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Evaluating Effective Teaching Strategies and Student Attributes that Lead to Better Learner Outcomes in the Online Classroom

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EVALUATING EFFECTIVE TEACHING STRATEGIES AND STUDENT ATTRIBUTES THAT LEAD TO BETTER LEARNER OUTCOMES IN THE ONLINE CLASSROOM

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Abstract

Online teaching and learning continue to grow in the post-pandemic educational world. The purpose of this thesis was to identify effective teaching strategies and student attributes that promote positive learner outcomes in the online environment. Based on the literature review of 30 research studies, evidence supports the following effective teaching strategies: (1) get students to engage with content, (2) give feedback, (3) get students working together, and (4) build students' self-efficacy. Teacher implementation of these methods increases student engagement and improves learner outcomes. Research also supports the following student attributes that contribute to positive, online, academic achievement: (1) motivation, (2) self-direction, (3) self-efficacy, and (4) supports. Prudent educators will consider these factors when enrolling online students to ensure success. Students will be best served by teachers who continue to define and apply best practices, incorporating effective teaching strategies for the online setting. The majority of the studies reviewed were focused on K-12 students; however, due to the lack of pertinent research available, some studies included students at the post-secondary level. Further studies in this area are needed to fill gaps in the current research and to keep pace with this ever-changing mode of learning so that online learning continues to be an avenue for a quality education.

Keywords: online, learning outcomes, engagement, teaching strategies, student attributes

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CHAPTER I: INTRODUCTION

Importance of Online Learning

With the onset of the COVID-19 pandemic, educational systems were forced to change rapidly. The virtual classroom, which had been rarely used in the K-12 public education setting, became common-place by necessity during the 2020-21 academic year. K-12 teachers had to quickly transition from in-class instruction to online instruction. This switch to an online setting required teachers to learn new technology, developing innovative ways to connect with students and deliver their instruction. For students and their families, it meant adjusting to a new routine where students' daily schedules were more flexible, internet function and computer access were critical, and a quiet space was required for optimum learning. With this shift, teachers, administrators, students, and their families were all forced to learn quickly how to adapt to this new and constantly changing educational environment.

Education is a cornerstone to the success of our future. Our founding fathers' belief that education is key to improved standard of living, health, and economic stability continue to this day. In this ever-increasing competitive global market, being at the forefront of technology and education is critical as an international leader. It is becoming increasingly obvious that the virtual classroom will continue to be an integral part of public education in our post-pandemic world even after school returns to "normal". Some families will prefer to continue with online learning. For example, online learning offers a great degree of flexibility regarding both time and space. Families can travel and still keep their children in a robust learning environment. High school students can work and not have to arrange their schedule around a structured school day. Students with social or behavioral issues may also benefit in the online learning

environment by having fewer distractions from peers and more flexibility than a traditional classroom setting offers. In addition, certain online learning tools will also be used in the traditional classroom setting as teachers see the benefits of technology. School districts across the country will be re-evaluating their online learning options to meet the needs of the next generation. Our educational system post-pandemic will be different, and the online learning environment will continue to play a key role. Therefore, it is imperative that as educators we learn how best to use this forum, and that we continue to seek to understand the unique aspects of online student engagement to optimize learning and achievement.

Roles of Teacher and Student

To optimize the impact of online learning, it is important to take into consideration both the role of the teacher and the role of the student in overall learning and achievement. To look at just one of these roles in isolation would not be as effective. Learning is a reciprocal process demanding both teacher and student to work together to achieve the best outcome. The International Society for Technology in Education recognizes these roles and has developed standards for both students and teachers; these standards provide a guide to both teachers and students for implementing online learning (Morgan, 2020):

The ISTE Standards for Teachers	The ISTE Standards for Students
1. Learner	1. Empowered Learner
2. Leader	2. Digital Citizen
3. Citizen	3. Knowledge constructor
4. Collaborator	4. Innovative designer
5. Designer	5. Computational thinker

6. Facilitator	6. Creative communicator
7. Analyst	7. Global collaborator

According to Hattie's (2003) research, 80% of the achievement variance is attributable to two main components - the student, and the teacher. Parents, family supports, school administration, class sizes, and peers all play a secondary role.

When it comes to learning outcomes, the role of the teacher is remarkably significant. Hattie's (2003) research attributes 30% of the achievement variance to the teacher. "It is what teachers know, do, and care about which is very powerful in this learning equation" (Hattie, 2003, p. 2). Regardless of in-class or online instruction, the role of the teacher is imperative to student success. Teaching strategies have a significant impact on students' learning. Robert Marzano and John Hattie have both reviewed the research on which teaching strategies work best. While they used different methods and terminology in their approaches, according to Killian (2015), they agree on these eight powerful strategies:

1. Have a clear focus
2. Offer overt instruction
3. Get students to engage with the content
4. Give feedback
5. Provide multiple exposures
6. Have students apply their knowledge
7. Get students working together
8. Build students' self-efficacy

In reviewing the literature for effective teaching strategies in the online environment, there will be an attempt to identify themes that connect back to these powerful strategies to further strengthen the validity of the findings.

Even more importantly, according to Hattie (2003), 50% of the achievement variance is attributable to the student. While some of these attributes are beyond the teacher's control, others can be taught or encouraged by the teacher. Here is where there lies a potential for teachers to impact students in the hopes of increasing learning outcomes. Attributes outside of the teacher's control are also worthy of being identified to assist in guiding students to the best learning environment. If students do not have the attributes needed for success in an online learning environment, traditional in-class instruction may be a better option. As we move into a more high-tech educational system, the ability to individualize the learning environment to meet the needs of students becomes either a great benefit or a great barrier to student success. Two key concepts worth mentioning which will be reviewed in further detail in the literature review section of this paper are student engagement and self-efficacy. Both student engagement and self-efficacy are common attributes for successful learner outcomes.

Definition of Terms

There are a few important terms used throughout this paper that merit clarification.

Student Engagement

While student engagement may not initially seem to be a determining factor in actual learner outcomes, it does contribute to lower drop-out rates and less social isolation. Both are important factors in the student's overall achievement. Student engagement is a complex

concept to define. According to Deng et al. (2020), student engagement consists of the following:

1. Behavioral engagement – participation and involvement in academic and class-based activities, such as, the number of video lectures accessed, the number of assignments attempted, video interactions, note taking, and participation in peer review tasks
2. Social engagement – students' social interactions with instructors and peers and their willingness to form and maintain relationships during learning
3. Emotional engagement – students' positive and negative reactions to teachers, classmates, classroom activities and schools
4. Cognitive engagement – students' self-regulation and willingness to exert necessary effort to comprehend complex ideas and master difficult skills (p. 691)

Self-Efficacy

Self-Efficacy is the primary motivational belief that drives students' help-seeking behavior as well as the application of task strategies and time management (Abdullah, 2020). Students with high self-efficacy tend to focus longer on a challenging task. They also have confidence in themselves and are more apt to ask questions to seek to understand. Self-efficacy is important in the online learning environment where teacher presence is often not as immediate as within a face to face classroom. Students with a high degree of self-efficacy are less likely to withdraw and give up. As a result, self-efficacy is a contributing factor to successful learning outcomes.

Online learning

In this literature review, the term online learning refers to instruction primarily given via the internet using virtual synchronous meeting rooms (attending at the same time) or asynchronous platforms (flexible time interactions). Other terms used in this paper that are synonymous with online learning include distance learning, e-learning, and virtual learning.

Learning Management System

The learning management system (LMS) is the platform used in the online setting to facilitate communication, content delivery, and assessments. While it is also often used in the traditional classroom setting, an LMS is an essential tool for online education. The LMS also facilitates the use of discussion forums, instructional videos, and other educational resources.

Purpose and Guiding Questions

During the pandemic, there was a heightened concern of students falling behind in their learning and overall achievement. Keeping students engaged in the learning process and continuing to achieve satisfactory learner outcomes has been a challenge during this transition from a traditional classroom setting to online instruction. Teachers have needed to learn new approaches to instruction using technology and online tools. Throughout this process, it has become clear that there are some teaching strategies that are more effective than others to engage students in the learning process. There are also students who are at greater risk of failing in this new environment. Since this abrupt, mandated switch to online learning at the K-12 level is new for many, there is not yet an abundance of research on this topic. The purpose of this literature review is to bring to light the research that has been conducted to date regarding both the most effective teaching strategies for online learning and student attributes

that lead to successful learner outcomes. During this process, gaps in the research will also be identified, gathering insights on the need for further research in this area.

Although at the time of this writing the COVID-19 pandemic is waning and many schools are transitioning back to a more traditional classroom setting, the importance of knowing how best to implement online learning remains. The data from this review of research will not only apply to pandemic times, but to post-pandemic education as well. For these reasons, this paper will seek to answer the following two questions:

- What are the most effective teaching strategies for online learning?
- What student attributes contribute to successful online learning?

Online learning will likely continue to be a critical component of the post-pandemic educational system. Therefore, it is imperative to evaluate and identify effective practices for optimizing learning in this online teaching environment.

CHAPTER II: LITERATURE REVIEW

Literature Search Procedures

This literature review summarizes the published literature regarding effective teaching strategies and student attributes that optimize online learner outcomes. Both qualitative and quantitative research studies are included in this literature review.

