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EXPLORATION OF STUDENT SUCCESS IN ONLINE LEARNING ENVIRONMENTS

A MASTER'S THESIS

SUBMITTED TO THE FACULTY

OF BETHEL UNIVERSITY

BY

HANNAH M. DEFRANCO

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EXPLORATION OF STUDENT SUCCESS IN ONLINE LEARNING ENVIRONMENTS

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APPROVED

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Abstract

Online learning is an increasingly utilized format of education in K-12 environments, yet research has not historically focused on this age group when examining best practices. Learning styles, self-regulation, and self-efficacy are considered to impact the success of students in online learning environments. This literature review examines the impact on and strategies for engaging learning styles, self-regulation, and self-efficacy to provide student success in K-12 online learning environments. Though research varies on the impact of learning styles, self-regulation, and self-efficacy in online learning environments, intentional incorporation of strategies to engage students does seem to improve learning and student success.

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CHAPTER I: INTRODUCTION

Face-to-face education has been the standard for K-12 education, until recently. During 2020, education systems were rapidly forced into online learning as the COVID pandemic swept the world and educators scrambled to meet the needs of their students in an online environment. Traditionally, online learning environments have been used for adult higher education learning or as an alternative pathway for high school students. Before 2020, 57% of online learning environments for K-12 in the United States were used to help students recover from missed or failed courses (Roberts, 2021). In 2021, 75% of US schools planned to operate online (Roberts, 2021). This propelled the education system to drastic change, highlighting the challenges and constraints of a system that was not previously utilized in this capacity (Lockee, 2021). In addition, through the transition to online education, educators, parents, and students found additional challenges that had not been experienced in a traditional face-to-face learning environment.

Before 2020, a large portion of the research conducted focused on online higher education and K-12 together, during the pandemic a significant “systematic review of literature regarding K–12 online teaching and learning in the United States was therefore conducted to begin to fill this gap” (Johnson et al., 2022, p.1). This literature and the circumstances of COVID have led to significant changes in how learning outcomes are determined (Lockee, 2021). This is particularly true as the role of secondary education changes to preparing students for postsecondary education and future industries.

As education has returned to a “new normal,” online learning environments continue to be utilized more often. Online learning is becoming more popular with a projected industry

increase of 20% from 2022 to 2028 (Wadhvani & Gankar, 2022). Best practices are being reconsidered with new data and the separation of K-12 online learning from adult online learning; deadlines, assignments, group work, and creative team-based problem solving are being reconsidered (Lockee, 2021). However, overall little research focuses on how to structure a course that meets the individual needs of students and helps to close the gap in students' success. Students face additional struggles as they are required to show their learning in different ways and work independently.

When considering best practices in online learning environments, it is important to consider that online learning operates in significantly different ways from traditional face-to-face learning environments. Online learning environments challenge students particularly due to the lack of teacher-to-student interaction which is key for both student engagement (Lu, 2021) and identification of student learning styles (Graf et al., 2009). In all online learning environments, whether there is teacher interaction or they are conducted asynchronously, students have significantly fewer interactions with their teachers. When traditional face-to-face teachers rely on interactions with students to identify learning styles and ensure those learning styles are engaged in their course, online teachers must rely on other strategies and intentional best practices to ensure they meet the needs of their students. Much of the research conducted on online learning and learning style has been conducted in either traditional face-to-face K-12 learning environments or postsecondary online learning environments.

By the nature of the online learning environment, learners have more independence and control of their learning. This is usually considered a positive feature to enhance motivation

(Reeves, 1993). However, research has shown that learner independence and control are associated with several negative outcomes, such as less time spent on tasks and the use of poor learning strategies (Brown, 2001; Williams & Sawyer, 1993). During the COVID pandemic, through various surveys, only about 60% of students in the United States regularly engaged in learning activities (Educators for Excellence, 2020; Kraft & Simon, 2020). This puts significant pressure on teachers to engage their students and equip them with the skills and strategies that will enable them to be successful in online learning environments.

Though challenges occur in online learning, the need to incorporate skills into the curriculum (Lu, 2021), and individualized learning (Graf et al., 2009; Ni, 2009), online learning also inherently benefits students by prioritizing certain skills and increasing effectiveness for learning (Ni, 2009). Two skills that may help with student engagement and student success are self-regulated learning and self-efficacy. Both have been identified as factors for student success in traditional face-to-face learning environments and adult online learning environments, but only a small amount of research has been conducted in K-12 online learning environments. By incorporating strategies to encourage and support students in engaging these skills could significantly increase engagement and student achievement. Additionally, areas of research are needed to identify further best practices for online learning to increase student engagement and individual learning.

