THE EFFECTS OF SELF-REGULATED LEARNING STRATEGIES IN ONLINE HIGH SCHOOL SCIENCE

by

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ABSTRACT

Students at Great Lakes Learning Academy (GLLA) participate in asynchronous, fully remote, online classes, from the comfort of their own homes and learning environments. Students are gifted and challenged with autonomy in their coursework. As a high school student, it takes a great deal of self-regulation to succeed in any environment, let alone an asynchronous, fully remote, online program from your own home. In this research study, science students at Great Lakes Learning Academy were taught valuable self-regulated learning strategies (SRLS) through videos, tutorials, and teacher reinforcement. Data from the pre- and post-administration of the Personal Schoolwork Inventory measuring students use of SRLS and attitudes towards online school and learning, were compiled. Data from the online learning management system and teacher observations, communication logs, and records were used as additional data collection instruments. Data were processed using both qualitative and quantitative analysis strategies. The results suggested that students benefited from the implementation and reinforcement of SRLS. Students learned and understood more about the grading scale and systems used at GLLA, increased their use of SRLS, completed more classes, and improved their attitudes towards online school and learning.

INTRODUCTION AND BACKGROUND

Context of the Study

Great Lakes Learning Academy (GLLA) is a grade 6-12 online public charter school based out of East Lansing, Michigan, serving a diverse array of fully remote students across the state. There are two pathways to graduation in the high school. In the traditional high school pathway, students take 24 credits (20 required, 4 elective) and are often working towards higher education. In the alternative high school pathway, students take 22 credits (20 required, 2 elective) and are often working towards a trade or profession. Of the 1,299 total students, 61.4% are considered economically disadvantage and 15.4% are students with disabilities. Of the student population, 67.29% of students identify as white, 16.35% as African American, 7.4% as Hispanic/Latino, 7.32% as two or more races, and 1.62% as Asian, American Indian, or Alaska Native (MI School Data, 2021).

The job of a science teacher at GLLA is two-fold and has been described as 80% advisory teaching and 20% science content teaching. The role of an advisory teacher is to communicate with students regularly, track and monitor students' progress in all their courses to ensure they are on track to complete their courses by the end of the year, and to be an advocate for the student and a liaison between the school and family. When an advisory student is struggling in a content class, the student and advisory teacher reach out to the content teacher for further supports. The science teacher gives assistance individually to students when they encounter struggles in the asynchronous, self-guided science curriculum. While licensed as a science content teacher, the job is much more focused on the advisory teaching model and assisting the 30-35 advisory students assigned to each teacher. In addition, the curriculum is

published at the beginning of the school year and may not be modified until the following school year. Therefore, a research investigation was designed for the purpose of aiding students in all their classes, not just their science content classes.

Students in the alternative high school pathway at GLLA take 6-8 credits per year depending on their individualized graduation plan. The classes are designed to take about six weeks to complete; however, the students have from August 30, 2021 – July 29, 2022, to complete all their courses. This intentional design allows for vast amounts of flexibility that students need throughout the year. Students are not required to attend live lessons, although they are made available to them. The curriculum is delivered completely online and consists of asynchronous readings, videos, interactives, and quizzes arranged into roughly five to six units per class.

A great deal of self-motivation and determination is required to succeed in this type of a program. Whether students are face-to-face or online, regardless of what classes they are enrolled in, they can benefit from learning strategies to help them become self-regulated and independent learners (Dabbagh et al., 2004). Students in GLLA's high school may benefit from embedding self-regulated learning strategies (SRLS) into their learning and communications with teachers.

Focus Question

The focus question of this study was, What are the effects of self-regulated learning strategies (SRLS) on fully remote high school science students?

My sub questions include the following:

1. Does the implementation and reinforcement of SRLS affect students' classwork completion?
2. Does the implementation and reinforcement of SRLS affect students' attitudes towards online school and learning?

CONCEPTUAL FRAMEWORK

History of Online Learning

Since distance education's beginnings in the 1980's it has expanded and changed dramatically. Distance education is distinguished by its ability to grant students access to text-based and computer enhanced materials from any geographic location, at any time of the day (Harasim, 2000). With the invention of the internet, learning has since shifted online creating a new platform for education, online learning, adding a communication piece to distance education (Moore et al., 2011). As online learning or education developed, it has since become the most common and popular form of distance education (Sadeghi, 2019).

In 2020 the COVID-19 virus hit, most schools closed, forcing instruction to quickly adopt an online learning platform while students and teachers worked remotely from their homes. There is a careful distinction to make between the emergency remote teaching response due to the pandemic, and true online education. The key distinction is that online education is a carefully thought out, planned, and researched endeavor. When the pandemic struck, there was not sufficient time for planning and research. Teachers did not have the time to invest in learning this new platform and the new learning and teaching strategies that come with it. Although conducted online, the emergency remote teaching response due to the pandemic should not be considered true online education (Hodges et al., 2020).

Characteristics of Online Learning Environments

Different characteristics of online learning environments outlined in early 2000's, have since been expounded upon (Anderson & Dron, 2011). Such characteristics as communication, access to material, and computer mediation, have played a vital role in distance education since

its beginnings (Harasim, 2000). The online learning environment makes group communication possible, allowing students to actively engage in their learning with teachers and peers (Carter et al., 2020). These environments have always had independence of access, in that students can access the materials at any time and from any place (Sadeghi, 2019). This allows students to access and engage with the content at a time and place when they are most prepared to learn and fits their individual needs best (Gilbert, 2015). Computer mediation allows for enhanced messaging through the internet, enabling customization, differentiation, collaboration, and enhanced access (Harasim, 2000).

Benefits and Challenges of Online Learning

There are three main varieties of online learning: fully remote, hybrid/blended, and traditional courses enhanced with web-based supports. In a fully remote online environment, there is no face-to-face interaction as all instruction and communication is conducted through the Internet. A traditional classroom that is enhanced with web-based supports is an environment in which the students and teachers meet regularly face-to-face and use web-based tools in the classroom to support learning. A hybrid or blended learning environment consists of both face-to-face and virtual meetings (Gilbert, 2015).

Each type of online learning comes with a host of benefits and challenges, appeals to a diverse array of students, and can reach students in different socioeconomic districts (Gilbert, 2015). Online learning also offers a large amount of flexibility and student choice while saving time by eliminating travel and other barriers in the way of accessing content (Sadeghi, 2019). In addition, many students who have disabilities, are single parents, have been expelled, or have dropped out of high school and are trying to earn their diploma, might gravitate to the online

learning environment (Gilbert, 2015). Students seeking to further their education, explore new opportunities that were not previously accessible, or take advanced placement or dual enrollment classes may also be attracted to the online learning environment (Beese, 2014).

Online education also presents many challenges to students, teachers, and administrators including questions about academic rigor, learning outcomes, social interaction, and student motivation (Gilbert, 2015). Another challenge with online learning is that students may feel more isolated from others (Gillett-Swan, 2017). Since learning online involves extensive technology use, this can be a challenge for many students to adapt to and overcome (Sadeghi, 2019). Learning online also requires a degree of self-regulation in the student so that they can internally motivate, monitor performance, and reflect (Yang, 2006).