To locate the literature for this thesis, ERIC (EBSCOhost) and ProQuest Education Journals searches were conducted for publications from 2000 to 2021. The literature was narrowed by only reviewing published empirical studies and peer reviewed journals that addressed the guiding questions. The key words and phrases that were used in these searches included “online learning and learner outcomes,” “online learning and effective strategies,” “online learning and synchronous and asynchronous,” “online learning and engagement,” “online learning and student success,” “distance learning and teaching strategies,” “distance learning and self-efficacy,” and “distance learning and success.”

This chapter will review the literature relating to (a) effective teaching strategies in the online setting and (b) important student attributes in optimizing learner outcomes. Before examining the effective teaching strategies and student attributes, it is important to review the literature that supports the theory that engaging students does, in fact, improve learner outcomes.

Importance of Student Engagement in Online Learning

Student engagement is a common discussion point in evaluating the effectiveness of online education, and is referenced frequently in the studies reviewed in this thesis. Engagement is an underlying theme relevant to both teaching strategies and student attributes.

Hence, the literature review section of this thesis begins with discussing what the research says about student engagement.

A study performed by Pazzaglia et al (2016) targeting U.S. high school students highlights the importance of student engagement for online learning. Participants included 1,179 students enrolled in 109 online courses offered by Wisconsin Virtual School, with 170 students taking more than one online course. Fifteen percent of enrollees were in Advanced Placement (AP) courses, 36% were in core courses, and 49% were in elective courses. Ninety-seven percent of student enrollments were in grades 9–12. The goal of the study was to identify patterns of student engagement and determine if higher levels of engagement were related to better outcomes. Pazzaglia and colleagues found that there was a positive correlation between the amount of time students engaged with the online course content and their academic performance. The best performing students engaged for two or more hours per week. Even students who consistently engaged less than two hours per week outperformed those who may have started out with higher engagement time but consistently declined in engagement throughout the semester.

In a similar study, Ifenthaler et al. (2018) analyzed data from 13,655 students (40% male, 60% female) who took two online courses offered by Curtin University in Australia. Student data regarding launching a task, time on task, length of written responses, and completion of a task were compiled and compared to learning performance. The authors concluded that a higher frequency of launching and completing tasks correlated with a higher number of correct responses. “The analytic results showed that learning engagement in challenge-based online

learning environments is significantly related to learning performance," (Ifenthaler et al., 2018, p. 230).

In another study involving student engagement, Louwrens and Hartnett (2015) interviewed four teachers and ten students (grades 7-10) to understand both teacher and student perceptions about what increases the level of student engagement. This study attempted to identify the various aspects of student engagement including behavioral, cognitive, and emotional. Although details of this study are discussed in the section of this thesis addressing effective teaching strategies, Louwrens and Hartnett noted how student engagement in the online environment is more complicated than measuring behavior statistics regarding frequency of logins, quantity of forum posts, or time spent online (as was used in the two studies cited above). Cognitive and emotional engagement are also important, making it difficult to measure this multi-dimensional concept of student engagement.

A clear definition of student engagement is important because it is a key indicator for positive academic achievement. A unique study by Deng et al. (2020) defined engagement as a multi-dimensional concept taking into consideration the following patterns of engagement: behavioral, social, emotional, and cognitive. Based on survey responses from 1,452 students enrolled in a Massive Open Online Course (MOOC), Deng and colleagues categorized students into the following three groups:

1. Individually Engaged - learners who exhibited a high level of behavioral, cognitive, and emotional engagement and a low level of social engagement
2. Least Engaged - learners who demonstrated a medium level of cognitive and emotional engagement and a low level of behavioral and social engagement

3. Wholly Engaged - learners who displayed the highest level of behavioral, cognitive, emotional, and social engagement (p. 691)

The survey results were analyzed to identify patterns of each group in relation to learner factors (age, gender, education background, origin, and motivation), teaching context (area of study, level of the MOOC, duration of the MOOC, and form of the assessment), and learning outcomes (completion, academic performance, and rating of instruction). Interestingly, neither age nor educational background were strongly correlated to any particular group; however, the wholly engaged group tended to consist of more males and those who were extrinsically motivated. As over 50% of survey respondents were from Africa and Asia, the correlation may not be fully applicable to the U.S. high school student population. In addition, higher engagement was positively correlated with rigor and frequency of assessment, but not correlated to any specific area of study. Not surprisingly, engagement was a determining factor in the successful completion of the course.

Results of these studies challenge teachers to implement the following strategies to increase engagement and potential student success in online instruction:

- Identify students who are not extrinsically motivated to be able to provide greater support and scaffolding to engage them in the learning process.
- Administer meaningful and frequent assessments, including self-assessment strategies to increase engagement.
- Provide an appropriate level of rigor to challenge students and keep them engaged.

These research studies provide evidence that student engagement does positively impact academic achievement; however, it would be insufficient to review only studies

regarding the relationship between engagement and learning outcomes. To effectively increase online academic performance, it is essential to identify the teaching strategies that increase student engagement. Exploring best practices in teaching strategies is the next step in improving learner outcomes in the online environment.

Effective Teaching Strategies for Online Learning

Teachers play an important role in the student's academic achievement. Hughes et al. (2021) used data from an online high school biology course offered by Florida Virtual School and found that teachers do impact learner outcomes. The goal of the study was to analyze student performance data to determine if certain teachers consistently had higher performing students than others. Performance was measured by students' rates of completion, time to complete, and exams scores. The sample consisted of 10,618 online students taught by fifty-seven teachers over the course of four years. All students and teachers shared the same curriculum, instructional materials, and exams. Not surprisingly, the results showed there was a notable difference in student performance between those taught by a higher-ranked teacher versus students taught by a lower-ranked teacher. Hughes and colleagues explained, "students of a teacher ranked at the 75th percentile had consistently better outcomes than students of a teacher ranked at the 25th percentile (p. 5)." The study recognizes that further research is warranted to determine exactly what the higher-ranking teachers do to achieve this result. More research on the pedagogical practices of the higher-ranking teachers would be helpful and provide information to assist in teacher training to ensure the best learner outcomes. However, one thing is clear - good teachers produce better academic results.

Although the Hughes et al. (2021) study did not identify specific characteristics of the higher-ranked teacher, there is evidence to support effective teaching strategies as a key component. Hattie's (2003) study revealed that the teacher has a significant role in the overall learning process for students, and 30% of the variance in student achievement may be attributed to the teacher. Although online learning changes the means of interaction between student and teacher, the importance of teaching strategies remains an essential factor for learning. As discussed in the introduction, according to Killian (2015), Hattie and Marzano agree on eight powerful teaching strategies that are important for learning. The four strategies that will be discussed in relation to the literature review include: (1) get students to engage with content, (2) give feedback, (3) get students working together, and (4) build students' self-efficacy.

Get Students to Engage with Content

The online classroom provides students opportunities to engage with content in many ways that are similar to the traditional classroom. However, there are unique and different ways for teachers to promote student engagement in the online setting. The use of visualization tools, interactive online activities, and online forum posts are integral components of the online learning environment and when used appropriately can increase student engagement. As online learning grows in popularity, the relationship between student engagement using these online education vehicles and students' overall learning outcomes continues to be a topic of great interest and research. Does use of visualization tools, hands-on online activities, and interactive games and quizzes increase the probability of a student's

successful course completion and overall learning? The following review of research studies addresses this question.

The topic of using visual instructional materials is examined in the study by Ilhan et al. (2021). Ilhan and colleagues analyzed the relationship between engaging students via the use of digital comics and learner outcomes. Data was collected from ten sixth grade students taking a distance learning social studies course conducted during the 2019-2020 academic year in the face of the COVID-19 pandemic. The purpose of this study was to determine the effect of digital comics material on students' academic success. The comics were closely tied to the learning concepts for the course, providing colorful and easy to understand pictures to explain relatively complex ideas. Based on the data, the authors concluded that implementing digital comics into the online curriculum enhanced learning and positively impacted student satisfaction with the course. Using fun, stimulating and creative educational materials in the online classroom helps to engage students with the content and, as a result, improves learner outcomes.

Providing additional evidence of the importance of visual enhancements to support online learning is Blackburn's (2005) study. The study involving 385 first-year university students enrolled in a statistics course, investigated the technological capability of embedding pictorial stories into online course elements as a technique for illustrating abstract statistical concepts with icons. Results indicated that the pictorial stories had a positive influence on student understanding of the subject matter, attentiveness, enthusiasm, and participation. Therefore, the findings of the research suggest the use of digital comics or pictorial stories is an effective medium of engaging students in the content and improving learner outcomes.

In addition to visualization tools, online interactive curriculums play a role in the distance learning environment. Ogbonna et al. (2019) conducted a study to further explore the use of interactive online curriculum among two secondary schools in Nsukka, Enugu State, Nigeria. A sample consisted of 70 middle school students, ages 10–12, who were enrolled in two distinct word processing classes from the two schools. One class of 34 students was taught asynchronously and the other class of 36 students was taught synchronously. Upon completion of the course, the data showed both the synchronous and asynchronous online courses greatly increased the students' word processing skills. The authors contend, "An increasing body of literature shows that students learn better when actively involved with the curriculum and learning content through technology. Teachers should thus develop curricula that engage students with hands-on, inquiry-based learning" (Ogbonna et al., 2019, p. 3-4).

The studies discussed thus far mainly involve samples of secondary students as opposed to college students. However, the samples were all relatively small and the research methods were not statistically quantifiable. The remaining studies reviewed relate to post-secondary students. While there certainly are differences between secondary students and college students, the findings of these studies provide insight and help fill the gap in research specifically pertaining to engaging students in secondary online learning. The lack of research studies suggests the importance of further research specific to engaging secondary students in the online setting.

