration with teachers and peers in an online learning environment. The results of the present study have implications for teacher training at the 7-12 level in online environments.

Purpose of the Study

Self-regulated learning skills and strong collaboration with teachers and peers have been identified as important for success in online classes at the postsecondary level. The purpose of this non-experimental study was to examine if the same holds true for 7th – 12th grade students. The study was conducted at a suburban independent college preparatory school located outside a large metropolitan city in the northeastern part of the United States. The independent variables that were compared and used as predictors were grade level, gender and teaching modality. One of the dependent variables was the students' perception scores from the Online Self-Regulated Learning Questionnaire (OSLQ) and from the sub-categories of the OSLQ (goal setting, environment structuring, task strategies, time management, help-seeking, and self-evaluation). The second dependent variable was the students' grade point averages (GPA) from May 2021. The OSLQ scores were also used as a predictor of GPA scores. Descriptive statistics were used to analyze the students' responses to what did and did not work well for them in online classes.

The suburban private college preparatory school where this survey was conducted offered in-person, online and a mixture of both to all its students in the 2020 - 2021 school year. All the students were fully online for a minimum of five weeks in the 2020 -

2021 School Year, and over 100 students were fully online for the entire 2020 - 2021 School Year. Because all students in the school participated in online classes for a minimum of one month, the survey was sent to all 427 students via a link in an email. Of those 427 students, 322 completed and submitted their survey.

Theoretical Framework

Barry Zimmerman tried to figure out the reasons why some students did very well in school while others struggled. Attributing this to the presence or lack of self-regulatory behaviors, in 1989 he developed the first of three models of self-regulated learning. Each model added to the previous model. Zimmerman defined self-regulation as the thoughts and actions that are planned, tried out and then evaluated, cyclically adapting to reaching personal goals. As individuals get feedback from past performance, they use that to adjust their current actions (Zimmerman, 2000).

In his latest model, the Cyclical Phases Model, Zimmerman and Moylan (2009) focused on three processes of self-regulated learning: forethought, performance and self-reflection processes. In the *forethought* phase, a student analyzes a task, sets goals for how to accomplish the task, plans out how to complete those goals and then different motivational beliefs engaged by the student activate the learning strategies. In the *performance* phase, the student will perform the task, monitoring their own progress and engaging different strategies to keep themselves cognitively focused and motivated to finish the task. Finally, in the *self-reflection* phase, the student will evaluate how they have performed the task and will assign attributes to their success or failure which in turn will generate thoughts and evaluations that can positively or negatively influence how the student approaches the same or similar task in future performances. Zimmerman's

Cyclical Phases Model of Self-Regulated Learning is central to the current study to determine the relationship of SRL with academic achievement during the Covid-19 pandemic. In addition, online learning during the pandemic became a major factor of students' learning.

In 2000, Randy Garrison was teaching and conducting research in online learning, which was called "distance learning" at the time. After several years of teaching in this environment, Garrison realized that the online classes required specific and unique components. Garrison and his colleagues created the Community of Inquiry (CoI) framework for both teachers and students in the online environment to develop course design and to evaluate courses. The CoI is comprised of three parts which must be equally present and interactive with the others. The three components are social presence (being able to interact with peers and the teacher in deep and meaningful ways and being able to be known as an individual by both peers and the teacher), cognitive presence (the extent to which the students can construct, learn, and verify the meaning of topics and concepts through discussions and reflection) and teacher presence (intentional course design and facilitation of the learning taking place).

In the current study, Zimmerman's Cyclical Phases Model of Self-Regulatory Learning and the Community of Inquiry framework formed the theoretical framework. It guided the research study by providing the background and structure that helped to support the findings of the study. The framework included the variables that were investigated and measured and the relationships that the researcher sought to understand.

Conceptual Framework

The Conceptual framework, as is shown in Figure 1, provides an illustration of

what provided the inspiration for the current study and the expectations for the outcomes. It demonstrates how the concepts from the theoretical framework are interwoven with the study's variables to generate a systematic order to the flow of the study.

In March 2019, the school at which the current study was conducted had to go completely online over the span of one weekend due to the beginning of the COVID-19 pandemic. Over the months of March, April and May that year, several concerning trends arose that continued in the fall of 2020. Those trends included student apathy and lack of engagement (e.g., not wanting to turn their camera on, not participating in class discussions and not completing homework), cheating (on homework and assessments), anxiety (e.g., expressing thoughts of anxiety to teachers, advisors and the counseling staff rose significantly in the months following the shut down in March 2020), and depression (high numbers of students telling their parents, teachers, advisors and the counseling staff they were depressed, wanting to self-harm and even expressing suicidal ideation).

The Administrative Staff of the school met weekly to discuss these student and teacher issues and to determine a plan of action. The Academic Administrators researched studies completed on online learning, and the theme of self-regulatory skills appeared regularly. Additionally, the teachers and advisors reported to the Administrators the students' desire for more social time together, for more time to gather online "for fun," and that they missed the days of in-person learning where they could interact with peers and their teacher as well as participate more easily.

Figure 1

Conceptual Framework Demonstrating the Theoretical Concepts, Variables and

Constructs in the Study
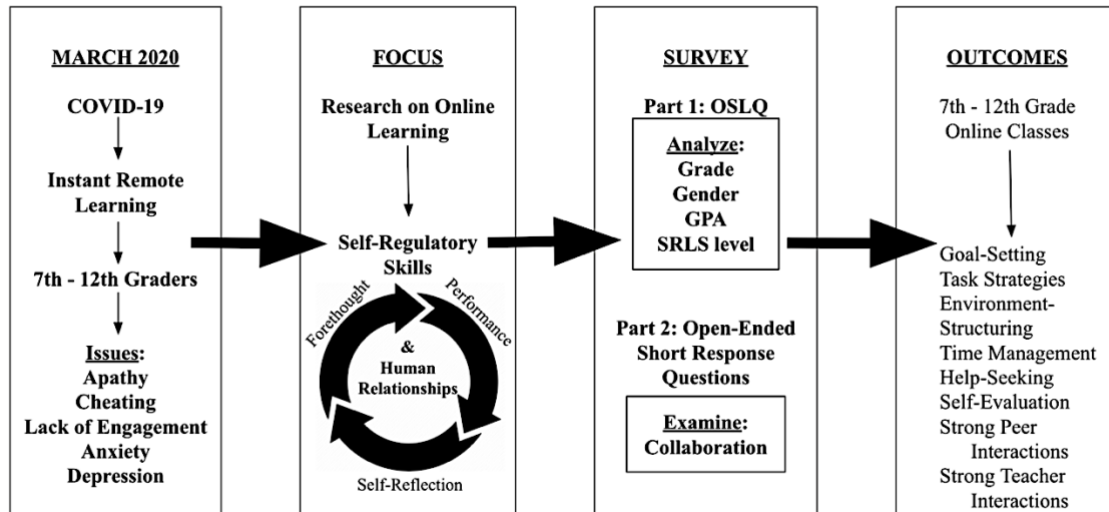
With the future unknown of whether or not the school would continue with the

hybrid online model it had used since March 2020, the Academic Office, in coordination

with the Administrative Team, created a survey for their students to take regarding their

experiences with online learning. The survey used the OSLQ to examine the use of the

students' SRLS as well as six open-ended questions on the students' perceptions of what

did and what did not work well in online classes as well as their thoughts on why.

Self-regulatory learning skills, including goal setting, task strategies,

environment-structuring, time management, help-seeking and self-evaluation, are vital to

success in college and graduate online courses. The Community of Inquiry model for

higher education online classes include equal presence of cognition, meaningful

socialization with peers and teachers and active teacher guidance and presence. The focus

of this present study was to determine if these necessary components of online classes at

the postsecondary level are also important for $7^{th} – 12^{th}$ graders.

Significance of the Study

A review of the literature on the effectiveness of online learning revealed that there has been limited research conducted on the topic of online learning success at the middle and high school levels. Most studies thus far have focused on the college and graduate levels, evaluating the different modes of online learning and deducing the skills that are needed to be successful at the college and graduate levels. Using the skills and class components determined as vital for success at the collegiate and graduate levels and building on the Cyclical Model of Self-Regulation and the CoI theoretical frameworks, the current study began to fill in that gap of research by providing insights for middle and high school teachers on how to help teach their students to regulate their learning in an online school context. The current study identified the difficulties $7^{th} – 12^{th}$ grade students faced in the online learning process. This will help inform middle and high schools about the necessary supports that should be provided to this age group in online classes.

As of the 2017 - 2018 school year, only 3% of all US middle schools offered at least one online course, while only 53.8% of high schools provided this option. Yet, as a result of the pandemic, 75% of all K-12 schools planned to operate online from Spring 2019 - Spring 2021. Completion rates for the online courses can be as much as 22% lower than traditional face-to-face classes, D and F grades are increasing by as much as 30% for middle school students, and in some regions of the country, failing grades in online courses have increased by as much as 70% (eLearning Statistics, 2020). Significantly increasing the academic performance of all students at the elementary and

secondary levels is a National Education Goal (§5812) (National Education Goals, 2021), which includes K-12 students who are online. Online K-12 education is at such a steep and dramatic rise (Farmer & West, 2019), and yet the statistics indicate that many 7th-12th grade students are struggling with learning in the online environment. Research is needed to understand how to teach in the online platform most effectively for meaningful learning to occur.

King et al. (2000) determined that self-regulation is influential in the success of online students (King et al., 2000). By having a more thorough understanding of how self-regulated skills as well as cognitive, social and teacher presences impact the perception, grades and success of middle and high school online students, administrators and teachers are provided with knowledge, resources and skills to create a plan of implementation in every online class that will support and increase student learning in the online environment. The current research has added to the scholarly literature and informed practices that can benefit administrators and teachers at the 7-12 level of education. The present study and related research benefits middle and high school administrators by providing them with information that can be used to make decisions to help facilitate long-lasting, sustainable online programs that are designed around how middle and high school students best and most effectively learn.

Connection with the Vincentian Mission in Education

St. John's University strives to provide an excellent education for all students, especially those in need. One function of online learning is the ability to get certain types of education, such as a college preparatory education, into the hands of those who are less fortunate economically, physically, or socially in ways that would prevent them from

attending traditional institutions. While online education at the collegiate level has been able to serve those less fortunate in these ways already, this study is an important step in working towards improving the level and quality of online classes for the $7^{th} - 12^{th}$ grade age group so that those in that age group unable to attend traditional schools will still have equivalent opportunities educationally.

Research Questions

Research Question 1

How do students' perception scores on the OSLQ compare by modality of instruction?

H_0: There will be no significant difference in the students' OSLQ perception scores based upon modality of instruction.

H_1: There will be a significant difference in the students' OSLQ perception scores based upon modality of instruction.

Research Question 2

How do students' perception scores on the OSLQ compare by grade level?

H_0: There will be no significant difference in the students' OSLQ perception scores based upon grade level.

H_1: There will be a significant difference in the students' OSLQ perception scores based upon grade level.

Research Question 3

What is the relationship of students' grade level (grades 7 - 12), gender (male, female), modality of instruction (100% online, 50% online and 50% in person, 10%

online and 90% in person) or students' May 2021 GPA scores and students' OSLQ perception scores?

H₀: There will be no relationship among grade level, gender, modality of instruction, or students' May 2021 GPA scores and students' OSLQ perception scores.

H₁: There will be a relationship among grade level, gender, modality of instruction, or students' May 2021 GPA scores and students' OSLQ perception scores.

Research Question 4

What is the relationship of students' perception scores on the individual sub-categories of the OSLQ (goal setting, environmental structuring, task strategies, time management, help-seeking, and self-evaluation) and May 2021 GPAs for each of the grade categories, (a) middle school, grades 7 and 8, and (b) high school, grades 9-12?

H₀: There will be no significant relationship of students' perception scores on the individual sub-categories of the OSLQ (goal setting, environmental structuring, task strategies, time management, help-seeking, and self-evaluation) and May 2021 GPAs for each of the grade categories, (a) middle school, grades 7 and 8, and (b) high school, grades 9-12.

H₁: There will be a significant relationship of students' perception scores on the individual sub-categories of the OSLQ (goal setting, environmental structuring, task strategies, time management, help-seeking, and self-evaluation) and May 2021 GPAs for each of the grade categories, (a) middle school, grades 7 and 8, and (b) high school, grades 9-12.

Research Question 5

How have the Class of 2022 students' GPA mean scores from May 2019, May 2020, May 2021, and the fall 2021changed over time (from before remote learning, during remote learning and after remote learning)?

H_0: There will be no significant difference in the Class of 2022 GPA mean scores over time (May 2019, May 2020, May 2021, and fall 2021).

H_1: There will be a significant difference in the Class of 2022 GPA mean scores over time (May 2019, May 2020, May 2021, and Fall 2021).

Research Question 6 (Descriptive Statistics)

How did students' perceptions of online learning during the Covid-19 pandemic compare with the Community of Inquiry theoretical framework?

Definition of Terms

Online learning

Online learning refers to academic studies done through synchronous or asynchronous environments with the help of any electronic device which has internet access. In these two online environments, the students can be anywhere in the world but can interact via the internet with both the teacher and the other students in the class (Singh & Thurman, 2019).

Self-regulated learning

Self-regulated learning is the ability to both understand and take charge of one's own learning environment. Self-regulated learning includes skills such as setting goals, monitoring one's own learning, self-instruction and self-evaluation (Harris & Graham, 1999; Schraw et al., 2006; Schunk, 1996).

Self-regulated Skills (SRS) or Self-regulated Learning Skills (SRLS)

Self-regulated Skills (SRS) or Self-regulated Learning Skills (SRLS) are those that relate to how well you manage your thoughts and actions. In higher education, the specific self-regulated skills of managing time well, thinking about one's own thinking (metacognition), regulating effort in studying, and critical thinking were positively correlated with the academic outcomes (Lee, D. et al., 2020). The six self-regulated learning strategies specifically examined in this study will be: (a) environmental structuring; (b) goal setting; (c) time management; (d) help seeking; (e) task strategies; and (f) self-evaluation (Barnard, Paton and Lan, 2008).

Self-regulated learning strategy training

Self-regulated learning strategy training refers to the teaching of self-regulated skills, including goal setting, self- monitoring, self-instruction, and self-reinforcement (Harris & Graham, 1999; Schraw et al., 2006; Shunk, 1996).