Self-Regulated Learning Strategies for Fully Remote Online Learning

A self-regulated learner is one who uses individually determined learning strategies to reach their academic goals, by responding to feedback about their learning skills and effectiveness (Zimmerman, 1990). SRLS consist of any strategy used to seek information to achieve goals based on one's educational interests (Zimmerman & Pons, 1986). Many of these SRLS have been developed to actively engage students in their own learning process. These strategies involve how students set and monitor goals; how they seek, record, organize, and review information; and how they self-evaluate, structure their environment, and seek help (Zimmerman, 1990).

In online learning environments, students must use self-regulation strategies to accomplish their goals since there is not a classroom teacher physically present to guide them through their learning process and monitor behaviors, attention, and progress (Dabbagh &

Kitsantas, 2004). A self-regulated learner uses strategies in planning and preparing to help them perform and self-reflect during the process (Carter et al., 2020).

Embedding SRLS into a classroom is beneficial to both in-person students and online students (Yang, 2006). Many students enroll in online learning environments to have more choice in their learning and to accommodate individual learning needs (Carter et al., 2020). Individual student-centered learning is part of the pedagogical foundation of online learning and is provided to students through web-based tools (Dabbagh & Kitsantas, 2004). Student's use of SRLS has been linked to academic success in online learning environments (Yang, 2006).

METHODOLOGY

Demographics

The online high school students at Great Lakes Learning Academy (GLLA) chose the online environment for an array of reasons. Many students who are working, apprenticing in a trade, are young parents, or have other extenuating life circumstances, appreciate the flexibility offered at GLLA. Other students with social anxiety disorders, learning disabilities, or other barriers to in-person school, may also have chosen GLLA because the program is delivered completely online. There are other students looking to accelerate their high school career, take advanced placement classes, or explore other possibilities that were not previously available, that may also navigate towards the unique online learning environment of GLLA.

At GLLA, the core classes, English, science, social studies, and math, all use standards-based grading to assess students' proficiency in the subject matter. The summative assessment at the end of the unit holds all the weight for the student's grade in the class. The summative assessment is designed to address the standards in the unit and students are allowed to reattempt the assessment showing their mastery of the standards in each unit until satisfied with their performance. Elective classes use a traditional grading scale; unlike standards-based grading, each lesson, workbook, checkpoint, project, and exam, is given a certain number of points and the points calculate their final grade in the class.

Students at GLLA are faced with a great amount of autonomy in their coursework. While this is viewed as an immense benefit to GLLA's program, it also requires a great deal of student supports to ensure academic success. Students have their own circumstances that made them choose the online learning environment, have the challenge of learning online, and have a great

deal of individual needs. Many teachers ask students how they can help or what they can do to support them. However, many students do not know the answer to these questions and need to learn to be independent learners and advocate for their needs. Thus, this research investigation was developed to measure the effects of SRLS on fully remote high school students' engagement in schoolwork, course completion, and attitudes towards school.

The research methodology for this project was approved by administration and received an exemption by Montana State University's Institutional Review Board and compliance for work with human subjects was maintained (Appendix A).

Treatment

The treatment consisted of two videos created by the researcher on SRLS for students to view, and reinforcement of those strategies through teacher interaction and communications (Appendix B). The two videos were designed to teach valuable skills in self-regulation identified based largely on research by Dabbagh et al. (2004). The topics of these videos were goal setting and planning, self-evaluation and monitoring, task specific strategies, and help seeking. In the videos it was emphasized how these strategies would benefit students' learning in an online setting, both in their science classes and other classes. The importance of goal setting and planning was emphasized in the videos, along with supporting strategies of time management, pacing, and tracking techniques, to encourage students to set specific, process-oriented goals and identify steps to achieve them. Students learned how to observe and compare their progress to specific goals or standards, make evaluative judgements of their progress, and effectively react to this information and plan accordingly for future success. Students learned specific learning strategies that helped them achieve their goals, such as organizing and transforming information,

structuring their work environments, and practicing content related skills. Students were also shown valuable resources for connecting with social and nonsocial supports from inside and outside the school.

Upon further need, at request, or by teacher suggestion, individual student tutorials and materials were given to further support and reinforce the strategies learned in the videos (Appendix C). A personal school calendar was one of these materials that were given to further support and reinforce the strategies from the videos. On this google slides presentation, that is shared with the teacher, student, and caretakers, is an overview of the students plan for class completion with further monthly, weekly, and daily details as needed by the student. This calendar reinforced many of the skills presented to students in the videos. By creating a calendar with the teacher, the students are creating timely goals and setting the steps along the way to achieve them. Students could schedule makeup time into these calendars, or other time to review their past performance, reinforcing self-evaluation and progress monitoring as well as time management and planning skills. Some students created a calendar or a monitoring system on their own, other students, used help-seeking strategies for assistance with these skills.

Data Collection and Analysis Strategies

To incorporate SRLS and measure their effect on classwork completion and attitudes towards online school and learning; treatment and non-treatment plans were devised. The non-treatment in this investigation consisted of data collected over a period of 50 days prior to the treatment, on advisory student's classwork completion and communications. These students were then given the treatment which consisted of teaching and reinforcing effective use of SRLS through videos and interactions over a period of 50 days. At the beginning and end of the

treatment, the students were administered the Personal Schoolwork Inventory which was designed to measure their use of SRLS and attitudes towards school and learning. This three-part survey included 14 Likert-scale questions and three open-ended questions on students' use of SRLS and 10 Likert-scale questions on students' attitudes towards online school and learning in general (Appendix D).

The first part of the Personal Schoolwork Inventory consisted of Likert-scale questions on student's use of 14 different SRLS. Students were asked to indicate how frequently they used each strategy. Students' responses were given a score, the higher the score, the more frequently the student used the strategy (1= never, 2= rarely, 3= sometimes, 4= often, 5= always). A score of 100% would indicate that students always agreed with the statement. These 14 strategies were further grouped into the four categories of goal setting and planning, self-evaluation and monitoring, task specific strategies, and help seeking. Mean scores from the pre-administration and the post-administration on these 14 questions were compared for analysis.

The second part of the pre- and post-Personal Schoolwork Inventory included three open ended questions asking how students prepare for assessments, what they do if they do not understand a skill or standard, and what they do if they are not satisfied with their level of mastery. Responses were analyzed for the same 14 SRLS and broken into the same four categories as the previous section: goal setting and planning, self-evaluation and monitoring, task specific strategies and help seeking. The scores indicate what percent of students mentioned the use of at least one of the strategies in the four categories identified. The mean percentages from the pre- to post-administration were compared for analysis.

The third part of the pre- and post-Personal Schoolwork Inventory included 10 statements addressing students' attitudes towards online school and learning. Students were asked to

indicate to which level they agree or disagree with each statement. Five of the questions were addressing students' attitudes towards learning in general, and the other five questions were addressing students' attitudes specifically towards online school. Each response option was given a code so that the larger number indicated the more that students agreed with the statement (1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree). A score of 100% would indicate that all the students strongly agreed with the statement. The mean scores from the pre- and post-administration were compared for analysis.

Data from the school's Learning Management System were collected and analyzed for classwork completion. During the non-treatment and treatment periods, the number of practice assessments and summative assessments each student completed was calculated as well as the number of classes completed. These values were compared for analysis.

Teacher communication notes and logs were kept and the number of communications during the non-treatment and treatment periods were calculated. The communications during the non-treatment and treatment periods, initiated by either teacher or student, were analyzed for themes in student-initiated questions brought up in communications regarding SRLS. The percent of students who asked these student-initiated questions during the non-treatment and treatment periods was calculated and compared for analysis.