Guiding Questions

The goal of this literature review is to consider the new data and existing literature to compile best practices for K-12 online learning. Asking the question: What are best practices for online learning environments? The focus of the research is on the impact of and strategies to

incorporate learning styles, self-regulated learning, and self-efficacy in online learning environments. Due to the limited research conducted in K-12 online learning environments, the research used will combine a variety of learning environments to identify possible impacts and the strategies that have been used to incorporate learning styles, self-regulated learning, and self-efficacy into online learning environments.

Definition of Terms

Online Learning: Online education, delivered through multimedia and Internet platforms, interchangeably referred to as web-based learning, e-learning, computer-assisted instruction, and Internet-based learning.

Learning Styles: How learners process and retain information for future use.

Kolb's Model of Learning Styles: A learning style model that consisted of four learning styles, the Assimilator, the Converger, the Accommodator, and the Diverger.

The Assimilator: Learners who acquire knowledge best through abstract concepts and the use of reflective observation. This learner may be described as logical, analytical, and systematic; and, prefers to work alone and values knowledge and understanding.

The Converger: Learners who acquire knowledge best through the processing of abstract concepts and the use of active experimentation. This learner may be described as practical, problem-solving, and technically oriented; and, prefers to work with things rather than people.

The Accommodator: Learners who acquire knowledge best through concrete experiences and the use of active experimentation. This learner may be described as hands-on, experimental, and action-oriented; and, prefers to work with people rather than things.

The Diverger: Learners who acquire knowledge best through concrete experiences and the use of reflective observations. This learner may be described as imaginative, creative, and emotional; and, prefers to work in groups and value interpersonal relationships.

Gardner's Theory of Multiple Intelligences: A theory that suggests that humans possess distinct and independent ways of processing information, encompassing eight types of intelligence.

VAK Theory of Learning Styles: A theory of learning styles that stands for Visual, Auditory, and Kinesthetic, representing three main learning styles: visual learners prefer images and graphics, auditory learners prefer verbal presentations, and kinesthetic learners prefer hands-on approaches.

VARK Learning Model: A model of learning styles created by Neil Fleming in 1987, that expands the VAK learning theory by adding reading/writing to the identified: Visual (V), Aural (A), Read/write (R), and Kinesthetic (K).

Virtual Learning Environment: an environment where students study a digital-based curriculum taught by instructors who lecture online via video or audio.

Kolb Learning Style Inventory (LSI): A questionnaire tool used to identify student's preferred learning styles based on Kolb's Learning Styles.

Felder-Silverman learning style model (FSLSM): A model developed in the 1980s by Richard Felder and Linda Silverman, designed to help students understand their individual learning styles and which helps teachers deliver material in ways that appeal to the varied styles of learning present in their students.

Self-regulation: The skill that students use to set their own goals and manage their learning.

Self-regulated Learning: The initiative-taking process used by students to acquire academic skills through defining tasks, setting goals, and implementing strategies to reach their academic goals.

Self-efficacy: One's ability to organize and implement the necessary actions to achieve the skill performance specified for certain tasks

CHAPTER II: LITERATURE REVIEW

Literature Search Procedures

To find the literature and information for this thesis, searches were conducted in Academic Search Premier, Psychology Database, EBSCO MegaFILE, ERIC, ResearchGate, and Google Scholar. The keywords that were used in these searches include “online learning,” “e-learning,” “secondary education online learning,” “online learning high school,” “online learning best practices,” “learning styles,” “learning styles online,” “learning styles online strategies,” “learning styles best practices,” “learning styles best practices online,” “identifying learning style,” “identifying learning styles online,” “self-regulated learning,” “self-regulated learning online,” “self-regulated learning strategies,” “self-regulated learning strategies online,” “self-efficacy,” “self-efficacy online,” “self-efficacy strategies,” “self-efficacy strategies online,” “online learning COVID,” “impact of COVID secondary education,” “engaging self-regulated learning,” “impact of self-regulated learning on online learning,” and “impact of self-efficacy on online learning.” This chapter will review the literature on engaging learning styles, self-regulated learning, and self-efficacy in online learning environments in three sections in the following order: Identifying and Engaging Learning Styles, Self-regulated learning, and Self-Efficacy.

Identifying and Engaging Learning Styles

The concept of learning styles was originally proposed in 1960 by Dunn, who identified how individuals interpreted and remembered information in unique ways. Just as individuals vary physically, it is believed that individuals vary in the way they learn (Keskin et al., 2021). Learning styles are considered a crucial factor in the learning process for students and teachers,

to engage and accommodate individuals' needs. The concept of learning styles emerged while studying individual differences in learning (Kaplan & Kies, 1995). Learning styles are independent of one another, without greater value or importance from one another (Mutlu, 2006).