Another study providing support for using visualization tools to impact the learning process is Sung-Hee Jin's (2017) study. The main goal of this study was to determine if an online visualization tool would increase participation, perceived satisfaction, team

collaboration, and learning. In the study involving 118 undergraduate students from a South Korean university's Engineering College (91 males, 27 females) enrolled in a creative thinking course, two visualization tools were introduced to two different groups (43 students in Group A; 40 students in Group B). A third control group (35 students in Group C) had no visualization tool. Group A had a visualization tool that represented group participation and interaction between groups (group awareness), while Group B had a visualization tool that represented the group participation and individual participation (group and objective self-awareness). Sung-Hee Jin (2017) measured online participation by analyzing each of the following units of activities with their assigned weighted value: "login frequency (1), number of original postings (3), number of responses and comments (2), the message lengths (2), the read messages (1), and number of votes (1), " p. 54. Student perceived learning and perceived satisfaction were determined from a questionnaire administered to the students.

Results of the Sung-Hee Jin (2017) study showed learners in both Group A and Group B had higher perceived learning and satisfaction than those in Group C. This suggests that visualization tools in the online environment enhance the learning process. In addition, learners in Group B had a higher degree of online participation than learners in Group A. The study also supports the theory that "objective self-awareness information has a more positive effect on individual participation than group awareness information," (p. 60). Practical implications of these findings include implementing visualization tools that provide individual feedback via online polls and assessments to enhance student engagement. Conversely, this study begs the question as to whether it is prudent to allow students to keep their camera turned off during online instruction. Does this practice hinder engagement? How can we more effectively use

visualization tools to motivate students to learn? These questions will be of great importance as we move into a new era of online learning.

A study by Bollinger and Armier (2013) analyzed data on graduate students' perceptions of requiring student-generated audio files as part of the curriculum of an online, asynchronous course. The objective was to gain an understanding of how required student-generated audio files impacted students' perceived satisfaction, engagement, connectedness, learning, and utilization. Both qualitative and quantitative methods were used with a sample of 22 students, which involved all education majors enrolled in one course offered by one institution.

The most significant observation of this study was that student produced audio files have the potential to increase engagement, active learning, and self-assessment. They also help students develop skills in communication and technology – both invaluable skills in this age of online learning. Many respondents felt the development and distribution of student-generated audio files fostered their engagement with instructional materials, involved them in their learning, assisted them in effectively communicating with peers, and increased their understanding (Bollinger & Armier, 2013). Although the study focused on student-produced audio files, it is highly likely that similar results would apply to student produced video files as well.

Important insights for classroom application from this study include student comments about staggering the audio file assignments within the class and not over utilizing this method of delivery. Having students take turns in producing audio files on various topics throughout the course would lessen the burden of the students needing to listen to everyone's audio file at

one point in the course. It would provide an opportunity for peer evaluation and for learning how to best use this delivery method.

Interactive games and quizzes in the online environment are another way to engage students with course content. The Peachey et al. (2006) study, involving nineteen students enrolled in online business courses offered by the University of Glamorgan in Wales, analyzed the impact of games and quizzes on student engagement. The games and quizzes related to the curriculum and were intentionally developed as supplemental educational material to add to the students' knowledge of the subject. A secondary goal of the activities was to encourage social interactions and a sense of community. In one of the learning modules, 54% of the posts for the module related to the dedicated social and games forums. The results of the Peachey et al. (2006) study indicate that "including online quizzes and games that are relevant to the taught subject can increase the participation levels of the students and possibly enhance the learning process," (p. 67).

There are many practical applications from these studies to promote students' engagement with course content. One application is utilizing interactive games and quizzes, such as Kahoot and Quizlet Live. These platforms increase engagement with the content, adding colorful graphics and a sense of fun competition. Any technological, educational tool that encourages student interaction and challenges students to apply their knowledge, providing positive feedback when a student completes a level or answers a question correctly, enhances student engagement with the content. Additional practical applications from these studies include hands-on interactive activities, such as the use of student created videos or audio files; and visualization tools, such as, online concept mapping tools to reinforce student

understanding of the content. These are just a few constructive ideas teachers can apply to engage students in the content within the online classroom and effectively improve learner outcomes.

Give Feedback

Teachers provide frequent feedback to students in a traditional classroom setting. The nod of a head, a smile, or a thumbs up can encourage students to stay engaged in the learning process. Within the online environment, these more subtle methods of feedback are often not readily available. What does teacher feedback look like in an online setting? Because non-verbal feedback is less prevalent without in-person contact, new and innovative ways for teachers to provide feedback in the online setting need to be considered. Online forums, posts, chat rooms and one-on-one virtual meetings are all options. During the literature review for this thesis a few research studies addressed the effects of teacher feedback. These studies are summarized in the following paragraphs.

One of these empirical studies by Dubuclet et al. (2015) investigated the impact of the discussion forum design and facilitative strategies on student participation and cognitive levels of student dialogue. This study included fifty-five students who were enrolled in three online secondary school courses (C++, Computer Science, and Advanced Math) taught by the same instructor. The students were primarily juniors and seniors of both genders, 78% male and 22% female. There were no face-to-face meetings with the teacher during the course. The results of this multiple-case study showed that the teacher's role during the online discussions influenced student participation and learning. Strategies such as participation requirements and question design had an impact on student participation and cognitive levels of student dialogue

(Dubuclet et al., 2015). It must be recognized that this study involved a relatively small sample of students taking courses from a single instructor; however, the results provide evidence that teacher feedback does have a positive impact on learning.

Of particular interest in the Dubuclet et al. (2015) study was the specific teacher prompt that increased student participation. Dubuclet and colleagues examined the student response rate when teacher's explicitly required student participation. The results showed a clear pattern that requiring students to participate is associated with a higher participation rate; however, specifying the minimum number of posts required may not be the best strategy. Although the discussion with the highest level of participation did not indicate a specific number of required posts, there was a strong emphasis that participation was required. When the teacher provided a minimum number of classmates to which students should reply, students rarely replied to more than the number specified, indicating that specifying the number of classmates to which students should reply may actually restrain students from replying to more than the specified number and limit the development of dialogue (Dubuclet et al., 2015).

The importance of feedback is addressed in an article by Page et al. (2020) examining best practices for online instruction. Listed as number one best practice is instructor feedback and availability. The author continued by explaining what type of feedback is most productive. Although encouragement and praise have a role in the student-teacher relationship, this was not the most effective feedback for student learning. Authentic, honest feedback regarding a student's effort and constructive comments on ways to improve appeared to be the most valuable and encouraged engagement. This type of feedback enhances learning by providing a deeper level of understanding along with an opportunity to apply this newly gained

understanding going forward. According to Page et al. (2020), the timeliness of the feedback and perceived accessibility of the teacher also increases the effectiveness of the feedback.

Reinforcing the importance of feedback is a study conducted by Lockman and Schirmer (2020) in an effort to identify effective teaching strategies within the online setting by reviewing research literature. Their findings highlighted once again that teacher feedback is an effective teaching strategy. The scope of the review included 104 empirical studies published from 2014-2019 involving both graduate and undergraduate students. Looking for patterns and trends in the research studies, Lockman and Schirmer identified common topics which include course design, teaching methods, engagement, and student attributes for success. For the most part, the effective online practices were similar to those used in the traditional classroom, such as, scaffolding, good student-teacher rapport, classroom collaboration, and academic support. In addition, Lockman and Schirmer (2020) found:

> Unique to the online environment are user-friendly technology tools, orientation to online instruction, opportunities for synchronous class sessions, and incorporation of social media. Given the few studies utilizing methodological designs from which claims of causality can be made or meta-analyses could be conducted, we identified only faculty feedback as an evidence-based practice and no specific intervention that we could identify as research-based in online instruction. (p. 130)

Regarding feedback, this study introduced the concept of face threat mitigation which is described as “an approach to reducing the potentially threatening nature of feedback when nonverbal cues are not available through face-to-face discussion to soften the impact,” (Lockman & Shirmer, 2020, p. 135). Face threat mitigation is most effectively addressed by

building a good rapport with students. The teacher-student relationship needs to be built on trust and mutual respect. By building trust and providing assurance of teacher accessibility and availability, the teacher can decrease any sense of threat and increase student engagement. Similar to face-to-face instruction, developing a good rapport with students is important when providing constructive criticism, but in the online setting teachers need to develop new techniques to promote a sense of accessibility. Showing interest in the student, asking questions, providing a caring environment, and being available are all important ways to build this trust. By addressing this unique threat within the online environment, teachers increase the effectiveness of the feedback.

This leads to the questions, "what specific feedback is best?" and "how is it most effectively delivered in the online setting?" The Lockman and Shirmer (2020) study specifically addresses these questions as follows:

> One implication is the use of feedback that is differential in what the student accomplished well and what needs to be improved, precise in exactly what the issues are that need to be addressed in a revision or future assignments, respectful of the student's effort and current stage of learning, and timely in offering feedback relatively soon after an assignment is submitted. (p. 149)

Since feedback is most effective when a good teacher-student relationship exists, it is important to consider how to develop a good relationship in the online setting. Addressing this issue is the study performed by Keaton and Gilbert (2020) which involved interviewing twelve students in grades 9-12 taking online STEM courses offered by a private school. The students were selected from a population of 156 students and identified by their teachers as either high-

achieving, average, or low-achieving students. Four students in each category were selected for the interviews.