Students participated in the research to varying degrees. Students were asked to complete the pre- and post-Personal Schoolwork Inventory and watch two videos teaching valuable self-regulated learning skills. At request or recommendation, students could have also received an additional individualized video tutorial and/or teachers aid in developing a student calendar. To be considered a participant in the research, a student must have completed the pre-administration of the Personal Schoolwork Inventory.

A triangulation matrix was created to show how each data collection instrument contributed to answering the focus question, What are the effects of SRLS on fully remote high school students? (Table 1).

Table 1. Data Triangulation Matrix.

Research Question	Data Collection Instruments		
Effects of SRLS on fully remote High School Students…	Source 1: 3-Part Personal Schoolwork Inventory	Source 2: Learning Management System Data Collection Tools	Source 3: Teacher Journal-Communication/Progress Logs
… use of SRLS	Parts 1 & 2	Assignment completion	Notes and trends
… classwork completion	Parts 1 & 2	Assignment completion	Notes and trends
… attitudes toward online school and learning	Part 3	N/A	Notes and Trends

DATA ANALYSIS

Results

The pre-administration of the Personal Schoolwork Inventory was completed by 23 students, this was the requirement to be considered a research participant, while 17 of those students completed the post-administration. The first of the two-part video on SRLS, was watched by 15 students, and 13 watched the second video. Individualized student tutorials were requested by 5 students and aid in creation of a personal schoolwork calendar was requested by 10 students (*N*=23)(Figure 1).

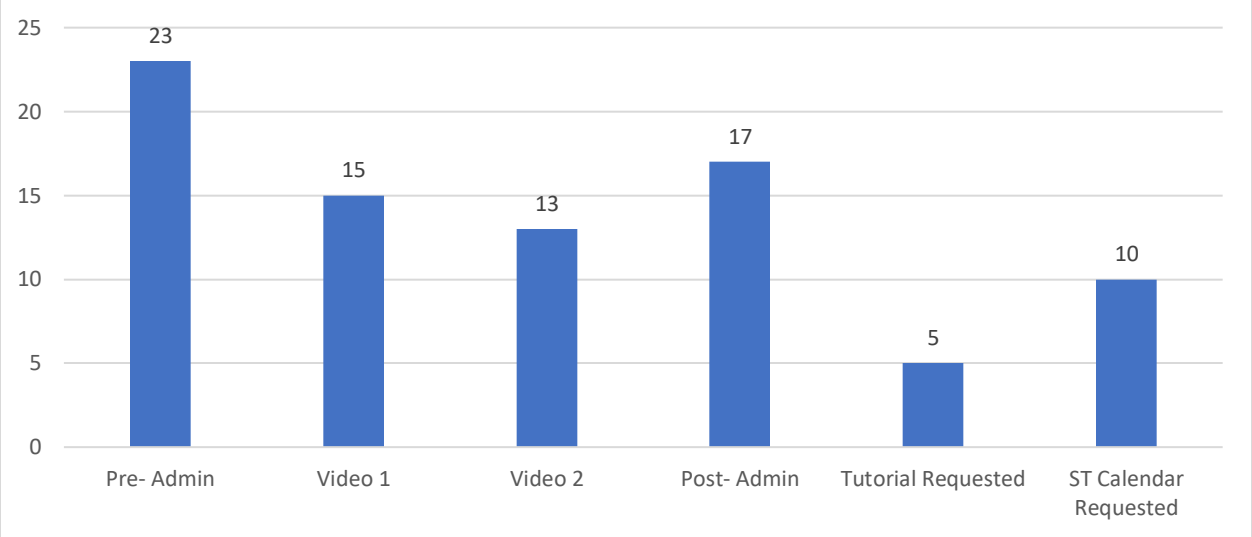

Figure 1. Number of students that completed each component of the research, (*N*=23).

Data collected from the learning management system indicated that students completed 1,593 practice assignments during the non-treatment period and 748 practice assignments during the treatment period. There were 151 summative assignments completed during the non-treatment period and 270 summative assignments completed during the treatment period. During

the non-treatment period, students completed 7 classes, while during the treatment period students completed 18 classes (*N*=23).

Data collected from teacher communication logs and notes indicated that there were 239 communications during the non-treatment period, and 207 communications during the treatment period. The student – teacher communications were further categorized into types of student-initiated questions asked during the communications. During the non-treatment period, 17% of students asked at least one question about pacing, while during the treatment 48% of students asked about pacing. Only 4% of students asked about grade levels, credits and how to advance during the non-treatment, while during the treatment 26% of students asked about grade levels and credits and 35% of students asked about how to advance. No students asked about the grading system during the non-treatment, while 9% of students asked questions directly about the grading system during the treatment period. Progress updates were asked for by 9% of students during the non-treatment period, opposed to the 43% of students who asked for progress updates during the treatment period (*N*=23) (Figure 2).

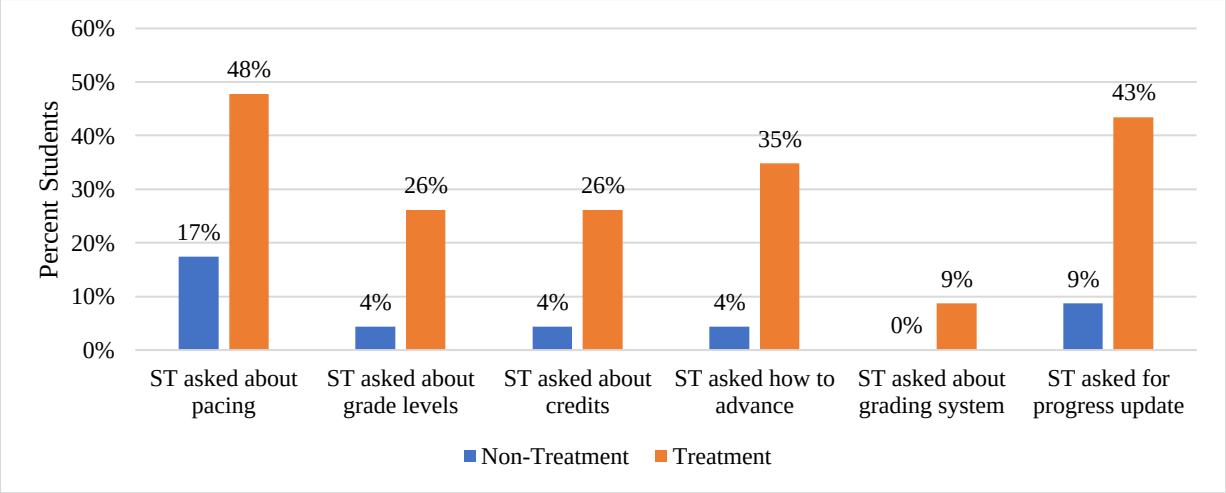

Figure 2. Communication Logs Data: Student initiated questions from teacher communication logs, (*N*=23).

The results of the first part of the pre- and post-administration of the Personal Schoolwork Inventory, which included 14 Likert questions, indicated that students' reported use of task specific strategies increased from the pre- to the post-administration, from a score of 68% to a score of 71%. The student reported use of help seeking strategies also increased from the pre- to the post-administration, from a score of 48% to a score of 53%. Students' reported use of goal setting and self-evaluation strategies both decreased from the pre- to the post-administration, with goal setting dropping from a score of 72% to a score of 69% and self-evaluation strategies dropping from a score of 68% to a score of 67%, (Pre *N*=23, Post *N*=17) (Figure 3).