Identification and Tools of Learning Styles

To identify learning styles, several models developed and were modified to further define how students learn. In 1983 Gardner's work on multiple intelligences identified three types of physiological learning styles called the VAK theory of learning styles – visual, auditory, and kinesthetic. Fleming and Mills (1992) developed the VARK Learning Model to expand the VAK learning theory by adding reading/writing to the identified learning styles – visual, auditory, reading/writing, and kinesthetic. In these models, visual learners prefer images and graphics, auditory learners prefer verbal presentations, kinesthetic learners prefer hands-on approaches, and reading/writing prefer interacting with text.

Another learning style model is the Kolb model (1984), which consists of four learning styles: the Assimilator, learners who acquire knowledge best through lecture, paper, and analogies; the Converger, learners who acquire knowledge best through hands-on labs and fieldwork; the Accommodator, learners who acquire knowledge best through simulations and case studies; and the Diverger, learners who acquire knowledge best through brainstorming. In 1988, Felder and Silverman modified this theory to interoperate the learning style as the learner's preferences in receiving and processing information.

Assessment for determining learning style typically surveys the learning preferences. Teachers need to understand their learning style as teachers tend to structure lessons around

their learning preferences; understanding their learning style helps teachers to develop a learning environment that purposefully appeals to a variety of learning styles (Pinchot & Poullet, 2014). This is important when designing an online learning course because learner interaction tends to rely on certain learning strategies.

The main purpose of developing a learning environment is to create a typical learning environment. There are three reasons learning styles are essential to best serve students their students: (1) it helps teachers to provide information and instruction that will help students deepen their learning, (2) knowing their learning styles help students to understand when they are struggling and how to develop their weakness, and (3) it helps teachers to match their teaching style with their student's learning style (Graf et al., 2009). When designing learning environments and creating learning activities, either online or in the classroom, it is crucial to know how a student learns (Muir, 2001) in order to successfully engage all students.

Impact of Learning Styles Online

Manochehr (2007) investigated the impact of online education on student knowledge-based learning styles. The research attempts to provide evidence that online learning environments are more effective for specific learning styles based on the Kolb learning style model. The study focused on undergraduate students at a major university who were enrolled in a subject course that was offered in a traditional face-to-face format and online options with the same teacher and knowledge-based tests administered on the same days (Manochehr, 2007). A Kolb Learning Style Inventory (LSI) was administered to students to initially identify students' learning styles (Manochehr, 2007). The LSI is a self-completed questionnaire based on the Kolb model that helps identify which learning style the individual

most identifies with. The LSI and teacher strategies were used as measurements. The study observed that, the Diverger, those who acquire knowledge best through concrete experiences and the use of reflective observation, and Accommodator, those who acquire knowledge best through concrete experiences and the use of active experimentation, tended to perform better in traditional or face-to-face learning environments; whereas the Assimilator, those who acquire knowledge best through abstract concepts and the use of reflective observation, and the Converger, those who acquire knowledge best through processing of abstract concepts and the use of active experimentation, did better in the online environment (Manochehr, 2007). This indicates that students who learn best through brainstorming, watching, and doing perform better in online learning environments (Manochehr, 2007). “The results of this research paper revealed that students’ learning styles were statistically significant for knowledge performance” (Manochehr, 2007, p. 13), confirming earlier studies.

In a study by Esichaikul and Bechter (2010), Kolb’s learning style theory is used to determine if there are differences between the learning types and how they utilize the different tools and strategies in online learning environments. This study indicates that differences in the four learning types exist during learning activities, such as discussion board posts, use of communication tools, and problem-solving (Esichaikul & Bechter, 2010). In comparison, Divergers were more likely to challenge a point of view on discussion board posts and tend to ask for teacher assistance (Esichaikul & Bechter, 2010). Convergences, however, tend to analyze data and put things into a model framework (Esichaikul & Bechter, 2010). Accommodators exchange email as a communication tool and will relate learnings to personal experiences more frequently (Esichaikul & Bechter, 2010). Assimilators tend to have offline discussions via phone

or personal meetings and are more likely to introduce new perspectives to discussion posts (Esichaikul & Bechter, 2010). This study shows that providing a variety of activities, learning strategies, and interactions is important for course creation to engage learners of different learning styles.