Short Form of the Online Self-regulated Learning Questionnaire (OSLQ)

The 24-item revised version of the OSLQ contains a 5-point Likert-type response format with values ranging from strongly agree (5) to strongly disagree (1). The higher the score the stronger the self-regulation is in the online student (Barnard et al., 2008, p. 4).

CHAPTER 2: REVIEW OF LITERATURE

Introduction

This section presents the findings from existing research literature. The research reviewed in this chapter comes from peer-reviewed journals and is organized according to the following categories: (1) The Role of Self-Regulatory Skills in Learning, (2) The Role of Self-Regulatory Skills in Online Learning, (3) The Importance of Communication and Collaboration in the Learning Process and (4) The Challenges of Online Learning. The chapter begins with a discussion of the theoretical framework for the study and then delves into the related current literature. The chapter concludes with a discussion of the gaps in the existing research literature, which the current study directly addresses, as well as how the study supports and extends the literature reviewed in this chapter.

Theoretical Framework

Zimmerman's Cyclical Phases Model of Self-Regulatory Learning

As students move through middle school, high school, and college, it is expected that they will increasingly take on more responsibility for their own learning. However, the degree to which students do this varies. Barry Zimmerman has been researching the reasons behind this since 1978, and his findings have led him to focus on the application of self-regulation to academics. Zimmerman is a pioneer in the creation of the self-regulated learning (SRL) theory. The SRL model applies the findings from cognitive science which state that when students are actively involved in their own learning, their academic performance increases (Zimmerman, 2008). Zimmerman's SRL model

illustrates how students can become engaged in their own learning and thus improve their academic achievement.

As his research progressed, Zimmerman came to describe both learning and self-regulation as cyclical since the feedback from one learning experience impacts future learning experiences or endeavors. In 2000, Zimmerman further refined his model, adding that self-regulated processes fall into three cyclical phases: forethought (think about problem), performance (practice it), and self-reflection (evaluate it), with specific SRLS present in each process (Zimmerman, 2000).

In 2009, Barry Zimmerman and Adam Moylan studied how students' thinking processes about their own learning and their motivation for learning affected and interplayed with one another. Together, Zimmerman and Moylan (2009) developed a model to help students understand how to approach learning in more effective ways, such as by thinking about their own learning and recognizing what motivated them to learn. They call this model the Cyclical Phases Model of Self-Regulation (2009), and it is this model that is the basis of the Framework for the current study.

Figure 2

Zimmerman's Cyclical Phases Model of Self-Regulatory Learning
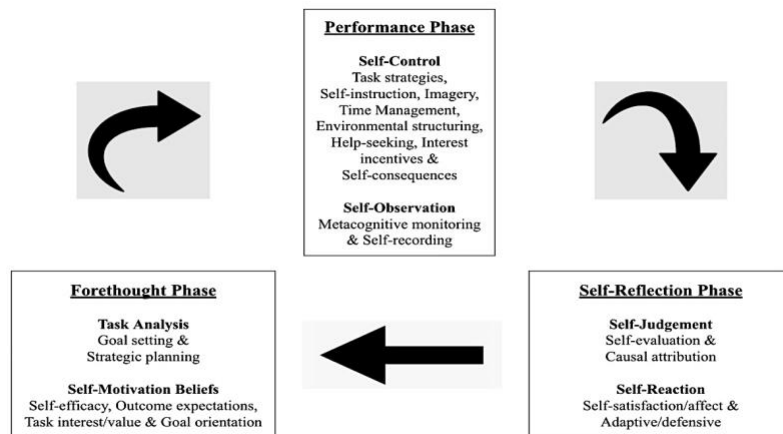
The Community of Inquiry Framework

In 1999, Randy Garrison et al. proposed a Community of Inquiry (CoI) model for educators involved in organizing online and blended learning courses. The authors had been working together as teachers in a graduate program that was partially online, and they realized that there were components of online classes that had to be present for optimal learning in this platform to occur. They created the CoI as a theoretical framework that teachers of online courses could use in their design of their courses in order to ensure that the highest level of learning takes place.

The CoI is based on John Dewey's belief that through collaboration, individual students can assume responsibility for actively constructing and confirming meaning. The CoI uses a collaborative constructivist approach to understanding what is needed for effective online learning at the collegiate and graduate levels. It defines the online learning experience as the interaction of social presence, cognitive presence and teaching presence (Garrison et al., 2009). It is the purposeful focus of consistently involving all three forms of presence by both online teachers and students together that creates a productive and thriving online learning environment.

Social presence is the ability of both students and teachers to be able to identify with their online community and to feel trust and safety to the extent that they can communicate freely. Both students and teachers should be able to develop relationships well enough that individual personalities are known by all involved. Cognitive presence is the extent to which the students can construct, learn and verify the meaning of topics and concepts through discussions and reflection. Teaching presence is found in the design of the course, in the facilitation of both the social and cognitive presences and helping

others to make sure they are learning in a way that is purposeful and meaningful. Both the teacher and students can be a part of the teaching presence in the CoI model (Garrison et al., 1999).

Zimmermann's focus on the cyclical development of self-regulated skills needed for academic success and the Community of Inquiry's focus on the cognitive, social and teaching presences both add to the understanding of what is needed for effective online learning to occur. The present study examined whether these models, which have been created as a result of studies at the college and graduate levels, also accurately portray the same truths at the 7th – 12th grade levels. The results of this study practically inform middle and high schools about the needed support that should be provided to develop their students' self-regulated learning skills in the online learning context. The theoretical framework for this current study was comprised of Zimmerman's Cyclical Phases Model of Self-Regulation Learning and the Community of Inquiry Framework.

Review of Related Literature

The Role of Self-Regulatory Skills in Learning

Self-regulated learning has been recognized as an important and vital part in learning success in both traditional and online learning settings (Dent & Koenka, 2016; Donker et al., 2014; Zimmerman, 1990; Alhazbi & Hasan, 2021). As authors Pelikan et al. (2021) stated, distance learning is typically not as structured as in-person learning. It relies on learners to regulate their own learning without help from the teacher. As a result, SRLS are even more important for online students to have to compensate for the lack of teacher directed SRLS. Pelikan et al. discuss additionally that studies, including those of Zimmerman and Martinez-Pons (1990) and Cavanaugh et al. (2004), have

indicated that the use of SRLS strategies changes with age. Younger students need more direction and support in learning how to organize and regulate their learning. Mary Rice and Richard Allen Carter, in their 2016 study on how online teachers of students with disabilities can help their students, suggest that researchers can help online educators determine how to include all phases of learning self-regulation into online coursework and thus support students of all ages at their varied levels of SRLS.

In their study Chen and Panda (2014) examined the self-regulated learning (SRL) of Chinese distance learners through a structured SRL scale and found that self-regulatory skills were important for online learning. The first phase of the study was a statistical analysis of reliability and validity of the survey. Once that was completed, the 54-item questionnaire was sent to 5,850 students, and of the 4,032 returned, 2,738 were found to be valid. Those 2,738 were either seniors in high school (grade 12; $n = 1,165$) or in Junior College (grade 14: $n = 1,573$). A t-test was run to study gender differences of self-regulated ability, and a significant difference was found ($t = 2.371$, $p < 0.05$), suggesting that male students in the online format were significantly better in self-regulated learning than the female students. A one-factor analysis of variance was used to examine the age differences, but no significant difference was found ($F = 0.06$, $p = 0.941$). Another t-test was run which indicated that those that were in the junior college scored significantly more in self-regulated learning ability than those who were seniors in high school ($t = 2.747$, $p < 0.01$).

As other studies have shown, the researchers determined from their results that the skills of all learners can be improved through teaching self-regulatory skills in online environments. The students are more "on their own" without their teachers present in the

room to aid them in self-regulation (Chen & Panda, 2014). Five key elements have emerged from the literature on online learning at the K-12 level that are required to help teach and support self-regulation in the online classroom: designing the online environment with purpose and intentionality, setting goals, fostering self-efficacy, being sure to include scaffolding and reflecting (Lock et al., 2017).

Allen et. al (2020) examined the role of self-regulated learning in online learning environments. They highlighted the fact that in traditional school settings, teachers are constantly helping students regulate their learning. The teachers are the main co-regulators of learning for students. However, in fully online learning, because the teacher is physically absent, SRLS support diminishes. The authors suggest that K-12 online environments should include the following:

(1) ask students to think about HOW they learn online;

(2) provide pacing support for the students;

(3) monitor how the students are engaging with the instructional materials; and

(4) train the families how to support their children in SRLS development since they are the on-sight adults from which the students must therefore learn critical self-regulatory skills.

The Role of Self-Regulatory Skills in Online Learning

Studies of online learning at the postsecondary level indicate self-regulation to be imperative for success in the online learning environment. Quesada-Pallares et al. (2019) studied the degree to which Vocational Education and Training (VET) students used metacognitive self-regulation when doing their coursework online. The authors had to first develop a questionnaire using some of the scales of Pintrich's model and then

validate the questions they chose through a confirmatory factor analysis. The questionnaire included SRLS strategies scales. Following the successful validation of their questionnaire, the researchers used a quantitative approach to a cross-sectional design. They took a purposeful sampling, resulting in 577 first year VET students in Catalonia. 42.5% were females, 56.2% were males and 1.4% "other or do not want to answer." The mean age of the participants was 24.89 years, and 75.4% were in a physical classroom while the other 24.6% were online.

At the start of the study, there were no differences found between online (Mdn = 4.33) and classroom (Mdn = 4.33) VET students regarding their perception of task value, U = 28674.50, z = -1.287, p = 0.198, r = -0.054. On the other hand, the metacognition levels among online VET students (Mdn = 3.50) differed significantly from those of the classroom VET students (Mdn = 3.30), U = 24116.50, z = -2.244, p = 0.025, r = -0.095. The second statistic illustrates that the students enrolled in the online classes "perceive that they employ more highly developed metacognitive self-regulation strategies than those students enrolled in classroom learning programs." (Quesada-Pallares et al., 2019, p. 6) A multiple regression model was employed using the SRL strategies as one of the dependent variables. In each of the three regressions run, the learning mode that was chosen did not rise as a significant factor. The resulting findings suggested that SRL strategies are an important part of determining academic success and that students who choose online learning tend to have a higher degree of employment of SRLS at the postsecondary level.

As Chen and Panda's (2014) research, along with the research of many others, has shown, self-regulated learning strategies are critical for online students to attain, and they

are something which middle and high school students can be taught. Olakanmi and Gumbo (2017) examined the role that self-regulatory training had in both secondary students' achievement and metacognition in chemistry in South Africa. Using an experimental pre-test post-test design, a total of 60 students (N = 60; male = 34 and female = 26), age 14 - 15, were randomly assigned into the experimental group (N = 30) or the control group (N = 30). Those in the experimental group went through four self-regulated learning (SRL) exercises over the span of four weeks.

The instruments used for data collection in the study were the self-regulatory strategies questionnaire (SRLSQ), the rates of reactions knowledge test (RRKT), classroom observations, and interview guides. All participants completed the SRLSQ at the start of the study, all participants completed the RRKT (the same test was both the pre and posttest), classroom observations were done of the students in the experimental group directly after a training intervention, and after each chemistry lesson, students from both groups were asked the same guided questions about what they were thinking throughout the chemistry lessons. For those in the experimental group, the intervention training included all phases of Zimmerman's 2002 SRLS model, including forethought (goal setting), performance (self-monitoring) and self-reflection.

An independent t-test was run to test the equivalence of the test scores on SRLSQ and RRKT of both groups at the start of the study. An independent sample t-test was run to examine the pre and post test scores of the groups for each of the instruments, with a significance level at 0.05. The observation and interview data were broken into thematic units and analyzed. A dependent sample t-test was run to determine if the pre-

intervention scores of the two groups were significantly different from the post-intervention scores.

A significant difference was found between the experimental group's pre-intervention and post-intervention test scores (t (30) = -7.602; $p < 0.005$). There was also a significant difference found between the shift in the means of the RRKT scores of the control and experimental groups, (t(60) = 4.95; $p < 0.05$). The result indicates that SRL training had positive effects on the students' achievement in chemistry, (Olakanmi and Gumbo, 2017) which points to the facts that students can be taught SRLS and that SRLS appears to improve achievement.

With the understanding that the students with strong self-regulatory skills performed the strongest in online learning, Yang and Kortecamp (2021) sought to determine how self-regulatory skills could best and most effectively be taught at the postsecondary level in order to increase academic achievement. Reviewing literature from 2000 to 2020, Yang and Kortecamp (2021) determined several key facts. In a setting where a student can be easily distracted by devices, the internet, food nearby or listening to a tv program in the background, self-regulation is especially critical (Yang & Kortecamp, 2021). The lack of self-regulation is a significant factor in online learners' academic experiences and outcomes (Oh & Reeves, 2013; Yukselturk & Bulut, 2007). The authors determined that the importance of self-regulated learning in online learning contexts is supported in the literature including areas of SRLS that are unique to online learning. They include being able to plan for technical problems, help-seeking from professionals when needed, time management, creating a strong study environment, and frequent checks of online gradebooks (Yang & Kortecamp, 2021).

With that established, Yang and Kortecamp set out to determine the most effective interventions to foster self-regulation in postsecondary online students. Their search included peer-reviewed publications and doctoral dissertations, and the 17 studies they ended up reviewing were grounded in both social cognitive theory and Zimmerman's cyclical three-phase SRLS model. The researchers concluded that conceptual supports, metacognitive supports and instrumental supports were the three most effective means by which to help increase SRLS. *Conceptual Supports* refers to specific SRL strategy training, "aiming to equip students with fundamental self-regulatory knowledge and skills" (Yang & Kortecamp, 2021, p. 27). One approach to this conceptual support is called detached training (Yang & Kortecamp, 2021, p. 27) which is a separate 'course' where SRLS training takes place. *Metacognitive Supports* include such things as teacher and peer feedback which help scaffold and guide students' learning and metacognitive process (such as goal setting and self-evaluation). *Instrumental Supports* refer to standardized instruments or supportive tools designed specifically to monitor students' learning progress and performance. Online teachers now can use things like online checklists and learning diaries that the students can add to while they are studying and that teachers can see and monitor at any time during the class.