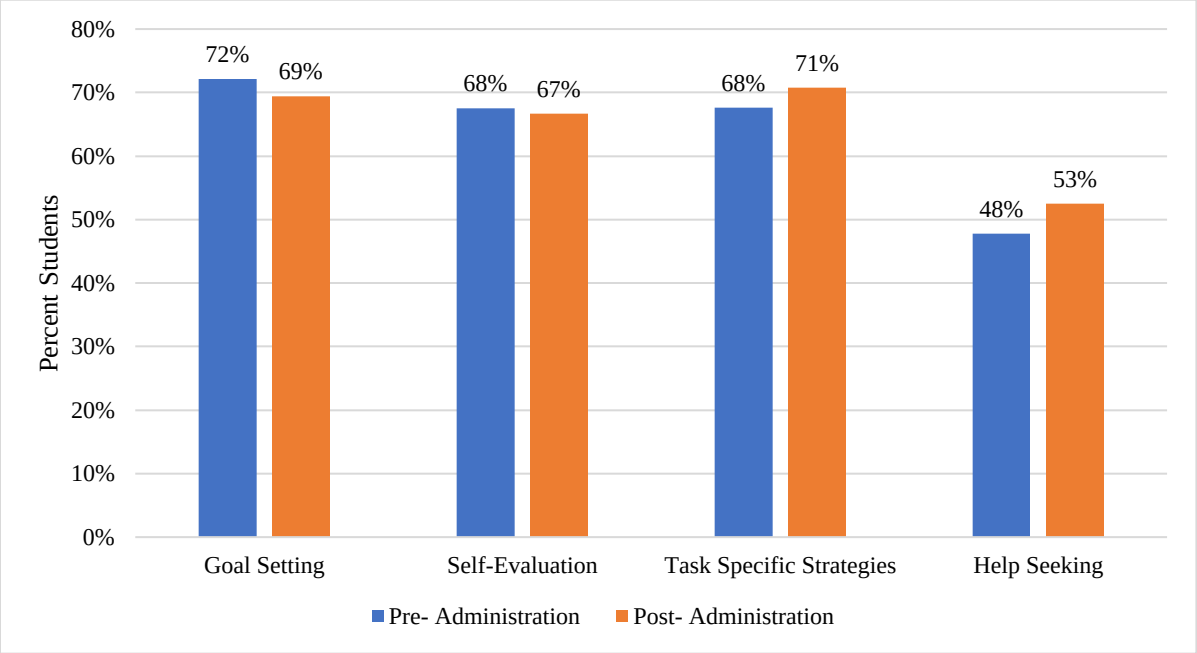

Figure 3. Personal Schoolwork Inventory Part 1: 14 Likert-scale questions on students' use of SRLS, (Pre *N*=23, Post *N*=17).

The second part of the Personal Schoolwork Inventory, which included three open-ended questions asking what strategies students used, indicated that the number of students who mentioned using one or more goal setting strategy increased from 30% on the pre- to 71% on the

post-administration (Pre *N*=23, Post *N*=17). When asked how a student prepares for summative assignments, one student wrote, “I look over my notes from previous checkpoints and make sure I have everything I need.” Another student responded, “I get all my notes ready from past assignments, then I go to my room where there [are] less distractions, then I start the assignment and take my time on it.” The use of self-evaluation and monitoring strategies increased from 17% of students to 53% of students mentioning the use of one or more strategy in this category. When asked how a student tries to understand the course material better if struggling, one student wrote, “I either go through parts of the lessons that explain it more closely or ask a teacher.” Another student responded, “I start a mini review from the beginning and see [what] I don’t understand or where I’m having trouble.” From the pre-administration, 91% of students mentioned using task specific strategies while on the post-administration 100% of students mentioned using one or more task specific strategies. When asked what a student would do if they did not pass a summative assessment, one student wrote, “[I would] research the standard I did bad on. Take practice tests and contact the teacher for guidance.” Another student wrote, “[I would] identify what the lacking grade is and see if I can improve it myself by practicing parts of the lesson or contact a teacher for resources and help.” The use of help-seeking strategies also increased from 35% of students to 41% of students mentioning the use of one or more help-seeking strategy (Figure 4).

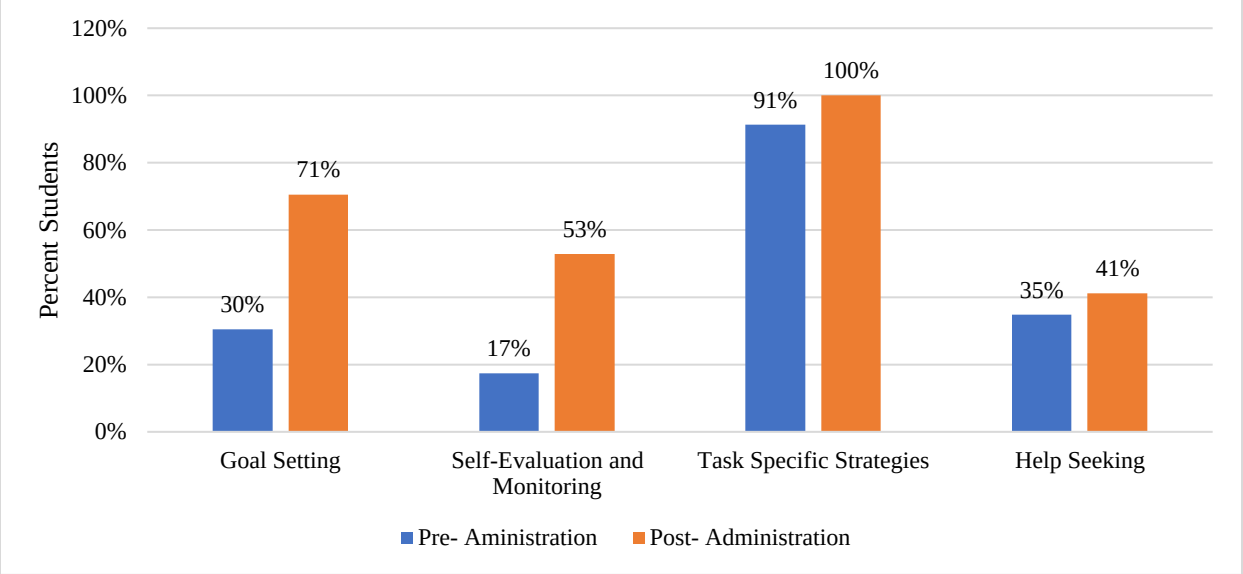

Figure 4. Personal Schoolwork Inventory Part 2: Open-ended response questions on students' use of SRLS, (Pre *N*=23, Post *N*=17).

Students were asked to what extent they agree or disagree with statements addressing their attitudes towards online school (Figure 5). The statement, "I like the flexibility of online school" received a score of 86% on the pre- and 85% on the post-administration. The statement "I prefer learning online," received a score of 76% on the pre- and 85% on the post-administration. The statement "I miss the social aspect of in-person school" received a score of 53% on the pre- and 58% on the post-administration. The statement "I enjoy online school" received a score of 83% on the pre- and 86% on the post-administration. Lastly, the statement "I find school interesting" received a score of 66% on the pre- and 71% on the post-administration.