Utilizing Technology for Learning Style Identification

As a solution for identifying individual learning styles while utilizing technology available for the digital learning environment, Graf et al. (2009) researched automatic approaches to identify learning styles in learning management systems (LMS) and tools to support teachers through the use of algorithms. For this study, the Felder-Silverman learning style model (FSLSM) was used; this model features four dimensions of learning: active/reflective, sensing/intuitive, visual/verbal, and sequential/global. Graf et al. (2009) identified relevant patterns of behaviors for each of the dimensions of the FSLSM, which was used to evaluate the data about students' behaviors looking at the frequency a student visited a particular activity or reading, creating the algorithm to identify each learning style. Results were compared to self-evaluations students participated in before the course. Overall, the data showed a positive correlation between the relevant patterns of behavior and self-evaluation, allowing teachers to identify students' learning styles in an online environment for teachers to adapt course materials to students' needs (Graf et al., 2009).

A similar study was conducted by Zajac (2009), which suggests that a learning style questionnaire should be integrated into the online classroom, to allow students to self-assess their learning style. Zajac (2009) utilized a Virtual Learning Environment and Gardner's Multiple Intelligence Theory to personalize the learning experience to meet individuals' needs. There

were three phases to this study. In phase one, data is gathered about learners' individual preferences by statistical analysis performed through data mining techniques (Zajac, 2009). The study collected questionnaire data from 220 students (160 university students, and 60 upper secondary school students) through electronic tools that consisted of 70 questions (Zajac, 2009). Phase two defined the structure of a knowledge-based (learning content repository), which was used to personalize learning (Zajac, 2009). Such databases should fulfill three main requirements:

- content must be divided into learning objectives, which can be joined together to create a new online course
- content is stored in various forms (e.g., text, audio or video recording, graphic representation (table, flowchart))
- how to combine different learning objectives must be defined (Zajac, 2009)

Phase three implemented an intelligent steering algorithm in the LMS. The intelligent steering algorithm uses AI techniques that can 'learn' and "generate the set of indications describing the needs of particular learners concerning learning content" that should be prepared for the students (Zajac, 2009, p. 6). Once a student identifies their learning style, the student then can choose the type of learning activity based on their preferences (Zajac, 2009), this provides a connection between identifying and engaging learning styles.

Strategies for Engaging Learning Styles

To provide a model for engaging learning styles online, Bonk and Zhang (2006) introduced the Read, Reflect, Display, and Do model, or R2D2 model, for adapting online instruction to accommodate student learning styles. The first portion of the model, Read,

includes reading, listening, and knowledge acquisition and is designed to accommodate learners whose primary style is verbal or auditory. Intentionally incorporating a variety of methods for the Read portion of this model helps replicate elements of face-to-face instruction, particularly the identification of learning objectives. The high rates of face-to-face students identifying learning objectives as important might be due to the increased emphasis on teaching objectives during the lecture in the classroom (Ni, 2013), by incorporating the variety of methods for the Read portion, teachers can emphasize the learning objectives.

The second component, Reflect, has students reflect on their learning acquisition through writing about what they have learned or observed, which accommodates observational learners (Bonk & Zhang, 2009). The format of online learning requires more frequent writing skills, substituting social and communicative interaction with “interactions with discussion boards, synchronous chat, electronic bulletin boards, and e-mails” (Ni, 2013, p. 201), which would create higher importance on the execution of skills and higher practice levels for students online. Writing for understanding and comprehension is associated with critical thinking skills and evaluation skills (Quitadamo & Kurtz, 2007), however according to the National Assessment of Educational Progress (NAEP), only 27 percent of eighth to twelfth-grade students scored proficient or above (2011). Providing additional practice in writing is crucial for closing this writing gap.

In the final two components, the Display portion of the R2D2 method primarily accommodates visual learners and has students create visual depictions or symbols of what they have learned (Bonk & Zhang, 2009). This component helps to reinforce Reflect and potentially provides a balance for students who fall below proficient in their writing skills. The

Do portion is the final component of the R2D2 model, which accommodates kinesthetic learners who prefer hands-on experiences (Bonk & Zhang, 2009). Do can incorporate scenarios, games, and other interactive activities or projects. This model has been incorporated into online education, particularly for students in supported environments.