McClain (2015) did a study reviewed by Yang and Kortecamp which demonstrated that online postsecondary students who filled out an online form regarding their use of time, their study environments, what they did to minimize distractions while studying and what helpful resources they used performed significantly better than those students in the study who did not use that online form. Additionally, the students who used the online form also increased their level of self-regulation as compared to their

peers in the study who did not use the online form. McClain (2015) therefore concluded that students should be taught about and taught how to use the self-regulatory skills of self-monitoring when they are studying online (Yang & Kortecamp, 2021).

Yang and Kortecamp concluded that online courses must be designed to support students' self-regulation for them to maximally benefit from the online environment because the structures normally found in traditional face-to-face contexts are not present in online courses (Yang & Kortecamp, 2021). The authors concluded their article with the following educational implications for postsecondary educators: (1) students should be taught SRL skills in such a way that they can transfer them to their daily learning routines; (2) long-term SRLS training with guided practice has strong potential in teaching students these skills and enabling them to use them for all of their learning; (3) metacognitive supports, such as teacher feedback, were shown to positively impact student involvement and attitude in their own learning; (4) instrumental supports, such as a learning diary, help students monitor their own self-regulation as well as show the teacher how the student is growing in self-regulation skills; and (5) all teachers should have knowledge of SRLS, so they know how to help and guide their students in a learning context where they are not physically with their students.

Most online Learning Management Systems are the technical systems online courses use to deliver their content to their students. They are designed with features that are intended to help teach online students how to regulate their own learning, as discussion boards where they can get feedback, for example. However, in a 2021 study done by Eric Araka et al. with college students in Kenya, the authors found these features intended to help teach and enhance SRLS were underutilized by students. Their results

also showed that students did not often get individualized feedback on their learning habits, the instructors did not give regular guidance, there was a lack of interaction between the teacher and each student, and there was a lack of peer interaction. Mostly these results were due to the high number of students in the online classes. Thus, their recommendations for online classes were to provide SRLS interventions to teach and reinforce the LMS features designed to help promote and enhance SRL as well as to work in analytical tools into the LMS in order to highlight for the teachers how each student is interacting with and gaining knowledge and insights from the LMS SRL-enhancing tools. Teachers can then more easily spot those students with weaker SRL skills and work in a more individualized way with them to specifically teach SRLS. The authors also recommend future studies to carry out research to examine how effective SRL interventions such as prompts, study hints and feedback on LMS will affect the use of these features and thus help improve the performance of online college students.

Zumbrunn et al. (2011) also investigated means by which to effectively teach self-regulation in the classroom. They examined the Labuhn et al. (2010) study of high schoolers, in which it was determined from the results of the study that learners who were taught SRL skills through both imitation and monitoring had higher academic self-efficacy and performed higher in academic assessments than those students who did not receive the training. Zumbrunn, et al. determined from their studies of past research results that the following SRLS can be taught:

(a) goal setting

(b) planning

(c) self-motivation

(d) attention control

(e) flexible use of learning strategies

(f) self-monitoring

(g) help-seeking

(h) self-evaluation.

The authors also discussed the best ways for educators to teach these skills. That includes direct instruction, feedback from both the teacher and peers, social support, both guided and independent practice and reflection practice. Finally, Zumbrunn et al. assert that teachers should spend time in each lesson showing their students how specific SRLS can improve their learning (Zumbrunn et al., 2011).

Yongjin Zhu et al. (2020) conducted a review of research that had been conducted on self-regulated learning in MOOCs (massive open online courses). They sought to create a general outline of the important factors which affect SRL in MOOCs. Drawing from Zimmerman's 2000 cyclical self-regulated learning mode and Pintrich's 2000 component oriented SRL model, the authors confirmed that SRL is a vital influence in the success of students in MOOCs. They also determined that the results of SRL in MOOCs were different from the SRL results found in traditional face-to-face schools. From their review, the authors suggest that online teachers should specifically include the use of task strategies and help-seeking in their course design. They also suggest future research needs to be done on the specific, unique learning methods of SRL in MOOCs.

The Importance of Communication and Collaboration in the Learning Process

While the research shows the importance of self-regulatory skills for online students and the actual feasibility of teaching SRLS to online students, there is another

key component that must be examined online learning at any age or grade level. That key component is peer interactions. Cleveland-Innes et al. (2019) examined the responses from post-secondary participants of a Technology-Enabled Learning (TEL)MOOC to the content of the challenges and benefits of using the Community of Inquiry (CoI) framework in the classroom. The classrooms could be online, blended or face-to-face. The CoI includes three types of presence needed for successful online learning: social, cognitive and teacher presence. The largest theme of the participant responses were the benefits of collaboration with peers. They felt the CoI framework brought the students together and helped them experience the value of learning together and through that increase their learning (Cleveland-Innes et al., 2019).

Peek et al. (2018), in their study of the correlation of both self-regulation and motivation with attrition and retention in online education, discussed a study conducted at the Indira Gandhi National Open University in India (Fozdar et al., 2006, as cited in Peek et al.,2018). Two hundred and fifty post-secondary students who had dropped out of the program completed a 21-item questionnaire. The questionnaire listed the reasons for dropping out, in relative importance. The most common reason the respondents gave for withdrawal was the lack of interaction with peer students. Peek et al. examined a group of undergraduate and graduate students who dropped out of an online course as well as a group of students who remained in the course for its entirety. Both groups took the 81-item Motivated Strategies for Learning Questionnaire (MSLQ) survey as well as filled out an open-ended question asking each participant for their reason(s) for staying in or dropping from the course. The academic self-regulatory skills of effort regulation and peer learning were significantly correlated with student retention (Peek et al., 2018).

Vlachopoulos and Makri (2019) completed a review of current literature to highlight the strategies for increasing and improving communication and interactions in online learning settings. The authors opened with a study done by Kim (2019) in which the online student participants reported feelings of loneliness and isolation. Kim's research indicated that students significantly depend on the presence of their peers to succeed. Vlachopoulos and Makri examined 924 articles that were published between the years of 2001 and 2018 in conference proceedings or academic journals. A qualitative approach of the findings was used resulting in four themes, each with several sub-categories. To assess inter-rater reliability, the sub-sample ($n=12$) of the articles was coded separately. The inter-rater reliability was 0.94, demonstrating a high degree of agreement among all the readers. A mixed-methods design using methodological triangulation was also employed.

Vlachopoulos and Makri concluded from their resulting data that communication between the teacher and the learner(s) is vital as is the interaction between peers in the class. The teacher has the task of mitigating the distance students feel by enhancing closeness and creating a social climate with timely feedback. The teacher can also help facilitate peer to peer collaborations and communication. Peer interactions should be a focus of every online course set up by using social networks, creating online spaces for peers to get to know one another and to collaborate, and enabling peer moderation of interactions to facilitate meaningful discussions. As with face-to-face classes now, online classes flourish when the instruction shifts from teacher-centric to student/learner-centric, promoting and keeping the social interactions central in the learning process.

In studies done by Moore (1993, 2012), Falloon (2011), Salmon (2011) and Kim et al. (2019), it is clear that a key component of the design of an online course must be the opportunity for collaboration between students as they learn and process new information. By creating an atmosphere in the online classroom where students are expected to help each other, to communicate with one another and to develop relationships with each other, the sense of transactional distance that Moore theorized is lessened (Falloon, 2011; Moore, 1993, 2021; Salmon, 2011, 2019). Barnard et al. (2007) likewise found that it is not only physical distance that influences student satisfaction and retention in online courses. It is also their perceptions of how strong the communication and collaboration were in the courses. The more the communication and collaboration, the higher the satisfaction with and retention in the course.

The Challenges of Online Learning

Studies on the online learning experiences of students in the midst of a global pandemic are starting to emerge, and they have highlighted that students faced significant challenges in trying to learn online (Aboagye et al., 2020; Adnan & Anwar, 2020; Bisht et al., 2020; Dhawan, 2020). Aboagye et al. (2020) identify five major issues that college-aged students face in online learning:

(a) access (both with internet connectivity and device compatibility)

(b) social (limited interaction for students with their peers)

(c) teacher (being unclear in their learning materials and not being available to

help)

(d) academic (lack of reading and/or communication skills)

(e) miscellaneous (lack of writing skills, lack of vocabulary, etc.).

Other studies reveal similar issues. Internet connectivity, the dearth of interaction between the classmates and between students and their teachers, and time management have become the central and common issues experienced by college students in the online learning environment (Adnan & Anwar, 2020; Bisht et al., 2020; Dhawan, 2020).

Finally, in another study done in August of 2021, authors Jon-Chao Hong et al. examined the ineffectiveness of high school students' learning in online courses that involve needing to conduct experiments and labs. The total number of experimental courses and the duration of online hands-on learning were examined. The higher the number of these types of courses that are offered, the more the high school students were able to talk and interact with their teachers and peers. High school female students were found to have higher online learning ineffectiveness, but the more the students were able to participate and engage with their teacher and peers, the lower that ineffectiveness score became. A big challenge in online education, particularly for high school students, is the size of the classes. If the class becomes too large for the teacher and the students to meaningfully interact with one another on a regular basis, the learning becomes ineffective.

Relationship Between Prior Research and Present Study

With an understanding from the current research on college-level students of the role of self-regulatory learning skills (SRLS) in successful online learning, the role that SRLS plays in achievement in online learning, the importance of teacher-student and student-student relationships (communication and collaboration) at the postsecondary level, and the specific challenges that come with online learning, the present study focused on a much less researched and documented age group in regards to online

learning. In his January 2019 article, which examined the studies conducted thus far in the K-12 level of online learning, author Michael Barbour states that as of the publishing of his article, there were only a select few studies conducted to examine online learning at the K-12 level and that most had methodological limitations (Barbour, 2019).

Additionally, the National Education Policy Center through their *Virtual Schools in the US* report, fully online K-12 learning consistently performed at lower levels than students in traditional face-to-face schools (Miron & Gulosino, 2016; Molnar et al., 2013, 2014, 2015, 2017). With the new reality which resulted from the onset of the COVID-19 pandemic which closed face-to-face schools and forced online education for all ages, it is vital that research is done at the K-12 level to determine how to successfully teach and learn online so as not to adversely affect the education of an entire generation. As a starting point of that K-12 research in online learning, the researcher of the present study examined the use of the six self-regulatory skills featured in the OSLQ by 7th - 12th graders to determine if there are differences by grade, gender, modality of instruction and OSLQ scores correlated to their GPA and to learn the insights from the students as to what is needed for online learning to become effective at these grade levels.

Conclusion

The research conducted on postsecondary student successes and struggles in online learning indicate that self-regulatory learning skills and collaboration with peers and with the teacher are two components central to findings. Quesada-Pallares et al. (2019) in their study on the use of metacognitive self-regulation by postsecondary students determined that SRLS are important in determining academic success. There is a gap in the research of this same focus at the middle and high school levels. Research needs to be done to

determine if SRLS are as strongly correlated with academic success as they are in the college and graduate levels. The implementation of the Community of Inquiry Framework, created to help postsecondary teachers design and run effective and meaningful online classes, was studied by Cleveland-Innes et al. (2019), and the highest level of satisfaction by students was the ability to have strong peer interactions throughout the course. Examining the effect of applying the CoI Framework to middle and high school online classes needs to be done to determine if the results will be the same or will reveal differences so that teachers can design their online courses around the specific needs and learning approaches for this age group. As has been done at the college and graduate levels, there needs to be research conducted at the $7^{th} - 12^{th}$ grade level on what the major struggles are for this age in the online learning environment.

Aboagye et al. (2020) outline five major issues that college students face in the online learning environment. With online school offerings in its initial stages for the $7^{th} - 12^{th}$ grades as compared to that at the collegiate level, it is vital that research identifies the specific struggles of this age group so that online course designs can be focused and tailored to address their needs. This study added to the limited body of research that exists by investigating the correlation of SRLS and academic achievement, the importance of peer and teacher collaboration and the specific struggles that $7^{th} - 12^{th}$ graders report in online classes. The results practically inform middle and high school educational institutions about the necessary support and online course components that should be provided to facilitate middle and high school students' success in online learning.

CHAPTER 3: METHODOLOGY

The purpose of this chapter is to introduce the research methodology for this quantitative study regarding the impact of self-regulatory skills on achievement in online classes at the $7^{th} - 12^{th}$ grade level with a special focus on effects by grade, gender, modality of instruction and level of SRLS use. Chapter 3 discusses both the hypotheses and the research questions which the study analyzed and answered in Chapters 4 and 5. This chapter describes the research design and the participants of the study and gives a narrative of the data analysis, including the tests that were run in SPSS and descriptive statistics of the sample population. The instruments that were used for analysis are outlined, and the validity and reliability of the survey are included.

Methods and Procedures

The following research questions will guide the current study.

Research Questions

Research Question 1

How do students' perception scores on the OSLQ compare by modality of instruction?

H_0: There will be no significant difference in the students' OSLQ perception scores based upon modality of instruction.

H_1: There will be a significant difference in the students' OSLQ perception scores based upon modality of instruction.

Research Question 2

How do students' perception scores on the OSLQ compare by grade level?

H₀: There will be no significant difference in the students' OSLQ perception scores based upon grade level.

H₁: There will be a significant difference in the students' OSLQ perception scores based upon grade level.

Research Question 3

What is the relationship of students' grade level (grades 7 - 12), gender (male, female), modality of instruction (100% online, 50% online and 50% in person, 10% online and 90% in person) or students' May 2021 GPA scores and students' OSLQ perception scores?

H₀: There will be no relationship among grade level, gender, modality of instruction, or students' May 2021 GPA scores and students' OSLQ perception scores.

H₁: There will be a relationship among grade level, gender, modality of instruction, or students' May 2021 GPA scores and students' OSLQ perception scores.

Research Question 4

What is the relationship of students' perception scores on the individual sub-categories of the OSLQ (goal setting, environmental structuring, task strategies, time management, help-seeking, and self-evaluation) and May 2021 GPAs for each of the grade categories, (a) middle school, grades 7 and 8, and (b) high school, grades 9-12?

H₀: There will be no significant relationship of students' perception scores on the individual sub-categories of the OSLQ (goal setting, environmental structuring, task strategies, time management, help-seeking, and self-evaluation) and May 2021 GPAs for each of the grade categories, (a) middle school, grades 7 and 8, and (b) high school, grades 9-12.