Interestingly, the student perception of the teacher's availability was high, and most students reported feeling that teachers were readily accessible, even more so than in a brick-and-mortar setting. Overall, the study indicated that interactions with the teacher could help to create a connection for some students. Interactions were defined as any type of communication between a student and teacher, including synchronous interactions via Zoom or GoogleMeets, and phone calls, as well as asynchronous communications such as emails and feedback on coursework. However, similar to the Lockman & Shirmer (2020) study, some students found the interactions created anxiety, preventing them from attending class for fear of having to interact (Keaton & Gilbert, 2020). This further supports the importance of good teacher-student relationships. In addition, this fear may also be related to the student's lack of self-efficacy which will be addressed in the student attribute section.

In Darby's (2020) article regarding tips on becoming a better online teacher, the topic of how to model engagement and create a caring learning environment where students perceive a high level of accessibility is addressed. Ideas from Darby's (2020) online teaching guide include: (1) publish weekly announcements explaining upcoming topics and/or to review previous learning, (2) promptly answer students' questions and/or online postings, (3) establish and communicate online office hours where students can discuss questions, (4) create and post videos that provide examples of learning activities/assignments, (5) communicate feedback and results of assessments in a timely manner, and (6) promote engaging online discussions.

Continuous feedback is an underlying theme in most of these ideas, helping to build a positive student-teacher relationship.

Feedback was also a theme studied by Curtis and Werth (2015). Their study's research goal was to identify factors affecting student achievement in a K-12 online public-school setting. Eight parent participants (all college educated), representing eleven students with varying degrees of online success, volunteered to be interviewed twice. This study shed light on the importance of feedback to parents as well as students. Although feedback to parents at the secondary level is not as critical as at the elementary level, it is still a valuable means to increase learner outcomes. Participants in the study reported that communication with the school positively affected student success and, adversely, poor communication negatively impacted achievement. The frequency of the communication varied depending on the grade and subject matter; however, once a week seemed to be the optimum frequency for the participants in the study. Curtis and Werth (2015) found the following:

> The most successful students in the current study were those who had parents who communicated with the school regularly. Many parents reported checking electronic mail daily and calling teachers or school personnel regularly. Parents also spoke about communication coming from the school as positive. (p. 174)

The last study examined for this literature review that relates to the importance of teacher feedback was a New Zealand study performed by Louwrens and Hartnett (2015) where they sought to understand both teachers' and students' (grades 7-10th) ideas on what increases engagement. Both the teachers and students interviewed stated that building relationships and providing support via feedback were important factors in engagement. "Receiving

feedback, accepting the critique, and acting on it appeared to require students to have a degree of emotional engagement," (Louwrens & Hartnett, 2015, p. 37). As engagement tends to improve learner outcomes, it follows that feedback is an effective tool for increased learning.

Get Students Working Together

Collaboration in the learning process is another effective teaching strategy. According to Killian (2015), both Hattie and Marzano state that having students work together is a powerful tool for gaining knowledge. Assigning students to work in small groups provides opportunities for them to share and learn from each other, reinforce learning, and develop social skills. Friendly competition among students can also create a sense of excitement. Students are more likely to be engaged when learning is fun and enjoyable.

Collaboration was also found to be beneficial according to Louwrens and Hartnett (2015). Louwrens and colleagues sought to understand what increases student engagement by interviewing four teachers and ten students (grades 7-10th). The results found that 50% of the teachers felt peer interaction and collaborative activities increased engagement. When students worked together on a project or activity and they perceived that their peers were counting on them to participate and constructively contribute they were more likely to be engaged (Louwrens & Hartnett, 2015). This supports the idea that having students work together impacts learning in a positive manner.

Another study addressing the benefits of collaboration was performed by Ng et al. (2020) whose purpose was to identify effective teaching strategies for online learning. The study involved three institutions in Hong Kong: one university, one primary and one secondary, and used qualitative research methods to observe, describe, and interpret the "lived

experiences" at these institutions as they faced the challenges of online instruction during the COVID-19 pandemic. Only one individual was selected at each institution including one secondary teacher. Given the exceedingly small sample size, the findings may not be truly reliable, but they do reinforce the importance of students working together. The results noted that, within the online context, activities where students had the opportunity to socialize were beneficial. Therefore, educational technology in the online setting should continue to emphasize ways to encourage any type of social interaction and incorporate collaboration among students (Ng et al., 2020). Specific ways the secondary teacher encouraged students to work together were by using online break-out rooms for group discussions and creating interest groups via Edmodo where students could collaborate with each other (Ng et al., 2020).

Social interaction was found to be a key component of collaboration and was highlighted as a best online teaching practice in the next study. The Makani et al. (2016) study focused on effective strategies or best practices that promoted deeper learning in the online environment. A systematic process was used to identify 857 studies published from 2006 thru 2016 that focused on effective online learning and virtual teams, including 500 studies that were classified as empirical studies. The results of the review found that conversation was a key component in deeper learning. "Conversation allows learners to experience social presence and develop a feeling of trust, belonging and psychological closeness, which is crucial to the promotion of deeper learning" (Makani et al., 2016, p. 13). Developing social interactions or conversations within the online setting helps to strengthen collaboration and teamwork. The study cited specific ways to promote conversation, including purposeful online discussions, and video conferencing or synchronous online meetings, such as an online break-out rooms. Such

strategies enhance the learning process by encouraging collaboration among students and promoting higher level cognitive skills. Interestingly, the concept of conversations as a key aspect of online learning not only reinforces the importance of working together, but it also supports the previously discussed strategy of providing feedback as conversations are also a critical aspect with this strategy.

This Makani et al. (2016) study's main strength was the large amount of data that was synthesized together to come to some insightful conclusions. One of these insights made by Makani and colleagues was that online teaching is most effective using the social constructivist theory introduced by Vygotsky in 1978. This theory emphasizes the importance of social interactions and collaboration in the learning process. It also is based on the idea that the student "constructs" their knowledge from experiential learning (Makani et al., 2016). While it is unclear how many of these studies relate to secondary education within the United States, the overall pattern of such a large amount of data reveals information worthy of reflection as to how it can be applied in the online educational setting.

Discussion and collaboration were found to be effective learning activities in the New Zealand study. Lai's (2017) study investigated online teaching practices by compiling the results of an online questionnaire completed by thirty-two online secondary teachers working in the NetNZ educational system, a community of fifty-four-member online schools in New Zealand. The teachers voluntarily participated in the study and had an overall average of five years of teaching in the online environment.

It is also important to note that New Zealand's educational system is ranked as one of the highest in the world. In both 2018 and 2019, New Zealand was ranked third in the world by

The Economist's Worldwide Educating for the Future Index, far surpassing the United States who was ranked 22nd ("Worldwide educating for the future," 2019). More specifically to the NetNZ educational community, a 2016 survey of NetNZ students showed that 93% of their students responded that they gained knowledge and understanding in addition to feeling engaged and well supported. Another positive factor is the high retention rate of 82% (NetNZ, 2016). Considering this stellar track record, it seems appropriate to investigate the teaching practices utilized by these teachers to help identify the best practices for online learning.

According to Lai (2017), pedagogical practices that were utilized within the NetNZ system included a flipped learning methodology where students were expected to come to the Google hangout prepared to discuss and interact with each other about the subject matter. In addition, 22% of the teachers reported using Knowledge Forum, a collaborative networking software to engage students in online discussion and idea sharing. Teachers noted that use of the software helped build community and connect students, providing a means for peer support and learning interaction. Developing relationships not only between the students and teacher but also between each individual student was an important factor for learning. By building a trusting and caring community students were more apt to learn from each other and work collaboratively (Lai, 2017). Overall, inquiry-based learning where students are encouraged to work together, share ideas and question concepts was frequently utilized as an effective teaching strategy.

Build Students' Self-Efficacy

Weaving through this thesis is the importance of student engagement for learning. One factor in keeping students engaged is to make sure they feel confident to tackle the task at

hand. Self-efficacy is the student's belief in his or her ability to succeed. It drives an individual student to persist rather than give up when faced with challenges. The idea of grit or the ability to set a goal and push to see it fulfilled is becoming recognized as a great predictor of success. Therefore, it only follows that building self-efficacy is a desirable characteristic to achieve better learning outcomes. The question is "how do you build self-efficacy, particularly in an online learning environment?" According to Marzano et al. (2013), teachers can build self-efficacy by providing genuine praise for specific achievements and expressing their belief in their student's ability to succeed.

Zeichner (2018) investigated two types of feedback that have the greatest impact on a student's self-efficacy: "cognitive content-oriented feedback designed to meet the student's cognitive needs relating to the curriculum, and non-cognitive feedback that refers to motivational–affective aspects of the learning process," (p. 13). The study sample included 171 high school students, aged 14-15 years old, who took the synchronous year-long distance learning course, *Intro to Computer Science*. The students were split into three groups each receiving a different type of feedback: content feedback only, cognitive and ability feedback, or cognitive and effort feedback. The students were given four questionnaires during the study: personal data questionnaire, self-efficacy questionnaire, student perception questionnaire, and an achievement test. The self-efficacy and student perception questionnaires were administered twice - both before and after the intervention. No significant differences were found in self-efficacy or perceptions between the three groups prior to the intervention. After the intervention (feedback), the group receiving content feedback only had a significant decrease in self-efficacy scores while the other two groups' self-efficacy scores increased. The

group receiving the content and effort feedback scored slightly higher than the group receiving content and ability feedback. The achievement test results showed similar distinctly different results between the three groups with the highest performing group being the effort feedback group and the lowest being the feedback only group. (Zeichner, 2018).