Several teaching strategies for online instruction were identified based on the VARK learning styles, which first suggests providing content in a variety of formats such as including audio narration with presentations that also include a written transcript of the audio (Zapalska & Brozik, 2006). For this study, students answered the VARK questionnaire, which has students identify their learning preferences. Only two students identified as having an auditory learning preference, possibly indicating that students with auditory preference may choose a traditional learning environment more often (Zapalska & Brozik, 2006). Based on this study, Zapalska and Brozik (2006) suggest the following techniques to promote a successful online learning process:

- use short-term and long-term, individually written assignments
- combine individual assignments with group assignments
- provide step-by-step instructions and directions whenever they are needed
- provide written comments on homework assignments
- allow students to work in groups and help each other to discuss, analyze, and solve problems
- use games, simulations, and/or active learning in combination with lecturing
- allow students to gain extra credit points from their oral presentations and active participation in class discussion or group learning
- provide oral assignments

- use video and computer assignments in combination with other teaching techniques

For students to succeed in online education, teachers should be able to identify different learning styles and how those preferences affect students' learning strategies. By combining a mixture of approaches and teaching methods, students will be able to choose the instructional style that best serves their learning style (Zapalska & Brozik, 2006). By incorporating a variety of activities and strategies into an online learning environment, more students will be engaged in learning.

Self-Regulated Learning

Self-regulation is the skill that students use to set their own goals and manage their learning (Zimmerman, 2008). Self-regulated learning is the initiative-taking process used by students to acquire academic skills through defining tasks, setting goals, and implementing strategies to reach their academic goals (Whipp & Chiarelli, 2004). According to a study by Artino and Ioannou (2008):

Self-regulated learners are generally characterized as active participants who efficiently control their own learning experiences in many different ways, including establishing a productive work environment and using resources effectively; organizing and rehearsing information to be learned; seeking help when they do not understand; and holding positive motivational beliefs about their capabilities, the value of learning, and the factors that influence learning. (p. 3)

When looking at the requirements of online learning environments, self-regulated learning is an essential skill for students to perform academically to their full potential, particularly in an online learning environment where students participate in independent learning more often.

Developing self-regulated learning skills also creates lifelong learners both at university and in their careers (White & DiBenedetto, 2018). As students are required to access information easily and with the development of technology, it becomes increasingly essential for students to acquire lifelong learning and self-regulated learning skills, particularly as independent online education environments become more prominent.

Components of Self-Regulated Learning

A student's perception of themselves as being intrinsically or extrinsically motivated to engage in learning activities is an important factor in a student's self-regulation (Yuksleturk & Bulut, 2009). Students who perceive themselves as intrinsically motivated may have higher self-regulation in independent activities. In traditional face-to-face learning environments, learners who can effectively self-regulate are the most effective learners (Boekaerts, 1997), by assuming responsibility for their learning (Zimmerman & Kitsantas, 2005). Furthermore, self-regulated learning is considered "a prerequisite for distance education" (Bothma & Monteith, 2004), due to the high level of learner autonomy and low levels of teacher presence (Lehman et al., 2014).

According to Zimmerman (2000), self-regulatory processes and beliefs consist of three cyclical phases: forethought, performance or volitional control, and self-reflection. The forethought phase happens before efforts to learn, and sets the stage for learning, through actions of setting goals and plans (Zimmerman, 1998, 2000). The performance or volitional control happens during the learning efforts and includes concentration and performance monitoring (Zimmerman, 1998, 2000). The final stage is self-reflection or evaluation that occurs after learning efforts, where the learners' reactions to that experience, result in additional

personal insight that influences the forethought phase of future learning efforts (Zimmerman, 1998, 2000). Zimmerman (2000) suggests that all students practice self-regulation at some point in their academic experiences, yet students have significant variations in their experience.

Adolescence is a critical period for the development of self-regulated learning (Dent & Koenka, 2016; Duncan et al., 2018), and self-regulated learning is a predictor of academic learning success (Cohen, 2012; Tauber et al., 2013; Pintrich & DeGroot, 1990). Both high-achieving students, as well as poor-performing students, struggle with self-regulated learning skills (Bjork et al., 2013). Self-regulated learning skills are important to teach all students at all achievement levels (Whittlesey & Steiner, 2021). Successful online students have more intrinsic motivation than students in traditional face-to-face learning environments (Wighting et al., 2008), which is directly tied to self-regulation skills.