H₁: There will be a significant relationship of students' perception scores on the individual sub-categories of the OSLQ (goal setting, environmental structuring, task strategies, time management, help-seeking, and self-evaluation) and May 2021 GPAs for each of the grade categories, (a) middle school, grades 7 and 8, and (b) high school, grades 9-12.

Research Question 5

How have the Class of 2022 students' GPA mean scores from May 2019, May 2020, May 2021, and Fall 2021changed over time (from before remote learning, during remote learning and after remote learning)?

H₀: There will be no significant difference in the Class of 2022 GPA mean scores over time (May 2019, May 2020, May 2021, and fall 2021).

H₁: There will be a significant difference in the Class of 2022 GPA mean scores over time (May 2019, May 2020, May 2021, and fall 2021).

Research Question 6 (Descriptive Statistics)

How did students' perceptions of online learning during the Covid-19 pandemic compare with the Community of Inquiry theoretical framework?

Research Design and Data Analysis

A non-experimental research design was used to determine the relationship of grade level, gender and instruction modality with students' scores on the Online Self-Regulated Learning Questionnaire and their end of year grade point averages. Additionally, descriptive statistics compared the students' perceptions of online learning during the Covid-19 pandemic with the Community of Inquiry theoretical framework concepts.

The data were screened for missing values, miscoded items and outliers. For each hypothesis, an analysis of normal distributions was run by reviewing the descriptives using SPSS. The researcher checked the boxes for skewness and kurtosis. This technique was appropriate as there were over 100 participants (Privitera, 2018). Strong self-regulatory learning skills and collaboration with both peers and teachers have been shown at the collegiate level to be two of the strongest predictors of academic achievement. The following research questions helped to evaluate if the same holds true for 7th – 12th grade students in online classes.

Originally, modality of instruction and grade were going to be examined together in a two-way ANOVA. However, when that was run, the Levene's test was significant (due to the grade variable). There was no interaction between the two variables, so the researcher instead analyzed them separately using a one-way ANOVA each time. This way, the one-way ANOVA analyzing the variable of modality of instruction had a Levene's test that was not significant. The ANOVA run for the variable of grade was a Welch's ANOVA.

The first research question, "How do students' perception scores on the OSLQ compare by modality of instruction?" was measured by a one-way between-subjects ANOVA to determine whether there were any statistically significant differences among the students' OSLQ perception scores based on their different teaching modalities. The assumptions of the one-way between-subjects ANOVA includes independence of observations, normality, and homogeneity of variance. The alpha level of ($p < .05$) was used to test for significance.

The second research question, "How do students' perception scores on the OSLQ compare by grade level?" was measured using a one-way between-subjects ANOVA to determine whether there were any statistically significant differences among the students' OSLQ perception scores based on their grade level. The assumptions of the one-way between-subjects ANOVA includes independence of observations, normality, and homogeneity of variance. The alpha level of ($p < .05$) was used to test for significance.

The third research question, "What is the relationship of grade level (grades 7 - 12), gender (male, female), modality of instruction (100% online, 50% online and 50% in person, 10% online and 90% in person), or students' May 2021 GPA scores and students' OSLQ perception scores?" was measured by a hierarchical multiple regression. This analysis was chosen to investigate the relationship between the five variables. Entering the independent variables in a step-wise fashion allowed for interpretation of model changes. Since previous analyses in this study examined differences on OSLQ by modality of instruction, that was entered as the first step. The results indicated that the model was a significant predictor of students' OSLQ perception scores. The assumption tests for this statistical analysis are the relationship between the independent and dependent variables must be linear, there cannot be any multicollinearity in the data, the values of the residuals must be independent, the variance of the residuals must be constant, the values of the residuals must be normally distributed, and there cannot be any influential cases biasing the model. The independent variables for this research question are grade level, gender, modality of instruction and students' May 2021 GPA, the dependent variable is the students' OSLQ perception scores. The alpha level of ($p < .05$) was used to test for significance.

The fourth research question, "What is the relationship of students' perception scores on the individual sub-categories of the OSLQ (goal setting, environmental structuring, task strategies, time management, help-seeking, and self-evaluation) and May 2021 GPAs for each of the grade categories, (a) middle school, grades 7 and 8, and (b) high school, grades 9-12?" was measured through a multiple regression. The assumption tests for this statistical analysis are that the relationship between the independent and dependent variables must be linear, there cannot be any multicollinearity in the data, the values of the residuals must be independent, the variance of the residuals must be constant, the values of the residuals must be normally distributed, and there cannot be any influential cases biasing the model. The independent variables for this research question are the students' perceptions scores of the sub-categories of the OSLQ and grade category, and the dependent variable is the students' May 2021 GPA scores. The alpha level of ($p < .05$) was used to test for significance.

The fifth research question, "How have the Class of 2022 students' GPA mean scores from May 2019, May 2020, May 2021, and the fall 2021 changed over time?" was measured by doing a repeated measures ANOVA. This analysis was chosen as every variable is continuous and can be used to help determine if a measurement changes over more than two time points. For the assumptions of this statistical analysis, there should be no significant outliers in any of the measurements, the dependent variable should be approximately normally distributed for each measurement of the independent variable, and the variances between related groups are equal. The independent variable for this research question is time; the dependent variables are the GPAs from the stated years. The alpha level of ($p < .05$) was used to test for significance.

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The sixth research question, "How did students' perceptions of online learning during the Covid-19 pandemic compare with the Community of Inquiry theoretical framework?" was measured using frequency and percentage data. This was chosen to illustrate the numbers of students' responses from short answer questions 1 and 2 that align with the themes and concepts found in the CoI theoretical framework (social presence, cognitive presence and teacher presence) in addition to any other themes that arose from the data.

Reliability and Validity of the Research Design

There are known threats associated with a non-experimental research design, which may include statistical conclusion, internal and external threats to validity. A possible threat to statistical validity was the random irrelevancies in the survey completion settings. Students completed the survey voluntarily, which means they may have completed it at school, at home or in another place. Depending on the social and physical environment, the estimate of the error variance may have been inflated. In order to minimalize the effects of this threat, the survey access by computer was standardized for all participants. The survey was given on a platform accessible to all students in all countries regardless of the web browser being used. In addition, an adequate sample size was obtained.

A possible threat to internal validity is the measurement of the dependent variable of GPA. Due to the ease of cheating in the online environment in the 2020 – 2021 school year, the measurement of grades may not have been as reliable as the in-person GPAs of years past or of the fall 2021 GPAs. Additionally, the teachers may have been less strict than usual due to being empathetic to all that the students were going through in the

pandemic. A possible threat to external validity is interaction of selection and treatment. While the survey went out to all students in an email using the students' school email address, not every student may have seen the email and thus would not have had the opportunity to complete the survey. Therefore, this may restrict the generalizability of the results to populations that share the same constellation of factors, namely students who are staying on top of checking their emails. In order the minimize the effects of this threat, every attempt was made to standardize the methods of collecting the data, which helped to control for the external threat.

The Sample and Population

Setting

The present study used the survey results from one suburban New York independent, boarding, college preparatory school, grades 7 - 12; the survey was distributed in the spring of the 2020 - 2021 academic school year. The school accepts students from a variety of socioeconomic and racial backgrounds. In the 2020 - 2021 school year, 425 students were enrolled in grades 7 – 12. As shown in Table 1, of the total student population, 50.4% were boarding students, 49.6% were day students, 57.6% were male, 42.4% were female, 71.7% were domestic students, and 28.3% were international students.

Table 1

Demographics of Students at Site School in the 2020 – 2021 Academic Year

	n	%
Gender		
Male	245	57.6
Female	180	42.4
Grade		
7	26	6.1
8	43	10.1
9	74	17.4
10	105	24.7
11	79	18.6
12	98	23.1
Type of Student		
Boarders	214	50.4
Day Students	211	49.6

As shown in Table 2, the domestic students came from 13 different states in the U.S.

Table 2

Domestic Students' States of Origin at Site School in the 2020 – 2021 Academic Year

	n	%
States		
California	4	1.31
Connecticut	2	0.65
Florida	5	1.64
Illinois	1	0.33
Maryland	1	0.33
Massachusetts	5	1.64
Nevada	1	0.33
New Jersey	9	2.95
New York	269	88.20
Pennsylvania	2	0.65
Texas	3	0.99
Vermont	2	0.65
Washington	1	0.33
Total	305	100.00

The average class size was 15 students, and the student-teacher ratio is 9:1. As shown in Table 3, the international students come from 17 different countries around the world.

Table 3

Students' Countries of Origin at Site School in the 2020 – 2021 Academic Year

	n	*%*
Countries		
Bahamas	1	0.24
Canada	3	0.71
China	79	18.60
Germany	3	0.71
Jamaica	1	0.24
Kenya	2	0.47
Korea	16	3.76
Nigeria	6	1.41
Romania	1	0.24
Russia	1	0.24
Serbia	1	0.24
South Africa	1	0.24
Taiwan	1	0.24
Turkey	1	0.24
Ukraine	1	0.24
USA	305	71.70
Vietnam	1	0.24
Virgin Islands	1	0.24
Total	425	100.00

Sample

As shown in Table 4, the sample of students who participated in the survey were a total of 322 out of the entire student population of 425. There were 58.4% male students, 40.4% female students, and 1.2% preferred not to answer the question on gender. There were 18.3% of the student body who were fully online the entire 2020 – 2021 school year, and of the remaining student body, 22.4% were half online and half in person and

59.3% were mostly in person. The participation by grade was 8.1% in 7th, 12.4% in 8th, 18.3% in 9th, 27.3% in 10th, 19.3% in 11th and 14.6% in 12th. The survey did not ask for the student's country of origin nor their status as boarding or day, so that data is not known of the sample population.

Table 4

Demographics of Sample Population from Site School in the 2020 – 2021 Academic Year

	n	*%*
Gender		
Male	188	58.4
Female	130	40.4
Prefer Not To Answer	4	1.2
Online Modality		
Fully Online	59	18.3
Half & Half	72	22.4
Mostly in Person	191	59.3
Grade		
Seventh	26	8.1
Eighth	40	12.4
Ninth	59	18.3
Tenth	88	27.3
Eleventh	62	19.3
Twelfth	47	14.6

The sample population is very similar to other private, international, boarding schools in the US who are 50% boarding and 50% day with a student size of around 400. The results of this study can only be generalized to those 7th – 12th grade online students who attend a school with similar demographics. The sample for this study represents the target population (7th – 12th graders who are online students) in as much as those in the target population are studying online and are preparing to go to college.

Population

In the 2020 - 2021 school year, the independent school closed its physical campus four weeks in the school year due to COVID precautions. All of the students were fully online for a minimum of four weeks in this school, in addition to the months of March, April and May in the previous school year. After those four weeks in the 2020 – 2021 school year where all students were home and online, students all had the choice every day throughout the year to choose to be physically in class or to be online. Being online meant one of two things: synchronous or asynchronous. All students from 8 am – 12 pm Eastern Time had to be synchronous via Zoom. The classrooms were equipped with a MEETING OWL PRO camera, which showed a 360-degree view of the room as well as a close-up of each person who was talking. The camera enabled all those online the ability to see the entire classroom as well as to be able to hear as much as possible what was being said in the classroom. Every student also had the ability to participate in class and be seen by the entire class. For any classes that were held after midnight in a student's time zone, the student was given the option to complete those classes synchronously or asynchronously.

Of the 425 enrolled students in the 2020 - 2021 school year, 125 were fully online the entire school year, meaning they took 100% of their courses online and were never in person on campus. Many of those students were overseas and were unable to come to the US due to COVID restrictions while others who were 100% online were local but chose to remain fully online out of COVID precautionary measures.

The fully online students at the school came from China, Korea, Nigeria, South Africa, Vietnam and six different states in The United States, as shown in Table 5. All

remaining students attended in person at some point in the school year. The teachers

taught to both the in-person and on-Zoom students at the same time, and the online

students participated in class discussions and had the ability to ask questions of their

teachers and their classmates in real time when they attended classes synchronously. For

every class, students also had asynchronous homework to do. Examples of this include

watching pre-recorded lectures and taking notes, reading documents, and submitting

answers to questions, and posting comments to discussion boards.

Table 5

Demographics of Fully Online Students at Site School in the 2020 – 2021 Academic Year

	n	*%*
States		
California	1	3.22
Florida	3	9.68
New Jersey	3	9.68
New York	21	67.75
Vermont	2	6.45
Washington	1	3.22
Countries		
China	78	62.40
Korea	11	8.80
Nigeria	3	2.40
South Africa	1	0.80
USA	31	24.80
Vietnam	1	0.80

Instruments

The survey results used in the current study came from a survey which had three

parts. In Section 1 of the survey, students were asked to provide their grade, age, gender,

modality of instruction, reported use of self-regulatory skills while involved in online

learning and assessment of their online learning experience.

In Section 2 of the survey, students were asked to rate their perceived use of specific SRL skills using a Likert scale (1 = Never true of me; 2 = Not usually true of me; 3 = Sometimes yes, sometimes no; 4 = Most of the time true of me; 5 = Always true of me). Questions one through five focused on goal setting (GS), questions six through nine focused on environmental structuring (ES), questions ten through thirteen focused on task strategies (TS), questions fourteen through sixteen focused on time management (TM), questions seventeen through twenty focused on help-seeking (HS) and questions twenty-one through twenty-four focused on self-evaluation (SE). An average was completed for each subscale and for the whole scale (OSLQ). Section two used the short form of the Online Self-Regulated Learning Questionnaire (Barnard et al., 2009) which had been used in previous studies to measure students' SRL skills in online learning (Onah & Sinclair, 2016; Zalli et al., 2019, 2020). The short form of the Online Self-Regulated Learning Questionnaire (OSLQ) was developed from the original 86-item form. The internal consistency along with the results from the exploratory factor analyses of the original data collected were thoroughly examined. The internal consistency of scores gathered for the short form of the OSLQ was $\alpha = .93$. The short form was developed by researchers at Texas Tech University in 2008 for a study conducted at the collegiate level on academic self-regulation.

In Section 3 of the survey, students were asked to complete six short-answer, open-ended questions asking the students for their insights into what and why certain instructional lessons worked well or did not work well for them in the online learning format as well as their suggestions on ways the school can improve online learning in the future.