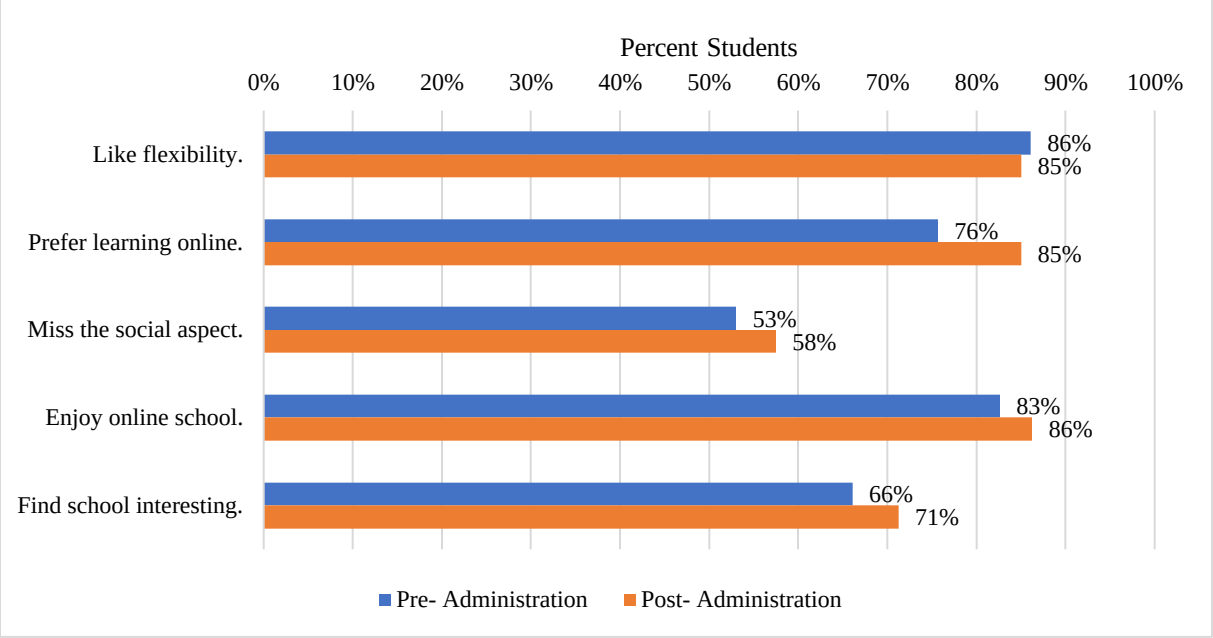

Figure 5. Personal Schoolwork Inventory Part 3: Students' scores on their attitudes towards online school, (Pre *N*=23, Post *N*=17).

Students were also asked to what extent they agree or disagree with statements addressing their attitudes towards learning in general. Every question showed improvement from the pre- to the post-administration of the Personal Schoolwork Inventory. The statement "I am responsible for my own learning" received a score of 86% on the pre-administration as opposed to 88% on the post-administration. The statement "I like learning new things" received a score of 81% on the pre- and 84% on the post-administration. The statement "I think earning a diploma is valuable" received a score of 84% on the pre- and 95% on the post-administration. The statement "School is preparing me well for my future" received a score of 77% on the pre- and 80% on the post-administration. The statement that read, "getting an education will make me a better person" received a score of 77% on the pre- and 83% on the post-administration (Pre *N*=23, Post *N*=17) (Figure 6).

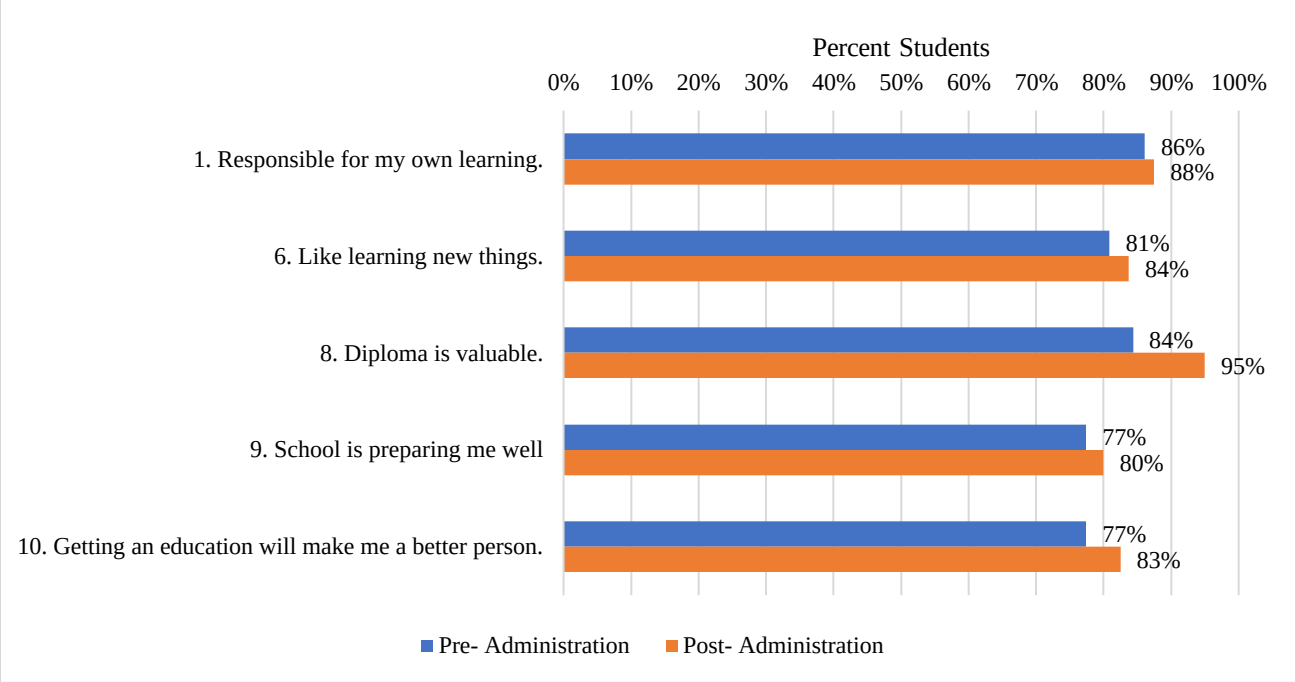

Figure 6. Personal Schoolwork Inventory Part 3: Students' scores on their attitudes towards learning in general, (Pre *N*=23, Post *N*=17).

CLAIM, EVIDENCE, AND REASONING

Claims From the Study

The purpose of this research study was to determine the effect of SRLS on online high school science students' classwork completion and attitudes towards online school and learning. From the non-treatment to the treatment periods the students increased their use of SRLS, understood more and asked more about the grading system and credits, and improved their attitudes towards online school and learning.

From the non-treatment to the treatment, students understood more and asked more questions about the grading system and credits. The data indicated that 24% more students on average, asked about pacing, grade levels, credits, how to advance, the grading system, and asked for progress updates. In standards-based grading, the practice assignments do not affect the overall grade in the class but are there for students to learn from in order to demonstrate their mastery on the standards-based assignments. This is a transition from a traditional based grading class where the students must complete every assignment presented to them and each assignment has a certain weight on their overall grade. Data collected from the learning management system indicated that students completed more practice assignments during the non-treatment period than they did during the treatment period. However, they completed more summative assignments during the treatment period than during the non-treatment period. This is most likely due to the students learning about the grading system and choosing to shift their efforts from completing every practice assignment, to completing the practices needed to understand and complete the summative assignments. While completing less practice assignments, and more summative assignments during the treatment, the students also completed more classes as seen

from the data from the learning management system. This decrease in practice assignments, and increase in summative assignments and classes completed, is evident of students having a better understanding of the grading system and how to advance in their classes. This increase in classes completed is evident of students understanding more about how the credit system works and use of the self-regulated strategies of goal setting and self-evaluation and monitoring to complete their classes. In addition, the data from the teachers notes and logs showed that students asked for more progress updates during the treatment period which is evidence of them using the self-regulation strategy of help seeking.