Impact of Self-regulated Learning

Matuga (2009) investigated self-regulation, goal orientation, and academic achievement of 40 secondary students, with a minimum GPA of 3.5, who completed online university courses in the sciences. Students were enrolled in the Post-Secondary Online Corridor (PAOLC) program which was designed to address concerns about students' success in online courses (Matuga, 2009). PAOLC incorporated the US National Education Association's Guidelines for Online High School Courses when designing three introductory college courses that featured the use of discussion boards to promote student-student and teacher-student interactivity (Matuga, 2009). Courses were facilitated by university faculty who had prior experience teaching online with the assistance of three secondary school science teachers (Matuga, 2009). Students entering the online course that were performance goal-oriented were concerned with getting a good grade

or engaging in activities that would achieve a good grade (Matuga, 2009). “At the end of the course, however, it appears that students are moving toward a learning orientation” (Matuga, 2009, p. 9), as opposed to the grade oriented. In comparison to low or average-achieving students, high-achieving students, when entering the online course, became more confident in their ability to learn in an online environment when looking at goal orientations (Matuga, 2009). When looking at self-regulation, data indicates that students were less likely to try to figure out materials if they were confused, as the semester progressed, students struggled to stick to a schedule, and they were less likely to ask for help (Matuga, 2009). Average and high-achieving students became “less confident in their ability to self-regulate their own learning as the semester progressed” (Matuga, 2009, p. 9). In contrast, low-achieving students became more confident in their own belief to self-regulate their own learning. This indicates that students’ previous academic achievement is not an indicator of future online learning success or self-regulated learning skills in an online learning environment.

Yukselturk and Bulut (2009) examined the “gender differences in self-regulated online learning environments with respect to motivational beliefs, self-regulated learning components and achievement” (p. 15). In this study, the Motivated Strategies for Learning Questionnaire (MSLQ) was used to assess 145 volunteer online students’ motivation and use of learning strategies. Results indicate significant differences in the male and female experience, particularly in the test anxiety (Yuksleturk & Bulut, 2009). However, in general, the study found that there were “not statistically significant mean differences among motivational beliefs, self-regulated learning variables” (Yuksleturk & Bulut, 2009, p.12) in relation to the gender of the student in an online learning environment.

Strategies for Developing Self-Regulated Learning

A study by Artino and Stephens (2006) utilized the MSLQ to provide insight into the relationship between motivational components and self-regulation. This study indicates that students' use of learning strategies in an online course is affected “by their motivational belief and attitudes towards the learning task” (Artino & Stephens, 2006, p. 7). This suggests that supporting and scaffolding self-regulated learning strategies for mastery should be incorporated into the design of online courses.

Many self-regulation learning interventions include aspects of planning, monitoring, and strategy use in their design (Paris & Paris, 2001). In the several intervention strategies, during the planning phase of interventions, the importance of helping students activate their prior knowledge was stressed, as well as goal planning (Harris et al., 2013; Purdie et al., 1996). As a writing intervention, Harris and Graham (1992) propose students should be taught how to set goals for their writing; and as a math intervention, Pape et al. (2003) included having students record their plan for studying for their weekly quizzes. Similar goal-planning strategies were implemented in Cleary's Self-Regulation Empowerment Program (SREP), which focused on science self-regulation interventions (Cleary et al., 2008). The SRE includes explicit teaching of planning skills, including task analysis, goal-setting, and strategic planning (Clearly et al., 2008).

Monitoring for understanding and efficacy of strategies used is an important element of self-regulation learning interventions. Souvignier and Mokhlesgerami (2006) utilized monitoring skills in reading interventions by teaching students to check for understanding of words and comprehension of the text passages. Many self-regulation learning interventions begin with direct or explicit instruction of learning strategies, this instruction is an important element of

self-regulation learning intervention. The Concept-Oriented Reading Instruction (CORI) program featured explicit learning strategies for several reading comprehension strategies, including activating background knowledge, questioning, searching for information, summarizing, organizing graphically, and identifying story structure (Guthrie et al., 2004).

In contrast to previous studies, Çetin (2022) also utilized MSLQ to evaluate 30 students' motivation and self-regulated learning to evaluate the possible impact on GPA, both online and in person. It was determined that there was not a significant correlation between the student scores on the MSLQ and their GPAs (Çetin, 2022). This discovery was in alignment with the previous study by Basila (2016) that determined that self-regulated learning did not have a significant effect on a student's academic success. These studies potentially indicate that self-regulated learning is not a significant factor in a student's success in online learning but only one aspect of a student's online experience.

Despite the possible lack of correlation between self-regulated learning and academic achievement, strategies have been developed to develop self-regulated learning. The self-regulated strategy development (SRSD) program, similarly, focused on writing strategies for producing a persuasive essay (Harris & Graham, 1992). SRSD utilized the mnemonic POW + TREE: Pick my idea, Organize my notes, Write and say more, Topic sentence, Reasons—three or more, Examine, Ending (Harris & Graham, 1992). The use of these strategies with students with disabilities was deemed an effective intervention, as students provided an increase in the number of response parts written and increased stability in the number of written words (Hoover et al., 2012). Though planning and explicit teaching of self-regulation learning

intervention strategies are seen and successfully utilized throughout the different subject areas, the strategies that are utilized are subject to specific (Fuchs et al., 2003).