Grade Point Average

The school follows a trimester system as is shown in Table 6, which reports grades in November, February, and May. Each trimester concludes with comprehensive exams, presentations or papers. Grade points and whole number equivalents for each letter grade are listed below.

Advanced Placement and honors classes receive an additional one-third of a point (0.33) added to the grade when D- or better. The weighted grade is reported on the transcript and is used in determining the overall grade point average for the year.

Table 6
Trimester Grading Scales

Regular Grading Scale

Letter Grade	GPA	Percent in class
A	4.0	93 - 100
A-	3.667	90 - 92
B+	3.333	87 - 89
B	3.0	83 - 86
B-	2.667	80 - 82
C+	2.333	77 - 79
C	2.0	73 - 76
C-	1.667	70 - 72
D+	1.333	67 - 69
D	1.0	63 - 66
D-	0.667	60 - 62
F	0	59 and below

Honors Grading Scale

Letter Grade	GPA	Percent in Class
A+	4.333	93 - 100
A	4.0	90 - 92
A-	3.667	87 - 89
B+	3.333	83 - 86
B	3.0	80 - 82
B-	2.667	77 - 79
C+	2.333	73 - 76
C	2.0	70 - 72
C-	1.667	67 - 69
D+	1.333	63 - 66
D	1.0	60 - 62
F	0	59 and below

P = pass; no numerical equivalent
I = incomplete; no numerical equivalent
W = withdraw; no numerical equivalent

Procedures for Collecting Data

The researcher first spoke with the Academic Dean at the site school to explain the researcher's idea for this study. Upon gaining the Academic Dean's verbal permission to move forward with the study, the researcher applied to the St. John's IRB board for

IRB Approval to conduct this study. Once IRB approval was attained, the researcher sent a letter of consent to the Academic Dean, which he signed and returned. The researcher was then sent the link to the responses to the survey. The researcher's data collection for this study was limited to the student body demographics from the 2020 – 2021 school year, the May 2021 GPAs of the entire student body, the May 2019, May 2020, May 2021 and Fall 2022 GPAs of the Class of 2022, the demographics of the students from the survey (grade, age, gender and teaching modality), and the students' survey answers. No other data was accessed from the archived data.

Research Ethics

To address ethical issues, the researcher first spoke with the Academic Dean at the site school to talk through the researcher's idea for this study. Upon gaining the Academic Dean's verbal permission to move forward with the study, the researcher applied to the St. John's IRB board for IRB Approval to conduct this study. Once IRB approval was attained, the researcher sent a letter of consent to the Academic Dean, which he signed and returned. The researcher was then given access to the anonymous survey data.

The data used in the study was archived data; informed consent of the participants was not required. The researcher did not have access to the names of the participants. The students' responses had been assigned codes by the school prior to the researcher receiving the data; no student names were sent to the researcher for this study. The data results from this study will be provided anonymously without any reference to specific students or to the school. The responses from the survey were kept secure on a locked, password protected laptop in a locked drawer in the researcher's office.

Conclusion

Chapter three described the research methodology and described the following aspects of the study: (a) research questions, (b) research design and data analysis, (c) the sample and population, (d) instruments, (e) procedures for collecting data and (f) research ethics. Findings from data collection and analysis are reported in Chapter 4.

CHAPTER 4: FINDINGS

Introduction

The purpose of this non-experimental study was to examine the relationship of grade level, gender, and modality of instruction to students' scores on the OSLQ and their end of year grade point averages, using the Cyclical Phases Model of Self-Regulation (Zimmerman and Moylan, 2009) and the Community of Inquiry Framework (Garrison et al., 2000). This chapter presents the results of the analyses and findings from the seven research questions in the current study. These results and findings provide context for the discussion and conclusion in the last chapter.

Results

The sample studied included 322 seventh through twelfth grade students who completed a survey about online learning. The students in this sample were students at the site school from grades 7 – 12 who were full-time students at the school in the 2020 – 2021 academic school year. Students that year were permitted to study fully online, to come in person half the time and to study online half the time or to be in person whenever the school was physically open. All of the students in that school year had participated in online classes for at least a month of that school year, so all of the students in the entire student body were sent the survey to complete.

Before running the statistical analysis, the data were screened. There were no coding errors. Cases were excluded on a hypothesis-by-hypothesis basis if data were missing, as described below.

Research Question 1

In the school year that the survey was conducted (2020 – 2021), students were able to be fully online, half of the time online and half of the time in person or most of the time in person. The first research question was: How do students' perception scores on the OSLQ compare by modality of instruction?

The hypotheses were:

H₀: There will be no significant difference in the students' OSLQ perception scores based upon modality of instruction.

H₁: There will be a significant difference in the students' OSLQ perception scores based upon modality of instruction.

A one-way between-subjects ANOVA was chosen as the appropriate analysis to determine whether there were any statistically significant differences among the students' OSLQ perception scores based on their different teaching modalities. An alpha level of .05 was chosen for testing the significance.

Before running the statistical analysis, the data were screened. There were no missing values or coding errors. The six assumption tests were then run to determine if the data were appropriate to use with the one-way ANOVA. The dependent variable, students' OSLQ perception scores, was continuous. The independent variable, modality of instruction, was categorical with three levels (fully online, half and half, and mostly in person). There was independence of observations as each person participated in only one group. There were no outliers as was determined by converting the dependent variable scores to z scores for each group. Each group with the dependent variable displayed a normal distribution on a histogram, and the Shapiro-Wilks values were non-significant

for each group: fully online (p = .162), half and half (p = .910), and mostly in person (p = .249). The Levene's Test of Variances was not significant, which indicated that there was homogeneity of variances, $F(2,319) = 1.697$, p = .185. All of the assumptions were met.

The one-way ANOVA was then conducted. There was a statistically significant difference between the groups $F(2,319) = 6.726$, p = .001, as is shown in Table 7. The effect size was $\eta^2 = 0.040$, which is small. A Tukey post hoc test revealed that there was a statistically significant mean difference between the fully online and the half and half groups (MD = .41437, SE = .12324, p = .002) and the fully online and the mostly in person groups (MD = .34440, SE = .10453, p = .003). The Tukey post-hoc also revealed a significant difference between the fully online group and other groups such that the fully online group had a higher average OSLQ (M = 3.5706, SD = .56901) than half and half (M = 3.1563, SD = .72681), and the mostly in person group (M = 3.2262, SD = .72851). There was no statistically significant difference between the half and half and the mostly in person groups (MD = .06997, SE = .09706, p = .751). Due to the significant results, the null hypothesis was rejected. The results indicated that students studying fully online perceive themselves as using self-regulatory skills more than students who are sometimes or mostly studying in person.

Table 7

ANOVA Results of OSLQ scores based on modality of instruction

Source	SS	df	MS	F	p
Groups	6.625	2	3.313	6.726	.001*
Error	157.123	319	0.493		
Total	163.748	321			

*Note. *p<.05*

Research Question 2

Since the dataset includes different developmental stages, the researcher next tested to see if OSLQ scores differed by grade. The second research question was: How do students' perception scores on the OSLQ compare by grade level?

The hypotheses were:

H_0: There will be no significant difference in the students' OSLQ perception scores based upon grade level.

H_1: There will be a significant difference in the students' OSLQ perception scores based upon grade level.

A one-way between-subjects ANOVA was chosen as the appropriate analysis to determine whether there were any statistically significant differences among the students' OSLQ perception scores based on their grade. An alpha level of .05 was chosen for testing the significance.

Before running the statistical analysis, the data were screened. There were no missing values or coding errors. The six assumption tests were then run to determine if the data were appropriate to use with the one-way ANOVA. The dependent variable, students' OSLQ perception scores, was continuous. The independent variable, grade, was ordinal with six levels (7th grade, 8th grade, 9th grade, 10th grade, 11th grade and 12th grade). There was independence of observations as each person participated in only one group. There were no outliers as was determined by converting the dependent variable scores to z scores for each group. Each group with the dependent variable displayed a normal distribution on a histogram, and the Shapiro-Wilks values were non-significant for each group: 7th grade ($p = .447$), 8th grade ($p = .236$), 9th grade ($p = .800$), 10th grade

($p = .489$), 11th grade ($p = .181$) and 12th grade ($p = .334$). The Levene's Test of

Variances showed a violation of the assumption of homogeneity of variance, $F(5,316) =$

3.827, $p = .002$, so a Welch's ANOVA was used $F(5,117.899) = 4.092$, $p = .002$.

There was a statistically significant difference between the groups $F(5,316) =$

3.780, $p = .002$, as is shown in Table 8. The effect size was $\eta^2 = 0.056$, which is small.

The Games-Howell post hoc analyses show that 9th graders have significantly higher

OSLQ scores than 11th ($MD = .34791$, $SE = .11734$, $p = .042$) and 12th graders ($MD =$

.55516, $SE = .12975$, $p = .001$). There was no statistically significant difference between

any of the other grades. Due to the significant results, the null hypothesis was rejected.

The results indicated that the 9th grade students perceived themselves as using self-

regulatory skills more than students in any other grade.

Table 8
Welch's ANOVA Results of OSLQ scores based on grade

Source	SS	df	MS	F	p
Groups	9.241	5	1.848	3.780	.002*
Error	154.508	316	0.489		
Total	163.748	321			

Note. *p<.05

Research Question 3

To further assess factors that may influence OSLQ perceptions, a multiple

regression approach was used for research question 3: What is the relationship of

students' grade level (grades 7 - 12), gender (male, female), modality of instruction (fully

online, half online and half in person, mostly in person) or students' May 2021 GPA

scores and students' OSLQ perception scores?

The hypotheses chosen were:

H₀: There will be no relationship among grade level, gender, modality of

instruction or students' May 2021 GPA scores and students' OSLQ perception

scores.

H₁: There will be a relationship among grade level, gender, modality of

instruction or students' May 2021 GPA scores and students' OSLQ perception

scores.

The alpha level of .05 was chosen to test for significance.

Prior to running the multiple regression analysis, the data were screened. Four

cases had "prefer not to answer" entered for gender, so those four cases were not used in

this analysis. Of the 318 remaining, 26 of those were missing the May 2021 GPAs, so

those were also not included in this analysis. This left 288 cases that were included for

analysis in this research question. The six assumption tests for the hierarchical multiple

regression analysis were then conducted. The relationship between the independent and

dependent variables was linear, as was demonstrated with scatterplots. The VIF scores

were well below 10 (grade level = 1.051, gender = 1.066, modality of instruction = 1.012

and May 2021 GPAs = 1.074), and the tolerance scores were above 0.2 (grade level =

.952, gender = .938, modality of instruction = .988 and May 2021 GPAs = .931).

Therefore, the multicollinearity assumption was met. The values of the residuals were

independent as were noted by the Durbin-Watson statistic, which was close to 2 (Durbin-

Watson = 1.962). The variance of residuals was constant, which was identified by the

plot showing no signs of funneling, which suggests the assumption of homoscedasticity

has been met. The values of residuals were normally distributed, which was evidenced by

the P-P plot. Finally, there were no influential cases of biasing or outliers evident in the

data, which was verified by calculating Cook's Distance values, which were all under 1.00.

The multiple regression analysis was run using SPSS. Type of teaching modality (β = -.142, p = .011), grade (β = -.246, p = .000) and May 2021 GPA (β = .266, p = .000) primarily predicted students' OSLQ perception scores, while gender (β = -.032, p = .572) did not significantly predict students' OSLQ perception scores. May 2021 GPAs received the strongest positive weight in the model and provided the unique contribution of sr^2 = .0660 or 6.6%, as is shown in Table 9. Grade followed as the next strongest positive weight and had a unique contribution to the model of sr^2 = .0576, or 5.8%. Results predicted OSLQ scores were equal to the regression equation of: Predicted OSLQ SCORE = 3.324 + (-.132 * Modality of Instruction) + (-.121 * Grade) + (.405 * May 2021 GPA). The null hypothesis was rejected.

Table 9
Summary of Multiple Regression for Variables Predicting OSLQ Scores of 7th – 12th Grade Students (N = 288)

Variable	*B*	*SE B*	β	sr^2
		OSLQ Scores		
Teaching Modality	-.132	.052	-.142	.0202*
Gender	-.047	.083	-.032	
Grade	-.121	.028	-.246	.0576***
May 2021 GPA	.405	.087	.266	.0660***
R^2	.131***			
F	10.696***			

*Note: *p < .05. ***p < .001.*

Research Question 4

The OSLQ is composed of six subscales. To test if individual subscales are more successfully predictive of GPA, a multiple regression was used. As this data set includes

a wide age range encompassing different developmental stages, for this analysis, middle school (grades 7 and 8) and high school (grades 9 – 12) were run in separate regressions. Research question 4 is: What is the relationship of students' perception scores on the individual sub-categories of the OSLQ (goal setting, environmental structuring, task strategies, time management, help-seeking, and self-evaluation) and May 2021 GPAs for each of the grade categories, (a) middle school, grades 7 and 8, and (b) high school, grades 9-12?

The hypotheses chosen are:

H_0: There will be no significant relationship of students' perception scores on the individual sub-categories of the OSLQ (goal setting, environmental structuring, task strategies, time management, help-seeking, and self-evaluation) and May 2021 GPAs for each of the grade categories,(a) middle school, grades 7 and 8, and (b) high school, grades 9-12.

H_1: There will be a significant relationship of students' perception scores on the individual sub-categories of the OSLQ (goal setting, environmental structuring, task strategies, time management, help-seeking, and self-evaluation) and May 2021 GPAs for each of the grade categories, (a) middle school, grades 7 and 8, and (b) high school, grades 9-12.

The alpha level of .05 was chosen to test each analysis for significance.

Prior to running the multiple regression analyses, the data were screened. Participants missing May 2021 GPAs were omitted from this analysis, leaving 292 cases.