Prior to the treatment, one student was asked how many classes they had remaining and how those classes were graded. The student did not know the answer to these questions, after viewing the videos and beginning the treatment period, the student was able to explain how many classes they had remaining and asked further clarifying questions demonstrating an understanding of the difference in the grading systems. The students have been told the answers to these questions, and the grading system has been explained to them, many times since the first day of school. When asked these questions initially, it was clear that the previous attempts to explain and teach these concepts had not been effective. After viewing the videos, this student said, “[the videos] were helpful because they didn’t just tell me the answers but told me how to figure it out.”

Students’ attitudes towards online school and learning improved slightly from the pre- to the post-administration of the Personal Schoolwork Inventory. Most of the scores only improved by a few percentage points, however, there was a larger increase in students agreeing with the statement, “I think that getting a high school education and diploma is valuable.” There was also an increase in the number of students who agreed with the statement, “I think getting an

education will make me a better person." When students were asked to agree or disagree with the statement, "I prefer learning online," more students agreed at the post- than the pre-administration of the Personal Schoolwork Inventory. This shows that after the treatment students had a more positive and increased understanding of how earning a diploma and getting an education is valuable and will make them a better person. They also slightly improved their attitudes towards online school.

To help overcome the challenges of asynchronous, online learning, students need to be taught valuable SRLS. Self-regulating is a valuable skill for any adult in any line of work. Being able to set goals and plan accordingly, self-evaluate and monitor performance, accomplish tasks with strategies that work for you, and seek help, make for a successful individual. As an adult, when it is time to learn something new, the first place most people turn to, is the Internet. In addition to learning how to self-regulate, it is important for our students to gain an appreciation and respect for how to use the Internet properly and effectively. While in-person schools often focus on students learning in the building during school hours, I believe that a student can learn wherever they are, at any time of day, if they have an open mind and a willingness to learn.

The role of the advisory teacher is critical to a successful online school environment. Every student needs a teacher advocate, advisor, guide, to help them through their education and address their individual needs. Someone to check in on them and help them with bigger tasks then just types of cells or times tables. These students need someone to check on their well-being, be an advocate for the student, and a liaison between the school and home. It is common practice to address the physical and emotional needs of a student before addressing their educational needs. An advisory teacher takes that holistic view of the entire student and

organizes resources and supports to address the specific needs of that student. This is a vital practice in an online school and is a full-time job in and of itself.

Value of the Study and Consideration for Future Research

The online, asynchronous, high school science classroom is one that both gifts and challenges students with autonomy. The students can complete their assignments on their own time frame, in their own homes, and at a time and place where they are ready to learn. They can practice as much as necessary before attempting to demonstrate a level of mastery. While this flexibility is a gift to students, it can also be a great challenge for many students to overcome to make the most of their online high school experience. Giving students a toolbox of SRLS is imperative to helping a student achieve academic success in this type of learning environment.

In this study several teaching strategies were implemented and reinforced through asynchronous lessons and communications to teach students valuable self-regulated learning skills. Each student was first taught different SRLS through videos. These strategies were reinforced further on an individual student basis, as every student has different skills, abilities, and needs.

The students would benefit from beginning the year with a student/teacher created school calendar that is shared amongst the teachers, student, and caretakers. Several students had remarked towards the end of the treatment, that they wished they had "started this sooner." For further research, the treatment from this investigation could become the non-treatment for a further development of lessons teaching students about implementing SRLS. The new lessons could be developed and worked on over the course of a semester and administered at the beginning of the next semester. This would create a semester-long non-treatment period and a

semester-long treatment period in which students are continually working on improving their self-regulated learning skills and development.

For future research, learning more about how and when students revise their work, or reattempt an assessment, would be interesting data to analyze. The learning management system collected several different pieces of data on the students, however, bringing the students into the data collection process could also be a method for teaching self-regulation strategies. Instead of analyzing the learning management system to calculate how many practice assignments, summative assignments, and classes a student completed, having students track this information themselves would be an additional method of teaching goal setting and planning, self-evaluation and monitoring, task specific strategies, and help seeking. This student produced data could be cross-referenced with the data from the learning management system. Not only would this make the data collection process easier, but it would also reinforce the strategies learned during the treatment making the research more valuable for the students.

Impact of Research on Author

As a science and advisory teacher at Great Lakes Learning Academy, it is my job to continually support my students in any way that I can throughout the entire year. Whether it is during the non-treatment or treatment periods, or before or after, it is my job to help them progress in their classes, understand how they are being assessed, and how they can make progress. While I am more than willing to help my students in any way I can, I also want them to learn these skills on their own. Instead of me telling them what their grade is, how they did on an assignment, what they need to do next, or what they need to go back and fix, I want my students to be able to self-regulate and answer these questions on their own, with teacher guidance and

support. Whatever their next steps in life may be, my students will need to have these self-regulatory skills to succeed.

Throughout the course of the year, non-treatment, treatment, and after, I have been working on and revising a system for helping my students stay organized on a monthly, weekly, and/or daily basis. I have learned that every student would like this in a different way, and I explained and gave examples of many different tracking systems in the videos and in communications with students. Despite every time I thought I "figured it out" there was always another way, a new way, or a better way to do it. This research made me appreciate the need to assess my teaching practices and analyze how effective they are at producing the desired results.

A common belief in education is that students must hear a message more than once to understand. In a brick-and-mortar school setting, the face-to-face setting makes it easier to see which students heard and understood a message the first few times, however, this is harder in digital communications and in an online environment. Since students are working on their own schedules, digital communications are often seen in passing and need to be responded to later. In digital communications students need to receive the same message many times in order to increase understanding. A single text message about the grading scale, may not get the message across. In education, another common practice is to give a message or a direction in different ways to help students understand it better. In the online setting, this means that we must use multiple platforms and communication methods with our students. When a student receives the same message in an email, text, call, conversation, and internet message, they are more likely to understand. Therefore, in an online school, multiple communications across varying platforms at varying times throughout the year is more likely to get a message across to a student and lead to understanding.

I have personally learned and grown through the process of teaching these skills tremendously. These self-regulation strategies and skills are not only valuable to my students, but they are valuable to me as an online teacher, an online student, and in my personal life. I have also learned more about digital communications and working with students at a distance, which translates to more effective messaging in my personal life as well. The ability to set goals and monitor steps along the way, to evaluate my own work and performance, to learn and accomplish my goals through task specific strategies that work for me and my learning style, and my ability to seek help and assistance when needed, are all tied into my professional and personal life and the lives of my students as well.