Based on Zeichner's (2018) findings, suggestions for increasing self-efficacy include a concerted effort on the part of the teacher to recognize the student's effort when providing feedback and emphasizing that errors or mistakes are an expected result in the learning process. Failures are not a sign of failing but an opportunity to learn and grow. According to Zeichner (2018), teachers can build self-efficacy by "supplying students with feedback designed to enhance their self-esteem and belief in their ability to put in the effort required to achieve the goal," (p. 22).

Another study, performed by Jeong et al. (2019), utilized Spanish college student and supports many of the same findings as those completed with secondary students in the U.S. This group of researchers assessed the impact active teaching methodologies had on self-efficacy in the online environment. To achieve this goal, a comparative study was carried out between a control group, in which a traditional distance methodology was used, and an intervention assessment group, in which an active learning methodology was applied. All participants volunteered to take part in the study and were randomly assigned to either the control group, consisting of 119 students, or the intervention group, consisting of 112 students. In the control group, students were given a textbook and encouraged to participate in online activities; however, their grade was solely based on the final exam. In the intervention group, the grade was based on the final exam in addition to the participation and completion of case

studies relating to each subject section, and an individual portfolio where students were required to perform self-reflection. The case studies involved interactive activities, such as concept maps, hot potato exercises, and online discussions, providing opportunities for on-going feedback from the teacher. During the last week of the course, a questionnaire was supplied to all students. Completion of the survey was voluntary and included seven questions assessing the development of students' self-efficacy during the course. Results showed that students in the intervention group exposed to active learning methodologies had higher scores on the final exam and higher self-efficacy levels from the control group. It was noted that the differences between the two groups were statistically significant (Jeong et al., 2019).

These studies reinforce the benefits of engaging students and providing feedback. There is a natural interplay between the effective teaching strategies discussed previously and the strategy of building student self-efficacy. In addition to feedback that explicitly acknowledges a student's efforts, the use of scaffolding by teachers to help the student feel competent to master the content is also a way to positively impact self-efficacy. Teachers who implement well-constructed lessons that incorporate these strategies will help the student develop their self-efficacy.

Self-efficacy will be discussed further in the next section regarding "Attributes of Student Success for Online Learning" as self-efficacy is one of the many attributes identified. More research studies were found relating to the attribute of overall self-efficacy than research studies specifically focused on how teachers build self-efficacy in their students. This is a definite gap in the research and necessitates the need for further research on how teachers can build this important attribute in their students to impact their academic success.

Summary of Effective Teaching Strategies for Online Learning

In summary, there are numerous studies that provide evidence of the effectiveness of the teaching strategies discussed: getting students to engage with content, giving feedback, getting students working together, and building students' self-efficacy. However, research on how to specifically implement these strategies in the online environment particularly at the secondary education level is not abundant. Overall, it is interesting to note that good teaching practices consistently impact student achievement in a positive way regardless if learning is done online or face-to-face.

Attributes of Student Success for Online Learning

As discussed in the introduction, learning is a reciprocal process between both teacher and student. Effective teaching strategies are just one side of this reciprocity. The student's online readiness is also an important factor in the overall academic success. In the Torun (2020) study an e-learning readiness scale was used to determine the relationship between certain readiness characteristics and academic success. The scale consisted of six characteristics (1) computer self-efficacy, (2) internet self-efficacy, (3) online self-efficacy, (4) self-directed learning, (5) learner control, and (6) motivation toward e-learning. The study involved surveying 153 freshman students enrolled in an English as a foreign language course at a public university to determine the relationship between their academic success and their e-learning readiness. The results showed the strongest correlation between academic success and self-directed learning and motivation. Conversely, there was not a statistically significant relationship between achievement and computer, internet, or online self-efficacy (Torun, 2020).

The type of technological skill self-efficacy addressed in this study is not the same as cognitive self-efficacy relating to mastering the curriculum; therefore, the results suggest that the newest generation of students feel technologically capable of maneuvering in the online environment. Even though this study involved freshman college students, it is highly likely that computer and internet self-efficacy for high school students is also relatively high which will be discussed further in the self-efficacy section to follow. This study sheds light on what student attributes are important for successful online learning, particularly self-direction and motivation.

According to Lockman and Shirmer (2020), their review of research literature supports the notion that student motivational and emotional variables significantly predict student achievement and satisfaction. In addition, several individual factors have also been found to be positively correlated to online course achievement. These include past academic success, motivation, family support, workload management, and digital literacy. Similarly, Darby (2020) asserts that online learning requires high-level executive-function skills, good time management skills, self-motivation, self-regulation, and the ability to assert oneself to seek help when needed.

Overall, the research reviewed clustered around these four main attributes: (1) motivation – the desire to do it, (2) self-direction – the ability to get it done, (3) self-efficacy – the confidence to do it, and (4) supports – the external helps to ensure it gets done. In the following sections, we will take a deeper dive into these student attributes, reviewing the research literature that addresses each student attribute and its impact on improved learner outcomes.

Motivation

Student motivation appeared numerous times during the literature review as a factor in online academic success. In Lockman & Shirmer's (2020) synthesis of 104 studies, motivation was commonly linked to online achievement. Before evaluating the impact of motivation, we first need to differentiate between intrinsic and extrinsic motivation. Students who are intrinsically motivated do something for the mere pleasure or personal satisfaction while extrinsic motivation is tied to an external reward or avoidance of a negative consequence or punishment. Intrinsic motivation is the desired attribute discussed in this section as it has a greater chance of sustaining a student's drive to succeed where extrinsic motivations are much more dependent on the external reward or punishment making it difficult to sustain over the long run. Established educational measurements of motivation, such as the Academic Motivation Scale (AMS), and the Motivational Strategies for Learning Questionnaire (MSLQ), were often used in the research studies on motivation as a base foundation for developing the surveys or questionnaires.

Intrinsic motivation was sighted as a factor in online success in a few of the studies reviewed. As noted previously, Curtis and Werth (2015) share their findings regarding the importance of giving feedback to parents after investigating factors for online success for secondary students enrolled at an online charter school located in the southwestern United States. Based on parental responses, of the eleven students, six had negative experiences with the online environment and five were successful. Qualitative methods were used consisting of two interviews each with eight parents representing eleven secondary students. Responses to the interviews were coded to identify themes. Two of the most frequent themes from parental

responses, regardless if they reported having a negative experience or success with the online school, were “students need to be self-motivated” and “students see relevance of education,” (Curtis & Werth, 2015, p. 173).

Motivation was also a factor in the Stacki et al. (2021) study published by a professor and her three graduate students pursuing their Middle Childhood Advanced Certificate. The study involved surveying seven New York public middle school teachers with varying levels of experience ranging from one to over thirty years to collect teacher opinions on the success of online learning during the COVID-19 pandemic. Selection of the teachers was based on relational connections to the graduate students. The qualitative survey was emailed to the teachers and consisted of thirteen questions to understand the teachers’ perspectives of their students’ learning in the remote environment forced upon them by COVID-19. “During remote learning, most teachers remarked that students who were self-motivated fared better than other students who did not have initiative or support at home,” (Stacki et al., 2021, p. 152). Similar to the study performed by Curtis and Werth (2015), this study represented a very small sample (only seven teachers); however, both studies did cite self-motivation as an important attribute for learning.

Positivity was cited as a key to motivation in the Cohen and Magen-Nagar (2016) study. The study examined Israeli high school students’ sense of achievement in the online setting and sought to see if the student’s learning strategies and motivation played a role. The hypothesis for the study was that higher levels of motivation and learning strategies predicted a higher sense of achievement. Of the 413 students (grades 8-11th) from 14 schools who enrolled in STEM courses, 163 students voluntarily participated in the study. A questionnaire was used to

obtain the data including twenty-four questions relating to motivation, and forty-three questions relating to learning strategies. In addition, there were five questions relating to a sense of achievement. All responses were reported using a Likert scale of one to five. The results indicated that two motivational orientations were found to be predictors of success. A more positive perception of control over learning was associated with a higher sense of achievement and the more positive beliefs there were, the higher the sense of achievement. Overall, motivation was high and all students participating in the study successfully completed the course. To verify the findings, a broader selection of students from other courses and varying academic achievement levels needs to be studied.

The Raes et al. (2020) study sought to determine if a student's internal motivation decreased in a hybrid or online setting compared to face-to-face teaching and if internal motivation was positively related to learner outcomes. In addition, the study determined if quizzes had a positive impact on internal motivation. The study design compared four learning settings for a high school Economics course taught by the same teacher. Fourteen 12th grade students taught by this one teacher were studied over the course of six lectures with the following four learning settings: (1) pure face-to-face where all students were physically present (2 lectures), (2) hybrid – face-to-face experience for half of the class (1 lecture), (3) hybrid – pure virtual experience for half of the class (1 lecture), and (4) pure virtual where all students attend remotely (2 lectures). Each lecture started with an interactive poll and ended with a formative assessment quiz which was used to evaluate learning achievement. Mixed research methods were used including a short survey administered after each learning setting inquiring about their intrinsic motivation and attitude about the quiz. In addition, students were asked to

respond to a pop-up question, “how engaged are you now?” which was randomly asked every 5-12 minutes during all the lectures. Students answered using a slider scale from zero (no engagement) to two (highly engaged). Qualitative data was collected via open ended questions, a teacher interview, and a student focus group about a month after the last lecture to share findings and obtain feedback. The results showed the highest intrinsic motivation was in the pure face-to-face setting while the lowest was in the hybrid virtual setting. Interestingly, the pure virtual setting had higher motivation scores than the hybrid, indicating that students feel less motivated when some of their peers are in the face-to-face setting, but they are not. The results also indicated there was a significant relationship between intrinsic motivation and learner outcomes. Lastly, the results indicated that the interactive quizzes at the end of the lecture increased motivation and engagement regardless of the learning setting. Feedback from students indicated that more frequent quizzes throughout the lecture would have been welcomed (Raes et al., 2020).