For hypothesis 4a that utilized the middle school students' data, the six assumption tests for the multiple regression analysis were conducted. The relationship

between the independent variable of goal setting and the dependent variable of May 2021 GPA was linear, as was demonstrated with a scatterplot. The relationships between the remaining five independent variables and the dependent variable were non-linear. There was no multicollinearity in the data as the highest correlation was goal setting with May 2021 GPA, $r = .267$, $p < .001$. When viewing the Collinearity statistics in the SPSS output, the VIF scores were well below 10 (GS = 2.348, ES = 1.889, TS = 2.559, TM = 3.459, HS = 2.681, and SE = 4.417), and the tolerance scores were above 0.2 (GS = .426, ES = .529, TS = .391, TM = .289, HS = .373, and SE = .226). Therefore, the multicollinearity assumption was met. The values of the residuals were independent as were noted by the Durbin-Watson statistic, which was close to 2 (Durbin-Watson = 1.828). The variance of residuals was not constant, which was identified by the scatterplot which showed signs of funneling, which suggests the assumption of homoscedasticity was violated. The values of residuals were not normally distributed, which was evidenced by the P-P plot, as the dots were not all closely placed near the line. The results should therefore be interpreted with caution. There were no influential cases of biasing or outliers evident in the data, which was verified by calculating Cook's Distance values, which were all under 1.00.

The multiple regression analysis was run using SPSS, and only the independent variable of goal setting (GS) was significantly correlated with the dependent variable, the May 2021 GPAs. Goal Setting ($\beta = .447$, $p = .033$) primarily predicted middle school students' May 2021 GPAs, while Environment Setting ($\beta = -.135$, $p = .464$), Task Strategies ($\beta = -.025$, $p = .905$), Time Management ($\beta = -.304$, $p = .224$), Help-Seeking ($\beta = .131$, $p = .549$), and Self-Evaluation ($\beta = .085$, $p = .762$) did not significantly predict

middle school students' May 2021 GPAs. Goal Setting received the strongest positive weight in the model and provided the unique contribution of $sr^2 = .200$ or 20%, as is shown in Table 10. Results predicted OSLQ scores were equal to the regression equation of: Predicted MIDDLE SCHOOL MAY 2021 GPA = 3.117 + (.245 * Goal Setting). The null hypothesis was rejected.

Table 10
Summary of Multiple Regression for Variables Predicting May GPAs of 7th & 8th Grade Students (N = 56)

	May 2021 GPAs			
Variable	B	SE B	β	sr^2
Goal Setting	.245	.112	.447	.200*
Environmental Structuring	-.063	.085	-.135	
Task Strategies	-.011	.095	-.025	
Time Management	-.119	.097	-.304	
Help-Seeking	.053	.088	.131	
Self-Evaluation	.036	.118	.085	
R^2	.136			
F	1.286			

*Note: *p < .05.*

For hypothesis 4b that utilized the high school students' data, the six assumption tests for the multiple regression analysis were conducted. The relationship between the independent variable of goal setting and the dependent variable of May 2021 GPA was linear, as was demonstrated with a scatterplot. The relationships between the remaining five independent variables and the dependent variable were non-linear. There was no multicollinearity in the data as the highest correlation was goal setting with May 2021 GPA, $r = .278$, $p < .001$. When viewing the Collinearity statistics in the SPSS output, the VIF scores were well below 10 (GS = 2.163, ES = 1.529, TS = 2.214, TM = 2.463, HS = 1.704, and SE = 2.199), and the tolerance scores were above 0.2 (GS = .462, ES = .654,

TS = .452, TM = .406, HS = .587, and SE = .455). Therefore, the multicollinearity assumption was met. The values of the residuals were independent as were noted by the Durbin-Watson statistic, which was close to 2 (Durbin-Watson = 1.967). The variance of residuals was not constant, which was identified by the scatterplot which showed signs of funneling, which suggests the assumption of homoscedasticity was violated. The values of residuals were not normally distributed, which was evidenced by the P-P plot, as the dots were not all closely placed near the line. The results should therefore be interpreted with caution. There were no influential cases of biasing or outliers evident in the data, which was verified by calculating Cook's Distance values, which were all under 1.00.

The results indicated that the model was a significant predictor of high school students' May 2021 GPAs. A significant regression equation was found $F(6,229) =$ 4.368, $p < .001$, and accounted for 10.3% of the variance of HS May 2021 GPAs ($R^2 =$ .103, adjusted $R^2 = .070$). Goal Setting ($\beta = .151$, $p = .006$) primarily predicted high school students' May 2021 GPAs, while Environment Setting ($\beta = -.001$, $p = .973$), Task Strategies ($\beta = -.065$, $p = .142$), Time Management ($\beta = .033$, $p = .461$), Help-Seeking ($\beta = .059$, $p = .137$), and Self-Evaluation ($\beta = .027$, $p = .579$) did not significantly predict high school students' May 2021 GPAs. Goal Setting received the strongest positive weight in the model and provided the unique contribution of $sr^2 = .200$ or 20%, as is shown in Table 11. Results predicted OSLQ scores were equal to the regression equation of: Predicted HIGH SCHOOL MAY 2021 GPA = 3.115 + (.151 * Goal Setting). The null hypothesis was rejected.

Table 11

Summary of Multiple Regression for Variables Predicting May GPAs of 9th - 12th Grade Students (N = 236)

Variable	B	SE B	β
	sr^2		
Goal Setting	.151	.055	.245
	.060*		
Environmental Structuring	-.001	.043	-.003
Task Strategies	-.065	.044	-.137
Time Management	.033	.045	.073
Help-Seeking	.059	.040	.122
Self-Evaluation	.027	.048	.052
R^2	.103***		
F	4.368***		

*Note: *p < .05. ***p < .001.*

Research Question 5

In order to see if the pandemic year (2020 – 2021) affected grades, a repeated-measures ANOVA was used to test for GPA differences across years of high school for the Class of 2022. Research question 6 is: How have the Class of 2022 students' GPA mean scores from May 2019, May 2020, May 2021, and the fall 2021 changed over time?

The hypotheses chosen are:

H₀: There will be no significant difference in the Class of 2022 GPA mean scores over time (May 2019, May 2020, May 2021, and fall 2021).

H₁: There will be a significant difference in the Class of 2022 GPA mean scores over time (May 2019, May 2020, May 2021, and fall 2021).

A repeated measures ANOVA was run. Mauchley's test of sphericity was significant ($p < .001$), indicating departure from sphericity. Therefore the Greenhouse-Geisser correction was used. The repeated measures ANOVA with a Greenhouse-Geisser correction determined that the mean GPA differed significantly between time points

$F(2.238, 89.527) = 6.594$, $p < .001$. Post hoc tests using Bonferroni correction revealed that the 9th grade year (2018 – 2019) was statistically different from all the other years. In other words, there was a significant mean difference found between 9th grade and every other year (10th – 12th) for the Class of 2022. The comparisons were 9th grade GPAs with 10th grade GPAs ($MD = -.113$, $SE = .021$, $p < .000$), 9th grade with 11th grade GPAs ($MD = -.139$, $SE = .030$, $p < .000$), and 9th grade with 12th grade GPAs ($MD = -.120$, $SE = .038$, $p < .020$). The null hypothesis was rejected. It is concluded that the pandemic year (2018 – 2019) was not statistically different from the 10th and 12th grade years for the Class of 2022.

Research Question 6

In the school year 2020 – 2021, students at the school where the survey was conducted were allowed to attend classes fully online (via Zoom), part time online/part time in person, or mostly in person. All students were sent the survey since all of them had spent at least four weeks in online classes that school year as well as the 2.5 full months the previous year when COVID-19 first shut down all schools in the U.S. The sixth research question is: How did students' perceptions of online learning during the Covid-19 pandemic compare with the Community of Inquiry theoretical framework?

There were six short-answer questions on the survey administered to the students. For the purposes of this current study, the answers to two of those six questions were examined. Those two open ended questions were:

1. When online classes worked well, what factors helped make that happen?

2. When online classes did not work so well, what factors helped make that happen?

As the questions were open-ended, the students could write one or multiple

statements to a question. Each point a student made was treated as a separate response

(i.e. The response "*Having fewer distractions around me and the quality of the Zoom*

meetings affected whether online classes worked well or not" was counted as two

responses: fewer distractions (1) and quality of Zoom meetings (2)). Responses that were

"*I don't know*" or nonsensical (i.e. "*stuff*") were not included, resulting in a total of 747

responses to the two short-answer questions that were analyzed for this study. Table 12

summarizes the categories the researcher developed through analyzing, coding and then

reanalyzing all of the data to fine-tune the codes. Additionally, Table 12 includes the

frequencies and percentages of the total number of responses for which each category

accounted.

Table 12
Frequencies and percentages of student responses to short answer questions 1 and 2

	Frequency	
Category of Response	*n*	%
Individually being known	62	8.3
Being able to think and learn with others	105	14.1
Teachers	176	23.6
Technology	176	23.6
Self-Regulatory Skills	132	17.7
Miscellaneous	49	6.5
Not used	47	6.2
Total	747	100.0

Table 13 displays the categories that arose from the students' answers to the first

two Short Answer Questions on the survey. The first three categories corresponded well

with the Community of Inquiry components and were changed to match those names:

Social Presence (was "Individually being known" in the original coding by the

researcher); Cognitive Presence (was "Being able to think and learn with others" in the

original coding by the researcher); Teaching Presence (was "Teachers" in the original

coding by the researcher). Additionally, Self-Regulatory Skills (the original code

assigned by the researcher) was changed to Self-Regulatory Skill Use.

Table 13

Frequencies and percentages of student responses to short answer questions 1 and 2, renamed

	n	%
Social Presence	62	8.3
Cognitive Presence	105	14.1
Teacher Presence	176	23.6
Technology	176	23.6
Self-Regulatory Skill Use	132	17.7
Miscellaneous	49	6.5
Not Used	47	6.2
Total	747	100.0

The researcher analyzed and then re-analyzed the data, and from those analyses,

several sub-categories arose within each category. Table 14 summarizes the findings.

Table 14

Sub-Categories of student responses to short answer questions with student response examples

Main Category	Sub-Category	Student Response Examples
Social Presence	Need to be known as an individual	*The classes that felt like they were easier to focus in were usually the ones where teachers really engaged well with students other than (just) in the lesson.*
	Need to be accountable for actions	*Teachers should be stricter on the rules to keep check on the focus and participation.*
	Need to be known as a student	*Whenever any online student needed help, it was easy to receive help and communication was fast.*
Cognitive Presence	Reasons online classes worked well	*Class discussions and debates made classes more fascinating. Mr. X's class was always fun because of this.*
	Reasons online classes didn't work well	*Breakout rooms were very difficult because students turned cameras off and would not talk to one another.*
	Variety in classes is needed	*Every class activity was the same every day, and we never got a chance to try to grasp the material in other ways.*
Teacher Presence	Teacher engaged students well	*Online classes were a lot easier when the teachers were engaged with their online students and made sure that our full faces were on camera so that we were paying attention.*
	Teacher did not engage students well	*When the teachers did not interact with the online students much, it wasn't necessary for me to pay attention.*
	Teacher preparation for class	*(Online classes worked) when the teachers were prepared.*
Technology	Ways technology helped learning	*Providing online notes after each class was really helpful for me to understand and summarize what I learned.*
	Ways technology hurt learning	*I think the WIFI for others was sometimes bad. For example, if my classmate was speaking and cut out due to connection issues, it made group discussions difficult.*
Self-Regulatory Skill Use	Using SRLS in online classes	*In general, if online schooling went well, it was because I had exceptionally good self-control and discipline that day.*
	Not using SRLS in online classes	*The distraction from my phone… made me not to concentrate fully.*
Miscellaneous	Length of class / Time of class	*Short classes are better because online my attention span is shortened. It also better when there are fewer classes in a day because when my classes go from 8am to 3:20pm online it is really draining and depressing.*
	Negative feelings about online learning	*Being online was trash. I hated it. I needed to be in person with people.*
	Mental health	*(I had) depression of being isolated online.*

Conclusion

The results of the six tests run on the OSLQ answers showed that students studying fully online perceive themselves as using self-regulatory skills more than students who are sometimes or mostly studying in person and that 9th graders perceived themselves as employing self-regulatory skills more than students in any of the other five grades. Regarding OSLQ perception scores, the MAY 2021 GPAs were the strongest predictors of OSLQ perception scores followed closely by the grade of the student.

In connection with the grade of the student, when put into the categories of Middle School (7th 7 8th grades) and High School (9th – 12th grades), while interpreted with caution, the results showed goal setting was a significant predictor of GPA in both categories. And, when examining the scores of the Class of 2022 from 9th grade through 12th grade, the only year that statistically stood out was the 2018 – 2019 school year, not the pandemic year of 2020 – 2021. It was therefore concluded that the pandemic year did not have a significant effect on the grades of the Class of 2022.

The sixth purpose of this study was to determine how well the students' perceptions of online learning during the COVID-19 pandemic compared or lined up with The Community of Inquiry theoretical framework. While all three areas deemed imperative by the CoI came through in the student responses (Social Presence, Cognitive Presence and Teacher Presence), three additional areas also surfaced, seemingly unique to the 7th – 12th grade level. All of these six areas will be discussed at length in Chapter 5.

CHAPTER 5: DISCUSSION

Self-regulated learning skills and strong collaboration with teachers and peers have been identified as important for success in online classes at the postsecondary level. The purpose of this study was to examine if the same holds true for $7^{th} – 12^{th}$ grade students. Given that little research in online learning has been conducted at the $7^{th} – 12^{th}$ grade level (Barbour, 2019), the researcher sought to contribute in this area to current gaps in literature. Most peer-reviewed studies focused on academic success in online learning (King et al., 2000; Barnard, Paton & Rose, 2007) and the components of successful online classes (Garrison et al., 2000) have been conducted at the postsecondary level. The researcher of this current study focused on grades 7 – 12 to help lay the foundation for the research now needed in this age bracket. The influences of teaching modality, grade, gender, perceived SRLS use (six sub-scales of the OSLQ) and the impact of the COVID-19 pandemic on students' grades were examined.

Implications of Findings

The research of Kim et al. (2019) found that online students often reported feelings of loneliness and isolation. Peek et al. (2018) studied the reasons students dropped out of postsecondary online schools. The most common reason respondents gave was the absence of interaction with fellow students. The academic self-regulatory skills of effort regulation and peer learning were also significantly correlated with student retention in Peek's study (2018). This study set out to determine if SRLS and collaboration with peers and teachers were equally important at the $7^{th} – 12^{th}$ grade levels.