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APPENDICES

APPENDIX A

IRB APPROVAL

MONTANA STATE UNIVERSITY
Request for Designation of Research as Exempt
MSSE Research Projects Only
(6/16/14)

****

THIS AREA IS FOR INSTITUTIONAL REVIEW BOARD USE ONLY. DO NOT WRITE IN THIS AREA.
Confirmation Date: 12/13/21 Mark T. Quinn
Application Number:

****

DATE of SUBMISSION: 12/2/21

-okay as exempt
-MSSE Classroom assessment
-Little/no risk
-Principal approved
-No concerns
MQ 12/13/21

I. INVESTIGATOR:

Name: **Luke M Southard**
Home or School Mailing Address:
Telephone Number:
E-Mail Address: **Lmsouthard@gmail.com**
DATE TRAINING COMPLETED: **2/28/2021** *[Required training: CITI training; see website for link]*

Investigator Signature 

Name of Project Advisor: **Carl (John) Graves**
E-Mail Address of Project Advisor: **graves@montana.edu**

II. TITLE OF RESEARCH PROJECT:

The Effects of Self-Regulated Learning Strategies on Fully Remote High School Students Engagement in Schoolwork, Course Completion, and Attitudes Towards School

III. BRIEF DESCRIPTION OF RESEARCH METHODS (If using a survey/questionnaire, provide a copy).

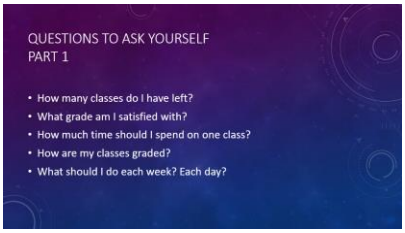
The goal of this investigation is to determine how self-regulated learning strategies affect fully remote high school students' engagement in schoolwork, course completion, and attitudes towards school. The nontreatment in this investigation will consist of an 8-week data collection period in which advisory students will be monitored for their engagement in schoolwork and course progression as measured from data pulled from the student learning management system. This same group of students will then be administered the Personal Schoolwork Inventory (Appendix A). This three-part survey consists of 14 Likert-scaled questions, an extended response section on the students use of self-regulated learning strategies, as well as 10 additional Likert-scale questions on students' attitudes toward online school. After the administration of the survey, the treatment will be administered. In the treatment, the same group of students will engage in five videos teaching different self-regulated learning strategies. After another period of 8 weeks in which students participate in the videos and the concepts are reinforced in student-teacher interactions, data will be collected again on students' engagement in coursework, course completion, and students will be administered the Personal Schoolwork Inventory again.

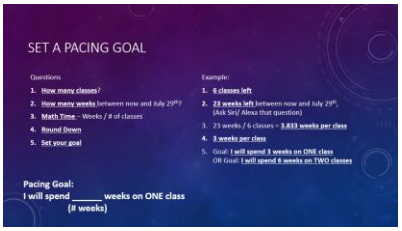
APPENDIX B

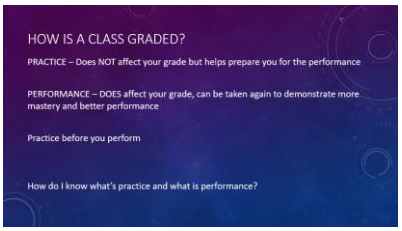
TREATMENT PRESENTATION AND VIDEO LINKS

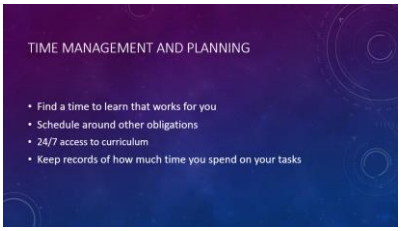
TREATMENT PRESENTATION AND VIDEO PART 1

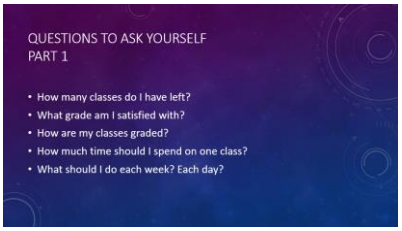
These slides were taught to the students in the following screencast video, part 1. (Link to video).





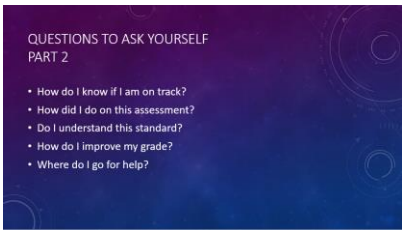


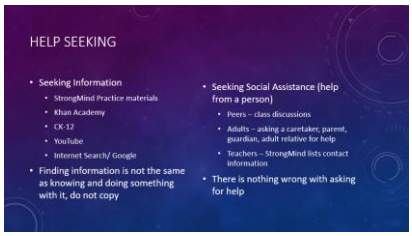


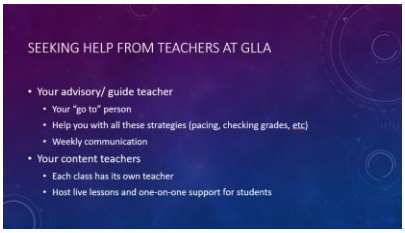


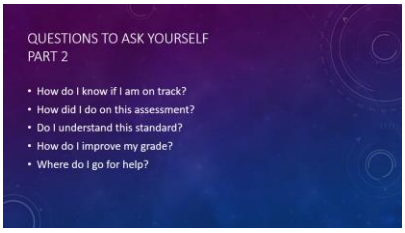
TREATMENT PRESENTATION AND VIDEO PART 2

These slides were taught to the students in the following screencast video, part 2. (Link to video).