What are some practical ways to increase student motivation? Teachers can motivate learners by providing choice and flexibility. Giving students more autonomy increases the chances that they will engage more deeply in the course as they can choose options that more closely match their interests and personality (Lai, 2017). Utilizing interactive quizzes, polls, and pop-ups can also positively impact motivation. Helping students understand the relevance of the learning to their future goals or aspirations also increases motivation.

Self-Direction

The attribute of self-direction for the purposes of this thesis is a broad term including the student’s self-regulated learning processes and learning strategies that enable the student

to accomplish the learning goal or referred to earlier as “the ability to get it done”. Pintrich (2000) identified three components of learning strategies: (1) metacognitive strategies—the students’ ability to think about their learning process including planning, monitoring, and regulating learning tasks; (2) cognitive strategies—the students’ actual strategies for engaging in the learning process including memorizing, organizing, making inferences, and connecting new information to prior knowledge; (3) resource management strategies—the student’s methods for adapting the learning environment to meet their own needs, including help seeking, peer learning, and time management. Students who incorporate these strategies in the learning process tend to be more successful in the online learning environment. According to Curtis & Werth (2015), ”parents of successful students described students making their own schedules, setting a daily plan, and doing much of the work independently,” (p. 171).

In the Abdullah (2020) study, self-regulation processes and metacognition skills were analyzed to determine what influences a student’s metacognitive ability. Metacognition, the ability to think about thinking, has been tied to greater learner outcomes in previous research studies. This study was performed using data from 506 secondary students, ages 13-17 years old, enrolled in three Malaysian schools. The schools were selected randomly from a list of schools identified by the State Education Department as having a high level of online learning. A questionnaire was administered measuring self-efficacy, procrastination, learning strategies, and metacognition skills by utilizing previously established psychological instruments appropriate for secondary school students. Three specific learning strategies were measured: (1) help seeking, (2) task strategies, and (3) time management. A Likert scale ranging from one to five was used to obtain responses (Abdullah, 2020).

The results showed students scoring highest in metacognitive skills and lowest in procrastination. In addition, all measurements were analyzed for relationships to determine interconnectedness. Interestingly, the relationship between learning strategies, particularly help seeking and task strategies, and metacognition skills were found to be statistically significant. Based on the results of the study, Abdullah (2020) shares a practical application "to enhance secondary school students' metacognition in VLEs (virtual learning environments), teachers have to scaffold the students in terms of help seeking, the use of task strategies and time management," (p. 11). All of these skills enhance the student's ability to direct their own learning.

Another study relating to college-aged students provides further evidence of the importance of the self-direction attribute. Hobson and Puruhito (2018) surveyed 409 voluntary participants who were college students (83% female, 17% male) enrolled at a large university located in southwestern United States. The survey included six questions that evaluated the student's perspective of how the course connected to their imagined future, referred to in the study as "connectedness", one question addressing self-efficacy, eight questions relating to self-regulation or self-direction skills, and twelve questions regarding the relevance of the course to the student's future goals. Quantitative methods were used as most responses were recorded on a Likert scale ranging from one to five. The results showed that there was a statistically significant correlation between the student's final grade and their level of self-efficacy and self-direction skills. While there was not a positive correlation with the other attributes and the student's final grade, there was a positive correlation between self-efficacy and self-direction with the other attributes, indicating these other attributes may also play a

role in the student's success (Hobson & Puruhito, 2018). Based on these findings, students who possess the ability to self-direct their learning by seeking help, planning their learning tasks, and managing their time are more likely to succeed in the online learning setting.

Self-Efficacy

As previously discussed, the important attribute to build student self-efficacy through effective teaching strategies gives students the ability to persevere when challenged. Studies often include self-efficacy as a factor in motivation as the two are interrelated. Low self-efficacy does tend to decrease motivation. However, for the purposes of this thesis, self-efficacy merits a place on its own as it has been identified as an attribute for success in numerous studies. Abdullah's (2020) data from secondary students found self-efficacy impacted a student's ability to seek help and manage their time, both important characteristics in self-direction, another attribute of a successful online student. Similarly, according to the Lockman and Shirmer (2020) study, synthesizing the results of 104 research studies, they found self-efficacy to be an attribute found in successful online students. More specifically, correlations were identified between high levels of self-efficacy and high academic achievement measured by the final grade in the course.

Providing further evidence on the importance of self-efficacy is the research study performed by Kim at el. (2015), showing how motivation, self-efficacy and self-regulation are connected. The study targeted secondary students enrolled in various online asynchronous mathematics courses offered by an online U.S. high school. The purpose of the study was to determine how motivation and engagement were related to achievement, and to identify supports that enhance motivation and engagement resulting in improved achievement. The

underlying hypothesis was that motivation was a precursor to engagement but not a guarantee of engagement. For motivation to translate into engagement, the student needed to have a sense of self-direction.

Kim et al. (2015) analyzed how motivation, self-regulation, and engagement varied between high achievers and low achievers by surveying 100 student participants three times during a semester-long course. The Motivational Strategies for Learning Questionnaire (MSLQ) developed by Pintric and DeGroot (1990) was slightly revised to reflect the online learning environment and was used to measure these three characteristics: (1) motivation - self-efficacy and relevance, (2) regulation - effort and metacognitive skills, and (3) engagement - both emotional and cognitive indicators. In addition, the Achievement Emotion Questionnaire in Mathematics developed by Pekrun, et al. (2005) was also revised for the online setting and used to measure emotional engagement. The students' final grade in the course, determined by factoring in scores from discussions, quizzes, assignments, and tests, was used to measure achievement. Participants (average age of 16) represented a broad range of abilities, including students from basic math, algebra, geometry, pre-calculus, calculus, and statistics. High performers were defined as those receiving an "A" in the course while low performers were those receiving "C" or below (Kim et al., 2015).

The data from the questionnaire showed two attributes that were distinctly different between the two groups – self-efficacy and effort regulation. The low performers' self-efficacy started out lower than the high performers and decreased during the semester while the high performers maintained a consistent level of higher self-efficacy throughout the course. Likewise, effort regulation had a similar pattern. High performers started with a higher level of

effort regulation and maintained this higher level. The study found that higher self-efficacy and higher effort regulation were linked to higher achievement (Kim et al., 2015). It is difficult to determine if self-efficacy is the driver behind effort regulation or vice versa, but it seems logical to conclude that students lacking confidence in their abilities would not exhibit consistent levels of effort. Hence, self-efficacy may be the core component in higher achievement.

These previous studies all relate to cognitive self-efficacy while the next study addresses a student's technological self-efficacy. Computer and internet self-efficacy was the topic of the study by Topolovcan and Matijevic (2014). A survey was given to 184 public school teachers with an average of 15 years of experience and 323 eighth-grade students in Croatia to assess their perceived self-efficacy related to basic computer skills, computer software skills, and web-based skills. Interestingly, the students scored about the same as the teachers regarding basic computer skills self-efficacy, but students had higher self-efficacy scores than the teachers regarding both computer software skills, such as, using programs to create videos, graphic design, and websites; and web-based skills, such as, blogging, using social media platforms, and participating in online learning platforms. These differences may be attributed to the fact that this next generation of learners have grown up with technology. Use of the computer and internet are second nature to them and their perceived self-efficacy regarding their use is relatively high. This is good news for students transitioning from a traditional classroom setting to an online learning environment.

Given the research findings, practical applications to increase self-efficacy may include effective teaching strategies discussed previously, such as giving students encouraging but constructive feedback that recognizes their effort, and scaffolding lessons to ensure students

are not feeling overwhelmed and potentially experience decreased self-efficacy. Research supports the conclusion that self-efficacy is the glue that holds students together in times of challenge and provides the grit to keep on going when the going gets tough - an essential characteristic of success.

Supports

Several supports were identified while reviewing the literature that impacted the student's ability to achieve their very best in an online setting. These supports, which are not typically controlled by the student, include parental support and technology support. For online learning, access to a computer, laptop, or i-Pad and a consistently reliable internet connection are essential. In addition, the Learning Management Systems (LMS), and social networking platforms are examples of technology supports that impact a student's ability to be successful. In this section we will review the literature that addresses these supports.

Parental support is often cited as a critical component in student success. As previously noted, Keaton and Gilbert (2020) interviewed twelve high school students (grades 9-12) taking an online STEM course. The goal was to understand the type of interactions students had with their teachers and parents, and, secondly, to learn if these interactions contributed to the student's success in the online course. "Parents took on many roles in this setting, including monitoring, motivating, instructing and organizing," (Keaton & Gilbert, 2020, p. 129). According to the study, the role of parents was an important factor in student achievement; however, the degree of parent involvement varied greatly for each student and there was no clear relationship between increased parental involvement and academic success. This finding was not surprising given that the more independent, self-directed student most likely requires little

parental support, but has high levels of achievement. Meanwhile the struggling student may need parental support to succeed.