Artino and Ioannou (2008) identified key findings and instructional implications for online learning that develop self-regulated learning. A key finding was “The Quality and Quantity of Students’ Self-Regulatory Beliefs and Behaviors Vary Greatly; Those with More Adaptive Profiles Experience Greater Success” (Artino & Ioannou, 2008, p. 3). Artino and Ioannou (2008) confirm that empirical findings indicate that in online learning, students’ beliefs and behaviors are associated with greater academic success, overall satisfaction, greater intentions to enroll in future online courses, and superior academic performance. Also, identified is the suggestion that there may be important developmental differences in students’ academic self-regulation, confirmed by research by Greene and Azevedo (2007). Based on this key finding, Artino and Ioannou (2008) suggest two instructional implications: (1) Assess components of students’ self-regulated learning and supply individual feedback; and (2) Provide students with differential support. These findings are supported by previous studies that promote scaffolding self-regulated learning strategies and providing a variety of learning activities to meet individual student needs in an online environment.

Paris and Wiongrad

Paris and Wiongrad (2003) designed comprehensive principles for teachers to use to promote student self-regulated learning in a course and during instruction. The first principle is: “Self-appraisal leads to a deeper understanding of learning” (Paris & Wiongard, 2003, p. 8). “Part of becoming self-regulated involves awareness of effective thinking and analyses of one's own thinking habits” (Paris & Wiongard, 2003, p. 4). Paris and Wiongrad (2003) argue that this

principle is useful for teachers as well as students, similar to Pinchot and Poullet's (2014) observation of learning styles, a teacher who reflects on their own learning will be able to understand their own tendencies to rely upon certain strategies that help them and create a more diverse set of strategies for students. Paris and Wiongrad (2003) provide three application strategies for this principle:

- analyzing personal styles and strategies of learning, and comparing them with the strategies of others
- evaluating what is known and what is not known, as well as discerning personal depth of understanding about key points
- periodic self-assessment of learning processes and outcomes

Incorporating these strategies, would increase personal awareness of different learning styles and strategies, and promote efficient effort allocation, monitoring of progress, and feelings of self-efficacy (Paris & Wiongard, 2003). Matuga's (2009) study of online learning environments with secondary students, observed that secondary students' belief in their own ability to monitor comprehension stem from their overestimation of self-regulated learning behaviors in a face-to-face environment. By incorporating intentional analysis, evaluation, and self-assessment of their own learning process and strategies, students could have a more accurate assessment of their self-regulated learning behaviors.

The second principle, "Self-management of thinking, effort, and affect promotes flexible approaches to problem solving that are adaptive, persistent, self-controlled, strategic, and goal-oriented" (Paris & Wiongard, 2003, p. 9), highlights that self-regulated learners will

efficiently control their own learning experiences in many different ways (Artino & Ioannou, 2008). Paris and Wiongrad (2003) state that:

Self-regulated learners do not simply follow a plan of action; they adapt to changing conditions and know what to do when they encounter problems. It is the flexible responses to unforeseen circumstances that typifies self-regulation, and it is important to note that self-regulated learners do not lose sight of their goals or lose positive perceptions of themselves when things do not unfold as planned. (p. 10)

To promote this efficient control of learning, Paris and Wiongrad (2003) provide three application strategies for this principle:

- setting appropriate goals that are challenging and attainable that are chosen by the individual and focus mastery orientation rather than a performance goal
- managing time and resources through effective planning and monitoring
- reviewing one's own learning, revising the approach, or starting new

Incorporating these strategies, would increase self-regulation through setting priorities, overcoming frustration, persisting to task completion, and an increase in self-monitoring (Paris & Wiongard, 2003). A study by Matuga (2009), observed similar findings, that students who increased their self-regulations transitioned their goals from grade orientation to learning orientation.