As the results of that survey were analyzed in this study, seven findings surfaced which are significant for the $7^{th} – 12^{th}$ grade online learner. Five of the findings center

around the necessary components of 7th – 12th grade online classes, one focuses on the importance of the 9th grade and the last focuses on the significance of goal setting.

The Community of Inquiry (CoI) Framework (Garrison et al., 2000) posited that there are three required components of an effective online class: Social Presence, Cognitive Presence and Teacher Presence. These also surfaced as major themes in the 7th – 12th grade responses on the survey. The students in the survey spoke most frequently about the teacher being the reason an online class worked or did not work, which lines up well with the Community of Inquiry Framework. The CoI states the teacher must make sure social presence and cognitive presences are being actively pursued as well as making sure that the students are learning. The students in the survey put a lot of weight (23.6%) on the teacher's ability to engage students online, evaluating the class as working or not working based on how well the teacher was able to engage students in the lessons. This aligns with the findings of Vlachopoulos and Makri (2019) that the teacher has the task of mitigating the distance students feel in the online learning environment by enhancing closeness, giving timely feedback and facilitating peer-to-peer collaborations and communication.

Cognitive Presence is the component of the CoI focused on the extent to which students can construct, learn and verify the meaning of topics and concepts through discussions and reflection. From the students' responses on the survey, this included statements about class discussions, class games (Kahoot) and Breakout rooms. This was the third most frequently listed topic (14.1%) by students in the survey of whether or not a class worked well online. This aligns with the importance the CoI places on cognitive presence for online classes at the collegiate level. Teenagers need interaction and

collaboration with their peers and teachers (Hong et al., 2021). The 7th – 12th grade

students mentioned 42 separate times how important variety was for learning and

verifying meaning in online classes. They implored teachers to do different activities and

to present material in different ways in every class. In April 2021, Harvard published a

student study entitled, "Post-pandemic pedagogy: 20+ tips from six innovative educators"

(https://tophat.com/teaching-resources/ebooks-and-guides/post-pandemic-pedagogy/).

The same need for variety was found at the postsecondary level that surfaced in this

study. This points to a potentially new focus for online classes at the 7th grade through

graduate level and would be an important focus of future research. Having teachers focus

on variety for their online classes extends the current research in the area of effective,

online learning for the 7th – 12th grades.

Social Presence, the third component of the CoI, focuses on the ability to interact

with peers and the teacher in deep, personal, and meaningful ways. This was the lowest

category (8.3%) in the survey answers given by the 7th – 12th grade students. In the CoI,

Social Presence is equal in importance to both Cognitive and Teacher Presences. This

low percentage on the survey is surprising. The school at which the survey was

conducted is a small boarding school where the teachers know their students well. The

teachers are dorm parents in the dormitories, family table leaders in the dining hall and

coaches of their athletic teams. With only an average of one hundred new students each

year, the majority of the student body were known well by their teachers prior to going

online. This is a possible explanation of why the students did not list more frequently the

desire to be known better by their teachers and peers. However, due to the very low

response rate, this is an area that should be studied further. In online environments where

the teachers do not know their students prior to the online class and will never be physically present with their students, is Social Presence as important to the 7th – 12th grade online students as it is to the college and graduate levels?

The findings of the remaining two categories that were raised by the students in the survey which do not fall under the umbrella of the CoI are use of technology and the employment of self-regulatory skills by the students. Aboagye et al. (2020) identified five major issues that college-aged students faced in online learning, and technology was one of those five. As with the student responses reviewed in this study, the responses in Aboagye's study focused primarily on internet connectivity and device issues. Additionally, the students in this survey discussed the teachers' problems with technology. The 7th – 12th graders listed technology as a significant (23.6%) part of the success or failure of online classes. Of the 176 comments regarding technology, 56.8% cited technology issues as being a cause of online classes not working well. It is important that teachers of online classes at this age level are well-acquainted with the technology being used in order to keep the class running smoothly and to know what to do when there are tech issues. The responses from the students in this area also suggest teachers of this age group must also be adept enough with the technology to continually bring in new apps or uses of technology to engage students in material and to use technology to keep communication clear. This is another area that would be important for future research, testing this theory on a more comprehensive and varied subject-base.

The employment of Self-Regulatory Skills was the other significant (17.7%) category which surfaced from the answers the students gave on the survey. In an age group where self-regulatory learning skills (SRLS) are in their developmental stages

(Gestsdottir & Lerner, 2008), it is significant that, as seen in Table 13, so many identified the success or failure of their online classes to be the success or failure in their own use of SRLS. The percentage of SRLS data from the short answer responses as seen in Table 13 point to the fact that while teenagers know on some level what they need to do to be a successful student, they still need guidance and teaching as well as accountability in the honing of these skills. This is an important finding. If self-regulatory learning skills are not actively taught, how will the majority of online students learn them? The research of McClain (2015) concluded that postsecondary students should be taught about and taught how to use the self-regulatory skills of self-monitoring when they are working in online environments. The finding from the present study on students having knowledge of SRLS but not knowing how to implement the skills extends McClain's findings down to the middle and high school levels as well. Yang and Kortecamp (2021) concluded their research on online learning at the postsecondary level with five educational implications, including the following: (1) online students should be taught SRL skills in such a way that they can transfer them to their daily learning routines, (2) online teachers should teach SRLS over the years as it has strong potential of enabling students to use SRLS for all of their learning and (3) online teachers should all have knowledge of SRLS so that they know how to guide their students in a learning context where they are not physically present with their students. The findings from this present study certainly imply that this is needed at the 7th – 12th grade levels as well. This is another necessary area for future research.

Referring back to the theoretical framework of this study, Zimmerman and Moylan (2009) posited that students' development of self-regulatory skills is cyclical in

nature. Implications of this based on this framework as well as the results of this study

suggest that SRLS should be taught each year, having students continually put these skills

into practice to try them, evaluate the results and then hone them before trying them

again. Reinforcement in each class each year would be an important practice for $7^{th} – 12^{th}$

grade online teachers. SRLS curriculums for the middle school and high school would be

an important development area needed next.

The ninth-grade year surfaced significantly in two areas in this present study.

When analyzing the grades of the Class of 2022 to determine if the pandemic year (2020

– 2021) had a significant effect on the grade point averages, the findings indicated the 9th

grade year for this class was significantly different from all the other years ($9^{th} – 12^{th}$

grade). The ninth grade in the site school is a large entry year, so many students are new

to the rigors and demands of a college, preparatory school. Additionally, many are living

away from home for the first time and do not have the daily academic support of parents.

These are possible reasons the 9th grade GPAs of the Class of 2022 were significantly

different from their $10^{th} – 12^{th}$ grade GPAs. It will be important to examine the GPAs

beyond the setting of this school from the pandemic year (2020 – 2021) to determine

more comprehensively the impact of the pandemic on GPA.

The second area where the ninth grade surfaced was in their perceived OSLQ

scores. The 9th graders rated their use of SRLS the highest of all the grades ($7^{th} – 12^{th}$).

This could be because they were eager to please their teachers and parents and felt they

were using the skills well, or this could also be due to naivety or a misunderstanding of

what was being asked in the survey. This finding, however, indicates that the 9th grade

year may be an important and critical year in which to teach and reinforce self-regulatory

skills as they already perceive themselves as being stronger at their employment than any other grade. From these two findings in this study, ninth grade may be a key year for future research to focus on in this $7^{th} – 12^{th}$ grade age group to determine the ways in which SRLS can be taught and reinforced in online classes as well as how that then affects students' GPA.

Goal setting was found to be a predictor of GPA at both the middle school (7th & 8th) and high school ($9^{th} – 12^{th}$) levels. Goal setting is a self-regulatory skill that is known and used already by this age group. Labuhn et al. (2010) listed goal setting as a SRLS that can be taught to students at the high school level. This would suggest goal setting would be a good SRLS to begin with in the teaching of SRLS each year in online classes. Zimmerman and Moylan (2009), in their Cyclical Phases Model, illustrated that students evaluate the effect of a skill they try and then base future decisions on that evaluation. As students see success in the use of goal setting, according to Zimmerman and Moylan's theory, they will be more likely to be willing to try other SRLS.

Relationship to Prior Research

Studies, such as that done by Pelican et al. (2021), have concluded that self-regulatory learning skills (SRLS) are needed for online learning at the postsecondary level since the online environment is less structured. The analysis of the short answers in this present study aligns with this conclusion. The $7^{th} – 12^{th}$ grade students attributed their success or failure in online classes to their level of SRLS use in 176 out of the 747 total answers.

Zimmerman and Martinez-Pons (1990) and Cavanaugh (2004) found that younger students need more support in learning how to regulate their learning. This aligns with

the findings from the short answer analyses of this study. At least some of the 7th – 12th grade students knew what they should do, as seen in comments such as "Online classes did not work well when I was unable to fight against distractions in my class, when I was not able to fight against procrastination for doing my homework." They did not always do what they knew they should do in the area of SRLS employment, as seen in Table 14 in the comments referencing the lack of SRLS use. Additionally, several of the student responses asked for added accountability in online classes, such as "Putting the video on kept people accountable." Many of the 7th – 12th grade students were able to articulate that they needed help staying on track and regulating their learning.

In the survey responses, the students talked at length about what they did to minimize distractions or how they succumbed to distractions, particularly in setting up their study environment, looking at their phone, surfing the web and playing video games while class was in session. Yang and Kortecamp (2021) set out to examine how self-regulatory learning skills could best and most effectively be taught at the postsecondary level in order to increase academic achievement. They determined that in a setting where a student can be easily distracted by devices, the internet, food nearby or a tv program in the background, self-regulation is especially critical. Oh and Reeves (2013) and Yukselturk and Bulut (2007) determined that self-regulated learning in the online learning context is supported in the literature including areas of SRLS that are unique to online learning. These include planning for technical problems, help-seeking from teachers, time management, creating a strong study environment and frequent checks of online gradebooks. The student responses on the survey analyzed in this study referenced all of the above topics other than checking the online gradebooks.

Vlachopoulos and Makri (2019) did a review of current literature to highlight ways to increase and improve communication and interactions in online learning settings. Two of their key findings were that the communication between the teacher and learner(s) is vital and that the interaction between peers in the online environment is likewise important. The analyses of the student responses in this study aligned with the first finding as the teachers' role in relationship and success in online classes was the top category of student responses, as can be seen in Table 13. The student responses on the survey did not align with the interaction between peers. Only 46 responses out of 747 total referenced peer interactions as a positive part of online classes, and only 43 responses referenced the importance of being known well by others in the class.

Self-regulatory skills are vital in the success of students, particularly in online environments (Yang and Kortecamp, 2021). From the findings in this study and other studies (Martinez-Pons, 1990; Cavanaugh, 2004), students younger than college age need more support in understanding how to regulate their learning. Zumbrunn et al. (2011) found that SRLS can be taught to high school students and asserts that teachers should spend time in each lesson showing their students how specific SRLS can improve their learning. Yongjin Zhu et al. (2020) suggest that online teachers should specifically include the use of task strategies and help-seeking in their online course design. These studies align with the students' responses in the survey of this current research asking for help in learning and employing SRLS.

Limitations of the Study

The current study presented some limitations, especially concerning student participants as a representative sample. This study included a medium sample size, but it

should be noted they were all from the same school. Different results may have been obtained from a sample of students from several different independent, private, college preparatory schools. Although the sample was diverse and the size was medium, this study can be generalized only to other schools with similar demographics.

The survey which the school administered was a self-reporting survey, both in evaluating a student's own self-regulation level use and in evaluating why online classes did or did not work. The limitations of such surveys include the fact that the students may have misinterpreted what the questions were asking. Additionally, many of the students taking the survey had English as a second language, so there could have been misunderstandings due to language.

The survey was sent by the school to the students. It was vulnerable to the social desirability bias (Grimm, 2010) and thus could be a threat to the external validity. The students taking the survey could have put down answers they thought their teachers would want them to say rather than what was accurate even though the answers were anonymous and confidential. This could result in data that is inflated.

A threat to the internal validity of the study could be the passage of time from the last time some of the students were actually in online classes to the time they took the survey in April. For those who were mostly in person, they were relying on their memory to recall their experiences in online classes.

Recommendations for Future Practice

Teachers and administrators can take away important findings from this research to help prepare and more effectively teach 7th – 12th graders in online learning. As was pictured in Figure 1, the development of online classes for this age group must be

comprised of several factors – some in common with postsecondary online classes – and some unique. As 7th – 12th grade teachers design their online courses moving forward, they should purposefully include focus on social, cognitive and teacher presence, as outlined in The Community of Inquiry Framework.

Zimmerman and Moylan in their 2009 Cyclical Phases Model suggest that students' acquisition of self-regulatory skills is cyclical. This means that they think about doing something, try it, evaluate how it went and then try it again based on their evaluation. Another suggestion for future research and application would be to build a 7th – 12th grade SRLS curriculum designed specifically for online students that will allow for the cycles of trial and evaluation. Online 7th – 12th grade teachers should make use of this SRLS curriculum that cyclically teaches self-regulatory learning skills. Based on the findings from this study, a recommendation would be to begin SRLS training each year with goal setting. They should integrate that into each of their classes along with ways the students can practice and evaluate their uses of SRLS. Following the cyclical nature of SRLS employment as proposed by Zimmerman and Moyan (2009), positive results will encourage continued trials and applications of future SRLS as they are taught.

The focus of variety as a requested component for online classes at the 7th – 12th grade levels based on the findings from the survey responses is another practical addition to online classes that teachers can implement. Using different apps and games, changing up who is speaking (teacher-centric vs. discussion based, for example), and using videos in place of lectures at times are suggestions for ways variety can be added to how online classes can run.

Teachers need tech training if they are specifically going to be teaching in the online platform. Frustration with tech issues, particularly when the teacher did not know what to do, surfaced in the student responses. Online teachers need to know how to use all of the technology required for the platform being used as well as be up to date on new apps and games that can be used during class time.

Recommendations for Future Research

There is currently a dearth of research on what is needed for online learning at the 7th – 12th grade levels to be equivalent to face-to-face schools. Based on the findings of this study, research needs to be conducted on how to teach self-regulatory skills more effectively to 7th – 12th graders online. It is vital that we develop a curriculum for middle and high school teachers to weave into their lessons daily that will purposefully teach and develop these skills needed for success in online learning. Trials should be conducted by grade to determine how to teach the skills and how to reinforce them.