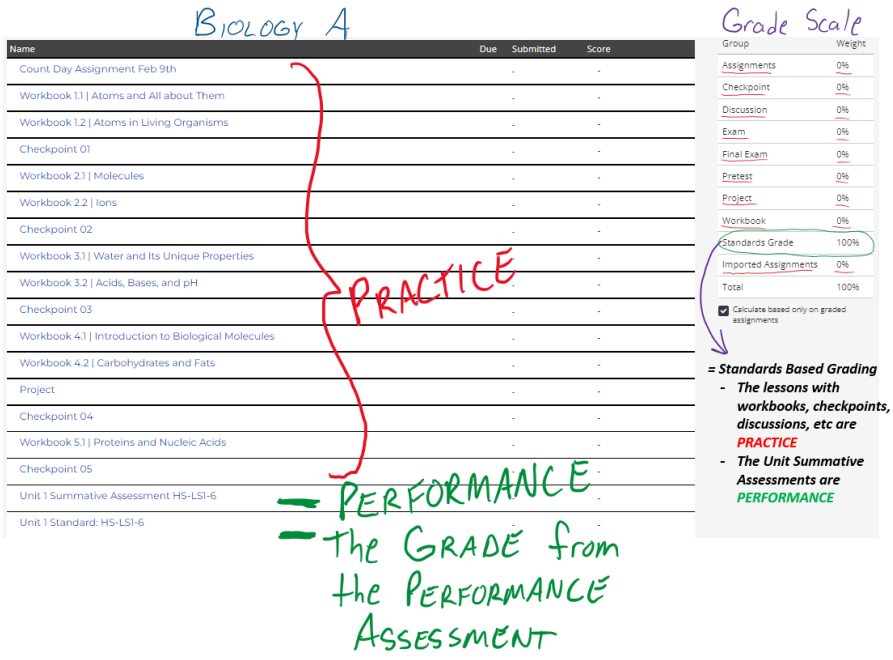


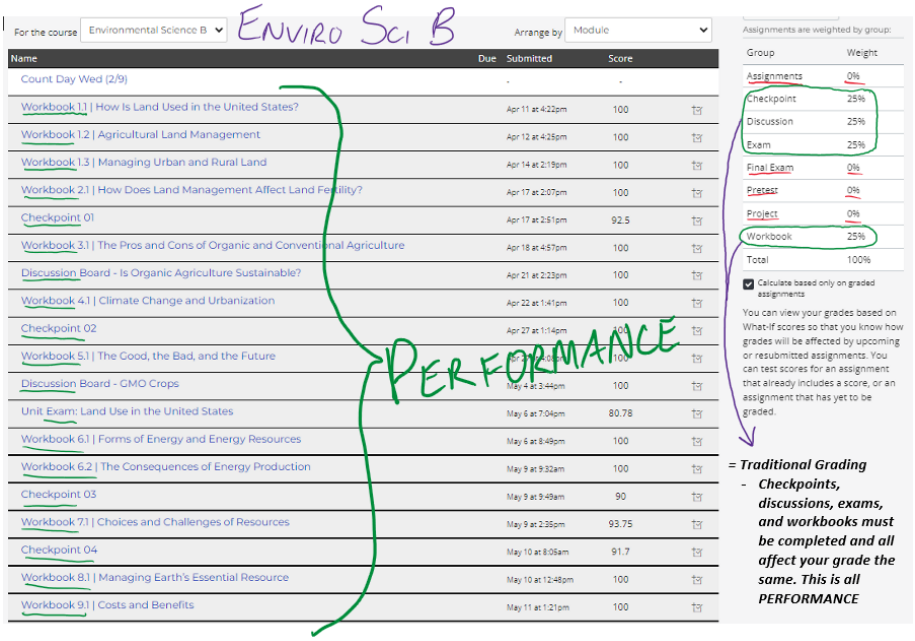


APPENDIX C

EXAMPLES OF FURTHER SUPPORTS AND A STUDENT SCHOOL CALENDAR

The following are examples from pictures or tutorials sent to students upon further need, at request, or by teacher suggestion. These two examples show a standards-based grading class versus a traditionally graded class.





The following is an example of a student school calendar shared between support teachers, the student, and their caretakers.

Example Student School Calendar

Supported Class	Independent Class	Due Date
- Spring NWEA	Economics	5/20
English 11 A	Career Planning	6/3
English 11 B	US Government	6/17
Spanish 1 A	World History A	7/1
Spanish 1 B	World History B	7/15
Art History: Origins & Modern	Art History: Origins & Modern	7/29
Makeup Work	**ALL CLASSES**	**7/29/22**

MAY 2022

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	**2** **12 PM**- Eng 11A - U2 SA **Econ** **- Wkbks 24.1-24.3**	**3** **12 PM**- Eng 11A - U2 SA **Econ** **- Wkbks 23.4-23.5**	**4** **12 PM**- Eng 11A - U2 SA **Econ** **- Checkpt**	**5** **12 PM- NWEA Math** **Econ** **- Wkbks 24.1-24.3**	**6** **12 PM** **NWEA Math** **Econ** **- Wkbks 24.4-24.5**	7
8	**9** **12 PM** **NWEA Math** **Econ** **- Wkbks 25.3-25.4**	**10** **12 PM** **NWEA Math** **Econ** **- Checkpt**	**11** **12 PM** **NWEA Reading** **Econ** **- Checkpt**	**12** **12 PM** **NWEA Reading** **Econ** **- Wkbks 25.1-25.2**	**13** **12 PM** **NWEA Reading** **Econ** **- Wkbks 25.3-25.4**	14
15	**16** **12 PM** **NWEA Reading** **Econ** **- U5 SA**	**17** **12 PM** **NWEA Reading** **Econ** **- U5 SA**	**18** **12 PM** **NWEA Reading** **Econ** **- U5 SA**	**19** **12 PM** **NWEA Reading** **Econ** **- U5 SA**	**20** **12 PM**- Eng 11A - Choose topic Career Plan - Intro Career Plan	21
22	**23** **12 PM**- Eng 11A - Research Career Plan - Who am I?	**24** **12 PM**- Eng 11A - Research Career Plan - Who am I?	**25** **12 PM**- Eng 11A - Claims Career Plan - Career Research	**26** **12 PM**- Eng 11A - Claims Career Plan - Income/ opportunity	**27** **12 PM**- Eng 11A - Evidence Career Plan - Education/ training	28
29	**30** **12 PM**- Eng 11A - Reasoning Career Plan - School search	**31** **12 PM**- Eng 11A - Counterclaim Career Plan - Work ready	1 **12 PM**- Eng 11A - Rebuttal Career Plan - Final	2 **12 PM**- Eng 11A - Review Career Plan - Final	3 Finish English 11 A - Review/ turnin Career Plan - Final	4

APPENDIX D

PERSONAL SCHOOLWORK INVENTORY

Personal Schoolwork Inventory Part 1 of 3

Directions: Please complete the Personal Schoolwork Inventory in Google Forms. Participation in this research is voluntary and participation or non-participation will not affect a student's grades or class standing in any way.

Part 1: Likert scale questions measuring students' use of self-regulated learning strategies.
Directions: Read through the self-regulated learning strategies and descriptions, then answer the questions with how frequently you have used each strategy.

Always Often Sometimes Rarely Never

1. Self-Evaluation:
   I check over my work to make sure I did it right
2. Organizing and Transforming Information:
   I organize my class materials; I make an outline before writing a paper
3. Goal setting and planning
   I set educational goals for myself and make steps to achieve them,
   I set pacing goals, and class completion goals
4. Seeking Information
   I find and review information on subjects I do not know or understand well
5. Keeping records and monitoring
   I rewrite course information in my own words, I monitor my progress in my classes
6. Environmental Structuring
   I complete my schoolwork in a space that suites my educational needs
7. Self-consequences
   I give myself rewards and consequences as I achieve steps towards my goals
   I let myself play a game, or take a break after making a certain amount of progress
8. Rehearsing and memorizing
   I prepare for my summative assessments by practicing or memorizing course materials
9. Seeking assistance from teachers
   I seek assistance from my teachers when I need help on schoolwork
10. Seeking assistance from adults
   I seek assistance from other adults in my life when I need help on schoolwork
11. Seeking assistance from peers
   I seek assistance from other peers or friends when I need help on schoolwork
12. Reviewing past tests
   I look back over my past summative assessments to review my performance
13. Reviewing StrongMind (online interactive textbook) Information
   I look back over StrongMind information to review for my summative assessments
14. Reviewing self-recorded notes
   I look back over notes I take myself to review for my summative assessments

Personal Schoolwork Inventory Part's 2 & 3 of 3

Part 2: Extended response questions measuring use of self-regulated learning strategies.
Directions: Please answer the following questions with as much detail as possible. Please answer in at least one complete sentence.

1. How do you prepare for your summative assessments?
2. What if you are having difficulty understanding the material, is there any method you use to try and understand the course material better?
3. If you took a summative assessment but did not demonstrate mastery on a part of it, in other words, you did not pass at least one of the standards in the assessment, what would your next steps be?

Part 3: Likert scale questions measuring attitudes toward online school.

Directions: Please indicate how you agree or disagree with each statement.

Strongly Agree Agree Neutral Disagree Strongly Disagree

1. I am responsible for my own learning.

2. I like the flexibility of online school

3. I prefer learning online to learning in-person

4. I miss the social aspect of attending in-person school

5. I enjoy online school

6. I like learning new things

7. I find school interesting

8. I think that getting a high school education and diploma is valuable

9. I think that school is preparing me well for my future career and life

10. I think that getting an education will make me a better person