Another study reinforcing the role of parental support is the Curtis and Werth (2015) study, discussed previously, where parents were asked about time commitments with their children enrolled at an online school. "Parents reported they spent much more time engaged in learning with their students while they were in an online school than they spent when students were enrolled in a traditional school," (Curtis & Werth, 2015, P. 179). However, the amount of time monitoring students was less for those students with higher levels of success. In addition, parents reported not only monitoring, but also mentoring students by providing immediate feedback to their child. In this way, the parent fills in as the teacher by giving feedback. It is important to note that feedback has already been identified as an important teaching strategy for academic success.

Another role played by the parent is that of a motivator. By helping connect school to their future success and making it relevant, parents were in some cases able to instill a greater sense of self-motivation (Curtis & Werth, 2015). The study was done in a charter school where students tend to have more involved parents than in the public schools simply due to the nature of the school requiring parental involvement to be enrolled. In addition, the parent participants volunteered for the study suggesting that less involved parents most likely were not interviewed. Other limitations of the study include the fact most families were Caucasian and had some level of college education. It would be informative to expand research within the public school and include minorities and varying levels of parental education.

In addition to parental support, a technology framework to support student's learning efforts should also be examined . The Curtis and Werth (2015) study brought to light the importance of the transparency and ease of use of the Learning Management System (LMS) as a tool to support the student's learning process. Huckabee (2010) reinforces the importance of this technological tool as well. The Huckabee (2010) study interviewed 30 remedial high school students taking an online summer school course. When asked what components attributed to their success in the online course, 33% of the students' responses related to the "instructional format of online courses" (p. 111). Huckabee (2010) elaborated as follows:

> Students specifically stated that the "step-by-step instructional sequence, the audio component that read to them, getting immediate feedback on missed work, and having the study guides and quizzes" as examples of conditions they strongly favored in the online mediated environment. (p. 112)

These findings suggest that an LMS that enables teachers to provide organized, accessible multimedia instructional materials and timely feedback is an essential component to online learning.

In addition to an LMS enabling timely teacher feedback, another factor in learning is the ability to engage in peer feedback and collaboration. A study performed by Yu et al. (2020) involving 468 Chinese high school students (ages 15-16 years old) enrolled in a private online learning platform with no teacher presence provided evidence to support the benefits of social networking in the online environment. Students who connected with other academically like-minded peers were more likely to complete their lessons. Five connections were the optimal number, suggesting that more connections to peers could actually distract the student from

learning (Yu et al., 2020). This aligns with the teaching strategy of "getting students to work together", but in this case it is the software platform that is encouraging the collaboration rather than the teacher.

Providing support to the online student can mean the difference between success or failure. According to Curtis and Werth (2015), parents with students identified as being less successful in the online school cited technology issues 22 times as a barrier to learning. School districts would be wise to invest in an LMS that is easy to navigate for both students and parents, enables instructor feedback, provides the ability to store audio and video files, allows for student-to-student interaction, and is flexible enough to allow for the addition of instructor resource materials. In addition, districts may need to provide i-Pads to students along with creative ways to access the internet. Lastly, consideration should be given to training parents in their role of mentor to their child enrolling in an online school environment.

Summary of Attributes of Student Success for Online Learning

To truly optimize online learning, student's motivation, self-direction, self-efficacy, and support systems including technological tools should be taken into consideration. As school districts offer more courses online, it would be beneficial to incorporate a student readiness survey addressing these attributes. The results of such surveys could be used to determine the need for any interventions or training of online students and/or their parents to ensure online academic success.

CHAPTER III: DISCUSSION AND CONCLUSION

Summary of Literature

Online education is here to stay. Gathering information to improve methods of online teaching and learning is of utmost importance to our educational future. The findings of approximately 30 research studies were incorporated into this thesis, the majority of which were conducted with K-12 student participants. There is strong research evidence to support the objective of this thesis, answering the question: what are the most effective teaching strategies and essential student attributes that lead to successful online learning outcomes? The literature review was broken down into two sections relating to effective teaching strategies and important student attributes.

The review begins by discussing the role of the teacher. The Hughes et al (2021) study reinforced the importance of the teachers' role in student learning, finding students of higher ranked teachers outperformed students of lower ranking teachers. Based on research done by both Hattie and Marzano, they agree on eight powerful teaching strategies that lead to better learner outcomes (Killian, 2015). Four of these strategies are investigated in this thesis to determine the impact these strategies have in the online setting: (1) get students to engage with the content, (2) give feedback, (3) get students working together, and (4) build students' self-efficacy.

Before delving into the specific teaching strategies, the research on the importance of student engagement for academic success was reviewed. Both the Pazzaglia et al. (2016) study and the Ifenthaler et al. (2018) study found that behavioral engagement (frequency of logins, time on task, etc.) was directly linked to learning performance. The Deng (2020) study

broadened the meaning of engagement to include not just behavior but also social, emotional, and cognitive components. Findings suggested that motivational strategies, appropriate rigor and scaffolding, and frequent assessments with feedback positively impact the various aspects of engagement.

Establishing the importance of student engagement connects well to the first effective teaching strategy "get students to engage with content". Research supporting the benefits of getting students engaged with the content provided evidence of increased achievement when interactive and visually stimulating instructional materials were used such as digital comics to illustrate complex concepts (Ilhan, 2021). Blackburn's (2005) study strengthened the evidence on the positive impact visual enhancements have on the learning process by finding that pictorial stories had a positive influence on learning and engagement. In addition, the Ogbonna (2019) study provided evidence that hands-on, active learning using technology platforms improves learning outcomes. Reinforcing these concepts were both the Sung-Hee (2017) study that discussed the positive influence visualization tools have on the learning process and the Bollinger and Armier (2013) study that revealed the hands-on activity of student created audio files increased learning. Lastly, the Peachey et al. (2006) study found that interactive games and quizzes increased social, behavioral, and cognitive engagement which enhances learning. Each of these studies provide ideas on how teachers can get students engaged with the content and in turn improve learning outcomes.

The next teaching strategy discussed was "give feedback". The Dubuclet et al. (2015) study showed the significant role of the teacher's participation in online discussion forums, influencing participation and cognitive engagement. Lockman and Shirmer's study

incorporating the results of 104 research projects relating to effective teaching strategies found faculty feedback to be the only evidence-based teaching practice within the online setting with promising effectiveness. They also went on to describe effective feedback as being specific regarding praiseworthy accomplishments and needed improvements while respecting and acknowledging the students' efforts. According to the Keaton and Gilbert (2020) study, teacher feedback can increase emotional engagement, creating a sense of connection. Darby's (2020) tips regarding online teaching practices re-emphasizes the importance of the student-teacher relationship in creating a caring online learning environment, and specifically mentions the need for timely feedback. Louwrens and Harnett's (2015) New Zealand study supports the evidence that feedback is an important aspect in engagement, and therefore, impacts learning. Feedback to parents is also an important teaching strategy as evidenced by the Curtis and Wert study where "the most successful students…were those who had parents who communicated with the school regularly," (p. 174). As a result, teachers who provide effective feedback to their students and families will increase learner engagement and achievement.

Collaboration, or getting students to work together, is the third effective teaching strategy discussed. The Louwrens and Harnett (2015) study found that teachers perceived that peer interactions and group activities increased engagement. Online activities encouraging social interactions were noted as being beneficial to the learning process in the Ng et al. (2020) study. The Makani et al. (2016) study synthesized the findings of 500 empirical studies conducted on best practices in the online environment. The results identified conversation as a key component in learning, reinforcing the importance of social interaction and collaboration. The study also suggested that online learning is most effective using Vygotsky's (1978) social

constructivist theory. The New Zealand study performed by Lai (2017) showed inquiry-based learning utilizing peer collaboration as an effective teaching strategy. Teachers reported using collaborative networking software to engage students in online discussions and idea sharing. New Zealand's stellar educational track record suggests these teaching strategies work well.

The last teaching strategy discussed was "build students' self-efficacy". Self-efficacy was an underlying theme in many of the studies regarding positive learner outcomes. In the Zeichner (2018) study, self-efficacy most positively impacted students receiving feedback that addressed both their cognitive ability and effort while self-efficacy declined for students receiving cognitive ability feedback only. Students need affirmation for their efforts to maintain confidence in their ability to achieve the desired learning outcomes. The Jeong et al. (2019) study reinforced the idea of the teacher's feedback being critical to self-efficacy. In addition, the study showed interactive instructional materials, "hands-on" activities, and scaffolding increased self-efficacy.

Even more important than the teacher is the role of the student in promoting their own achievement goals. Considering the online environment has some unique aspects compared to the traditional classroom, four student attributes relating to online learner outcomes were identified and discussed in the second section of Chapter II. These four attributes were: (1) motivation, (2) self-direction, (3) self-efficacy, and (4) supports.