Research is also needed to determine the technological skills needed for online teachers to be proficient in the online platform, and current apps and other such resources need to be continually updated for teachers to be able to include variety in online classes for the 7th – 12th grade age group.

Further research must be conducted to determine if 7th – 12th graders need and value their social presence in online classes. The results from this present study did not indicate that, but studies conducted at the postsecondary level indicate otherwise. This current study also showed the 9th grade year to be a significant year regarding grades and perceived employment of SRLS. The freshman year of high school should be studied more widely to determine if indeed this is a pivotal year for online students and then

determine how to use that information to implement the teaching of SRLS in online classes in grades 7 – 12.

Conclusion

Three of the unique findings of this age group in relation to online learning are areas that fall under the domain of teachers: use of technology, varying what happens in class and teaching SRLS. Garrison et al. (2000)'s Community of Inquiry could be expanded for the $7^{th} – 12^{th}$ grade level to include the naming of these three areas under the component of "Teacher Presence." Garrison et al. (2000)'s original model was built for postsecondary asynchronous courses. This would expand that model to include synchronous classes from the $7^{th} – 12^{th}$ grades.

A Self-Regulatory Learning Skills curriculum needs to be created specifically with online learning skills as the focus, and $7^{th} – 12^{th}$ grade teachers of online courses need training in the curriculum to include it in their courses. Specific attention and further research need to be conducted on the 9th grade year, examining their perceived and actual SRLS use. Goal setting was an SRLS that was predictive of GPA in this study. Goal setting would therefore be a logical place to start in both the SRLS curriculum and the study of 9th graders.

Educators are at a very exciting and monumental time in history with the burgeoning new frontier of online education for our middle and high school students. While a significant amount about the strengths and pitfalls of online learning at the postsecondary level has been examined, it is imperative that the specific learning needs of online 7th – 12th grade students are studied and understood. Teachers of these online classes need to be trained in the necessary components of online classes for this age

group and need to be equipped with the necessary technological skills. Research must be done more broadly in order to provide what is needed for the 7th – 12th grade online learning environment to be effective, meaningful and powerful for the next generation. This study and its implications are one step towards the goal.

APPENDIX A: IRB Approval Memo

IRB #: IRB-FY2022-205
Title: The Importance of Self-Regulatory Learning Skills and Collaboration in 7th - 12th Grade Online Classes
Creation Date: 12-21-2021
End Date:
Status: Approved
Principal Investigator: Tonja Detwiler
Review Board: St John's University Institutional Review Board
Sponsor:

Study History

Submission Type	Initial	Review Type	Exempt	Decision	Exempt

Key Study Contacts

Member	Joan Birringer-Haig	Role	Co-Principal Investigator	Contact	birringj@stjohns.edu
Member	Tonja Detwiler	Role	Principal Investigator	Contact	tonja.detwiler16@stjohns.edu
Member	Tonja Detwiler	Role	Primary Contact	Contact	tonja.detwiler16@stjohns.edu

APPENDIX B: Signed Letter of Consent for Archived Data to be used in Research Study

Informed Consent - Academic Dean (Use of Archived Data)

To: Dr. Sean Riley
1 Chapman Parkway, Stony Brook NY 11790

From: Tonja Detwiler
12 Chub Hill Road, Stony Brook NY 11790

Subject: St. John's University Doctoral Study in Instructional Leadership

My name is Tonja Detwiler, and I am a doctoral candidate in the Department of Administrative and Instructional Leadership at the Graduate School of Education, St. John's University, Queens, NY. I am conducting a study for my dissertation titled: A NON-EXPERIMENTAL STUDY ON THE IMPORTANCE OF SELF-REGULATORY LEARNING SKILLS AND COLLABORATION IN 7TH - 12TH GRADE ONLINE CLASSES. My mentor is Dr. Joan Birringer-Haig, Department of Administrative and Instructional Leadership, St. John's University.

I am writing to request the use of archived data collected by the Stony Brook School between the 2019 – 2021 school years. The purpose of my non-experimental study will be to test the theory that self-regulated learning skills (SRLS) and strong collaboration with teachers and peers relate to higher academic achievement for students in grades 7-12 at the Stony Brook School. The archived data that I wish to use for my study would consist of the students' scores and open-response question answers from the SBS' Online Classes Survey and from the students' final grade point averages (GPA) from May 2019 – 2021 and first trimester GPA scores from fall 2021.

Little research has been done to date on what is needed for 7th - 12th grade students to be successful in the online platform. Through the theoretical frameworks of Zimmerman's Cyclical Model of Self-Regulated Learning and the Community of Inquiry theoretical framework, this non-experimental study will seek to examine the correlation of grade level, gender and employment of SRLS' levels (high, medium and low) to students' scores on the Online Self-Regulated Learning Questionnaire and their end of year GPAs in order to understand what is needed for effective and successful learning in online classes at the 7th - 12th grade level. The data collected from the archives will be kept secure on an external portable hard drive, which is password protected. It will also be kept in a locked cabinet for security. The data will remain confidential and no one other than me will access to it. The names of the students will be coded by only using their school ID numbers so that I can match their survey scores to their GPA scores. There will be no risk of harm as no mention will be made of our school's name or location or the names of the students in my doctoral dissertation. The school's and the students' privacy will be maintained.

If you have any questions or concerns about my study, or if you wish to report a research-related problem, you may contact me, Tonja Detwiler at (631) 977-9767 or at (tonja.detwiler16@my.stjohns.edu), or my mentor, Dr. Joan Birringer-Haig at (718) 990-3125 or at birringj@stjohns.edu. You may also contact the Institutional Review Board at St. John's University, Dr. Raymond DiGiuseppe, at (718)990-1955, or digiuser@stjohns.edu.
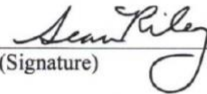
On behalf of the Stony Brook School at 1 Chapman Parkway, Stony Brook, NY 11790, I give Tonja Detwiler permission to access the archived data from the responses on the SBS' Online Classes Survey and the students' GPA scores from 2019 – 2021.

Sean A. Riley, Ph.D   January 27, 2022

(Printed Name)   (Date)

(Signature)

Tonja Detwiler   January 27, 2022

(Printed Name)   (Date)

(Signature of Doctoral Candidate)

Thank you in advance for your cooperation in allowing me to access the archived data for this study.

Sincerely,

Tonja Detwiler
Doctoral Candidate, Administrative and Instructional Leadership
St. John's University

Online Self-Regulated Learning Questionnaire (OSLQ) (Barnard et al., 2009)

The site school based Section 2 of their Survey on this Questionnaire.

Goal Setting
Item GS1: I set standards for my assignments in online courses.
Item GS2: I set short-term (daily or weekly) goals as well as long-term goals (monthly or for the semester).
Item GS3: I keep a high standard for my learning in my online courses.
Item GS4: I set goals to help me manage study time for my online courses.
Item GS5: I don't compromise the quality of my work because it is online.

Environment Structuring
Item ES1: I choose the location where I study to avoid too much distraction.
Item ES2: I find a comfortable place to study.
Item ES3: I know where I can study most efficiently for online courses.
Item ES4: I choose a time with few distractions for studying for my online courses.

Task Strategies
Item TS1: I try to take more thorough notes for my online courses because notes are even more important for learning online than in a regular classroom.
Item TS2: I read aloud instructional materials posted online to fight against distractions.
Item TS3: I prepare my questions before joining in discussion forum.
Item TS4: I work extra problems in my online courses in addition to the assigned ones to master the course content.

Time Management
Item TM1: I allocate extra studying time for my online courses because I know it is time-demanding.
Item TM2: I try to schedule the same time every day or every week to study for my online courses, and I observe the schedule.
Item TM3: Although we don't have to attend daily classes, I still try to distribute my studying time evenly across days.

Help-Seeking
Item HS1: I find someone who is knowledgeable in course content so that I can consult with him or her when I need help.
Item HS2: I share my problems with my classmates online, so we know what we are struggling with and how to solve our problems.
Item HS3: If needed, I try to meet my classmates face-to-face.
Item HS4: I am persistent in getting help from the instructor through e-mail.

Self-Evaluation

Item SE1: I summarize my learning in online courses to examine my understanding of what I have learned.

Item SE2: I ask myself a lot of questions about the course material when studying for an online course.

Item SE3: I communicate with my classmates to find out how I am doing in my online classes.
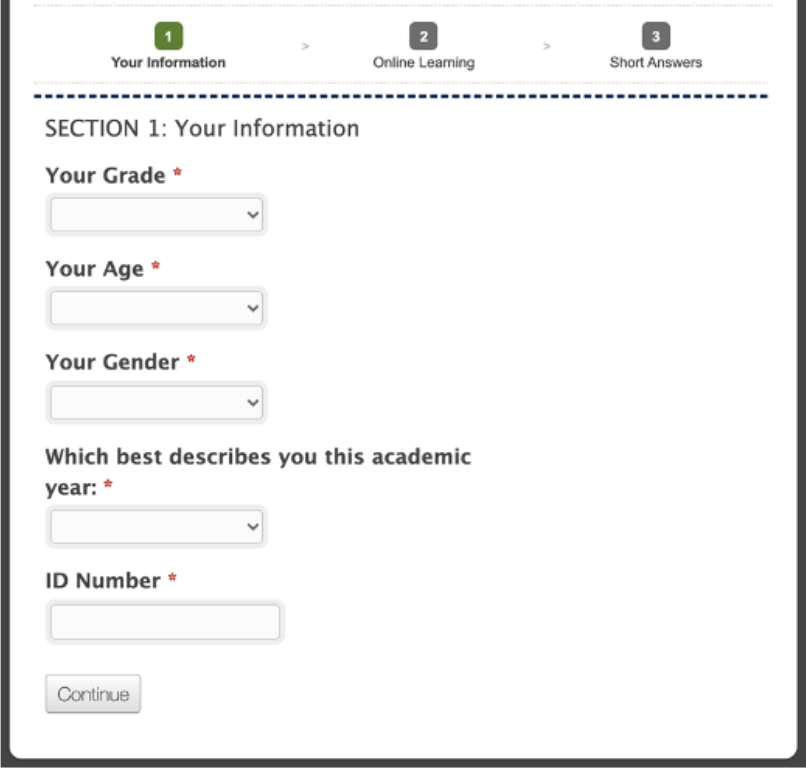
Item SE4: I communicate with my classmates to find out what I am learning that is different from what they are learning.

Reference:

Barnard, L., Lan, W. Y., To, Y. M., Paton, V. O., & Lai, S.-L. (2009). Measuring self-regulation in online and blended learning environments. The Internet and Higher Education, 12(1), 1–6. http://dx.doi.org/10.1016/j.iheduc.2008.10.005

APPENDIX D: Site School Survey

Online Classes Survey emailed to students at site school in April 2021

SECTION 2: You as an ONLINE LEARNER.

*

	Never true of me	Not usually true of me	Sometimes yes, sometimes no	Most of the time true of me	Always true of me
I set standards for the way I approach my assignments in my online classes; I never do assignments quickly or in a messy way just to get them done.	○	○	○	○	○
I set short-term goals (daily or weekly) and long-term goals (monthly or for the Trimester).	○	○	○	○	○
I keep a high standard for my learning during my online class sessions on Zoom.	○	○	○	○	○
I set goals to help me manage studying time for my online classes.	○	○	○	○	○
I do not hand in lower quality work when I am studying online; the quality of my work is the same whether I am in person or online.	○	○	○	○	○
I choose the location where I study so that there are as few distractions as possible.	○	○	○	○	○
I find a comfortable place to study.	○	○	○	○	○
I know where I can study most efficiently for my online classes.	○	○	○	○	○

I keep a high standard for my learning during my online class sessions on Zoom.	○	○	○	○	○
I set goals to help me manage studying time for my online classes.	○	○	○	○	○
I do not hand in lower quality work when I am studying online; the quality of my work is the same whether I am in person or online.	○	○	○	○	○
I choose the location where I study so that there are as few distractions as possible.	○	○	○	○	○
I find a comfortable place to study.	○	○	○	○	○
I know where I can study most efficiently for my online classes.	○	○	○	○	○
I choose a time to study where there are as few distractions as possible in my online classes.	○	○	○	○	○
I try to take more thorough notes for my online classes because notes are even more important for learning online than in a regular classroom.	○	○	○	○	○
I read out loud the instructional materials that are posted online to help me fight against distractions.	○	○	○	○	○
I prepare my questions before joining in a chat or group discussion online.	○	○	○	○	○
I do extra problems in my online classes in addition to the assigned ones to master the class content.	○	○	○	○	○

I allocate extra studying time for my online classes because I know they are time-demanding.	○	○	○	○	○
I try to schedule the same time every day or every week to study for my online classes, and I keep to that schedule.	○	○	○	○	○
Although we do not have to attend every class every day, I still try to distribute my studying time evenly across days for each class.	○	○	○	○	○
I find someone who is knowledgeable in each of my online classes so that I can consult with him/her when I need help.	○	○	○	○	○
I share my problems with my classmates online so we know what we are each stuggling with and can work together to solve our problems.	○	○	○	○	○
If I need help, I try to meet my online classmates on Zoom or Facetime (seeing each other while we talk) when I get help from them.	○	○	○	○	○
I am persistent in getting help from my teachers through email/Portal messages.	○	○	○	○	○
I take time to summarize my learning in my online classes in order to examine my understanding of what I have learned.	○	○	○	○	○
I ask myself a lot of questions about my class material when I am studying in my online classes.	○	○	○	○	○
I communicate with my classmates to evaluate how I am doing in understanding things in my online classes.	○	○	○	○	○

I communicate with
my classmates to
find out what I am
learning that is
different from what
they are learning.

○   ○   ○   ○   ○

Continue   Previous

SECTION 3: Short Answer

1.) When online classes worked well, what factors helped make
that happen? *

2.) When online classes did not work so well, what factors helped
make that happen? *

3.) What teacher(s) made it the easiest to learn online – and what
did he/she/they do to make it that way? *

4.) What did you do in order to stay focused and pay attention
during your online classes? *

5.) What did you do in order to stay on top of your HW and
studying for your online classes? *

6.) What could SBS do to improve online classes? *

Submit   Previous

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