Student motivation was commonly referred to in the literature as a necessary student attribute for success. In Lockman & Shirmer's (2020) synthesis of 104 studies, motivation was frequently linked to online achievement. Likewise, in the Curtis and Werth (2015) study, one of the most frequent themes from parental responses was, "students need to be self-motivated,"

(p. 173). In the Stacki et al. (2017) study surveying middle school teachers about their perspectives on their students' online learning during COVID-19, teachers responded, "students who were self-motivated fared better than other students…" (p. 152). Similarly, motivational orientations were found to be a predictor of success in the Cohen and Magen-Nagar (2016) study examining Israeli high school students' sense of online achievement. Reinforcing these findings was the Raes et al. (2020) study comparing face-to-face, hybrid, and virtual settings. The results indicated a significant relationship between intrinsic motivation and learner outcomes. In addition, hybrid students who were attending a class virtually were least motivated while face-to-face students had the highest intrinsic motivation. To increase engagement and motivation, the study found frequent interactive quizzes had a positive effect.

Self-direction was another student attribute associated with online learning success. This attribute includes metacognitive ability, learning strategies, and time management. According to Curtis & Werth (2015), "parents of successful students described students making their own schedules, setting a daily plan, and doing much of the work independently," (p. 171). In the Abdullah (2020) study, secondary students were surveyed to determine what characteristics influence metacognition skills. Results found that learning strategies, particularly help seeking and task strategies increased metacognition. In addition, scaffolding was identified as a teaching strategy to build these skills. A study of college students performed by Hobson and Puruhito (2018) reinforced these concepts finding a correlation between the student's final grade and their level of self-direction skills. The Hobson and Puruhito (2018) study also found a link between self-efficacy and achievement – the next attribute in this review.

Self-efficacy, the student's confidence in their ability to achieve a certain outcome, was found to impact a student's capacity to seek help and manage their time, positive characteristics in developing healthy self-direction (Abdullah, 2020). The Kim at el. (2015) study surveyed secondary students and found higher self-efficacy was linked to higher achievement. In this same study, effort regulation, recognized as a characteristic of self-direction, was also linked to higher achievement reinforcing the idea that self-efficacy is a factor in developing self-direction skills. Lastly, the Topolovcan and Matijevic (2014) study regarding computer and internet self-efficacy was introduced showing that students have a relatively high self-efficacy regarding technology use. Overall, the research supports the conclusion that self-efficacy is an essential characteristic for student success.

The last attribute discussed was "supports" which included both parental and technological support. The Keaton and Gilbert (2020) study found that parental support of "monitoring, motivating, instructing, and organizing" was an important factor in student success (p. 129). However, there was no clear relationship between increased parental involvement and academic achievement, suggesting this attribute's importance is dependent on the student's existing motivation, self-direction, and self-efficacy. The Curtis and Werth (2015) study reinforced these same findings and highlighted the importance of the ease of use of the LMS to support student's learning process. The Huckabee (2010) study reiterated the influence the technological format has on the learning process, including the instructional sequence and access to instructional materials. In the Yu et al. (2020) study the social networking platform was also identified as an important technological support tool. Students who connected with other like-minded peers improved their level of participation and

engagement. (Yu et al, 2020). This emphasizes the importance of the effective teaching strategy of getting students to work together. In summary, both technological and parental supports can have a positive impact on online learner outcomes.

Limitations of the Research

Initially, the goal was to limit the age of the studies to no more than five years old; however, to find sufficient support for the research questions the age range was expanded. As a result, roughly 70% of the studies are from the last five years while the oldest study dates to 2006. In addition, due to the lack of studies performed within the United States, international research studies were included in the review. Results from foreign studies may not be as applicable to the U.S. educational system due to cultural differences. As the online learning environment and technology advancements continue to develop at a fast pace, the age of some of these studies may not be reflective of the current environment.

There were shortfalls regarding the research studies' representation of the general population within education. Until the most recent COVID-19 pandemic, online education for K-12 was not routinely offered to the public; therefore, the K-12 studies do not reflect the diversity of the student population. Some of the studies specifically mentioned that their sampling was not diverse, such as the Curtis and Werth (2015) study which was conducted on Caucasian families in a charter school. In addition, many of the studies relating to K-12 education collected data from volunteer participants which inherently biases the sampling, omitting those who may be less engaged or disenfranchised with the educational system. There also was a lack of studies performed within the U.S educational system. None of the

studies specifically addressed the unique needs of special education students, minorities, or students from families of lower economic status.

The size of the sample or number of students and their families involved in the collection of data was relatively small. Over 40% of the studies used samples of less than 100 participants, making it difficult to draw statistically valid conclusions. Few studies used a control group and many used interviews and questionnaires that needed to be interpreted and synthesized into categories, increasing the likelihood of varying conclusions due to the subjectiveness. Interestingly, the Lockman and Schirmer (2020) study that reviewed 104 studies attempting to identify effective teaching strategies within the online learning environment found no effective teaching strategies that could be identified as research based.

Implications for Future Research

As mentioned earlier, the concept of student engagement is difficult to measure as it incorporates multi-dimensional factors of behavioral, cognitive, and emotional engagement. Past studies have mainly focused on behavioral engagement as it is an easier concept to measure. Future studies to further understand the influence of specific aspects of engagement that result in higher achievement would be worthy of pursuing.

More studies need to be performed using research-based methodologies and statistically valid sampling sizes. As stated by Lockman and Schirmer (2020), none of the findings from the 104 studies reviewed were research-based. Many of the studies relating to effective teaching strategies in the online environment were based on subjective responses from teachers and students. Quantifiable data using control groups and true random sampling should be incorporated in future studies. In addition, subsequent research studies should

include larger samples representing all aspects of the diverse student population. Studies specific to minorities and special needs students would also be important to determine the unique characteristics of these groups.

Most public schools were mandated to offer an online curriculum during the COVID-19 pandemic. With copious amounts of recent data available regarding the online setting, the opportunity to review this data and utilize it for future studies exists. The potential to learn more about the unique aspects of online learning is there, it just needs to be tapped. Hopefully, more studies will be performed to learn more about effective teaching strategies during this transitional time in education and identify those student attributes that lead to positive online learning outcomes. The pace of change within the online environment makes it imperative that we continue to study the best practices to stay relevant.

Implications for Professional Application

The future of education is in transition as more school districts offer online learning as an option for their students. Online learning offers a unique opportunity for educators to tailor their instruction to meet the needs of each individual student. Learning can happen at the pace best matched to the individual student. In the Curtis and Werth (2015) study it was cited that "individualized instruction proved far more important to parents who identified their students as being less successful than those whose students had been successful in the online environment."

The research offered many practical applications relating to implementing effective teaching strategies to increase student engagement and improve learning outcomes. Some of these teaching strategies include the following:

- Encourage student engagement with the content by utilizing stimulating visualization tools, relevant discussion forums requiring higher level thinking skills, and interactive games and activities.
- Provide timely, honest, constructive feedback, recognizing student effort to build student self-efficacy.
- Create a caring online learning environment to build trust between student and teacher by communicating office hours, publishing weekly announcements, and responding timely to students' questions and concerns.
- Keep parents informed with weekly communications.
- Implement inquiry-based learning where students are encouraged to work together, sharing ideas and questioning concepts.
- Scaffold the learning process to help the student feel competent to master the content and build self-efficacy.
- Administer meaningful and frequent assessments, including self-assessment strategies to increase engagement.
- Provide an appropriate level of rigor to challenge students.
- Guide students in how to seek help, use task strategies, and improve time management to strengthen self-direction skills and increase self-efficacy.

Not only do these teaching strategies improve learner outcomes, but they also tend to develop positive student attributes needed for success: motivation, self-direction, and self-efficacy. In addition, teachers can help connect the learning to the students' lives to increase its relevance by providing choice and flexibility – all factors which increase student motivation.

Another practical application is the development of teachers who focus on and specialize in teaching online students only. During the pandemic, teachers were expected to simultaneously teach both online and face-to-face in a hybrid model. Research shows that students attending the hybrid sessions online had very low engagement rates. Therefore, it makes sense to not mix online and face-to-face instruction within the same course. This would increase engagement and enable the teacher to hone their skills for their specific setting.

To provide the necessary support to online students, school districts would be wise to invest in an LMS that is easy to navigate for both students and parents, enables instructor feedback, provides the ability to store audio and video files, allows for student-to-student interaction, and is flexible enough to allow for the addition of instructor resource materials. In addition, districts may need to provide i-Pads or computers to students along with creative and consistent ways to access the internet. To enlist and encourage parental support, school districts should consider training parents in their role of mentor to their children enrolling in an online school environment.

As online education becomes a more readily available option within public education, the ability to screen students before enrolling in online education to determine their level of e-learning readiness and development of attributes for success is of paramount importance. This type of screening could help identify students who need more guidance or scaffolding to be successful. In this way, students' chances for success in the online environment would increase.

Conclusion

With the ever-increasing use of online teaching and learning in public education it is imperative to learn the best and most effective teaching strategies to enhance learner outcomes in the online environment. Coupled with effective teaching strategies is the importance of student attributes that lead to online learning success. The purpose of this thesis was to identify these effective teaching strategies and student attributes. Based on the review of research studies, evidence supports these four effective teaching strategies for online learning: (1) get students to engage with content, (2) give feedback, (3) get students working together, and (4) build students' self-efficacy. Implementation of these teaching strategies improve student engagement in the learning process and result in higher levels of academic achievement. In addition, the research centered around these four student attributes for online success: (1) motivation, (2) self-direction, (3) self-efficacy, and (4) supports. Students who possess or have access to these attributes will have a greater chance of succeeding within the online learning environment. As educators, our goal is for our students to reach their highest potential. For the future success of online learning, utilizing effective teaching strategies and developing students' attributes for online learning will promote this goal and ensure the online learning environment continues to be a worthy, relevant, and essential component of education.

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