The third principle, "Self-regulation can be taught in diverse ways" (Paris & Wiongard, 2003, p. 12). Paris and Wiongrad (2003) argue that both children and adults can be taught self-regulated learning, however the approach to how they are taught may vary depending on the learner, and teachers should adapt their method of instruction to the learner. The first

method of instruction is explicit instruction, directed reflection, metacognitive discussions, and participation in practices (Paris & Wiongard, 2003). Though it is not necessary for an individual to have direct instruction in order to master self-regulated learning, “many children do not gain metacognitive insights or use self-regulated effectively without direct instruction and it seems plausible that many teachers can increase their own metacognitive understanding through explicit instruction” (Paris & Wiongard, 2003, p. 12). The second method of instruction is indirectly by modeling and by activities that entail reflective analyses of learning (Paris & Wiongard, 2003). Two strategies suggested to incorporate modeling and reflective analyses of learning are journaling and conferences with students, which provide an avenue for self-exploration, self-discovery, and self-disclosure (Paris & Wiongard, 2003). The second method of instruction is assessing, charting, and discussing evidence of personal growth (Paris & Wiongard, 2003). This would include, record keeping of goals met, grades received, and progress made in behavior management and learning, which could be compiled into a portfolio of the students' self-appraisal (Paris & Wiongard, 2003). Each of these methods to incorporate the third principle scaffolds the previous two principles and provides a reflective process of the students' self-regulated learning, possibly providing growth in the students' self-efficacy.

The fourth principle, “Self-regulation is woven into the narrative experiences and the identity strivings of everyone” (Paris & Wiongard, 2003, p. 14). “Self-regulated learning is shaped by the identity of the group one belongs to or aspires to join” (Paris & Wiongard, 2003, p. 14), and is similar across groups because it is learned through participation and membership. Paris and Wiongrad (2003) provide insight into the need to adapt strategies to consider the individual, stating: “how individuals choose to appraise and monitor their own behavior is

usually consistent with their preferred or desired identity” (p. 14). Especially, after age 12, students gain identities which can be associated with their perceived trajectory within formal education; if these identities are consistent with a college-bound or intellectually curious person, that student may engage in positive aspects of self-regulated learning (Paris & Wiongard, 2003). Teachers will then need to consider how students' identities influence responsiveness to teaching about self-regulated learning, particularly when considering multicultural values and non-academically oriented families (Paris & Wiongard, 2003). Providing instruction explicitly or implicitly for students may vary depending on the student's own perceived identity and how that identity interacts within an educational environment.

Though the principles provided by Paris and Wiongard (2003) were developed with a traditional face-to-face learning environment in mind, they do align with previous research, strategies, and tools used in both a self-regulated learning environment and individual learning strategies. These principles are also adaptable to online learning environments and could provide significant guidance for teachers when designing an online learning course that incorporates self-regulated learning strategies.

Self-Efficacy

Students that showed high self-regulated learning skills, also, often showed high academic self-efficacy beliefs (Zimmerman & Kitsantas, 2005). Self-efficacy is one's ability to organize and implement the necessary actions to achieve the skill performance specified for certain tasks (Zimmerman, 2000). Research indicates that self-efficacy impacts one's confidence in their skills to perform a task, in addition to their judgment about one's ability to accomplish a task (García & Pintrich et al., 1991).

Studies have shown that there is a relationship between students' academic achievement and self-efficacy beliefs (Zimmerman, 2005). Task choice, effort, patience, and success of the learner is affected by self-efficacy (Çetin, 2022). Self-efficacy strongly affects learning motivation (Bandura, 1997; Cho & Heron, 2015; Eryaman, et al., 2013; Schunk & Ertmer, 2000). Students who feel successful in their learning are more likely to work harder, participate more readily, persist longer, and have a higher level of achievement compared to students who doubt their learning capabilities (Pajares, 1996). For students who believe that they are competent, their self-efficacy is enhanced (Schunk et al., 2014).

In the context of online learning, students' motivational beliefs, such as self-efficacy and task value, play a crucial role in their academic performance (Artino & Ioannou, 2008). As students work independently in online education environments, they are expected to regulate and perform tasks independently. As they navigate through the independent work they will be expected to have or develop self-efficacy to effectively complete the required task for the online course.

There are three areas that are considered when assessing self-efficacy online: technology, learning, and social interaction (Shen, 2013). Technology self-efficacy plays a significant role in the preparation of educators who use educational technology successfully to improve student learning (Holcomb et al., 2010). According to Wang (2013), students' self-efficacy concerning technology and their use of technology in online learning is a critical element in measuring whether students are prepared for online learning. Torkzadeh (2002) determined that it was possible to increase the self-efficacy level of online technologies through educational processes.

There have been several studies on the impact of self-efficacy on students' online success. In the same study from Çetin (2022) that identified self-regulation as having no significant correlation to a students' academic performance in an online education environment, self-efficacy did have a significant role in the students' academic performance. Students with high self-efficacy performed significantly better in the online course than the students with lower self-efficacy. Çetin (2022) states:

This means that when students' judgments about their ability to accomplish a task is high and their confidence in their skills to perform that task are high, they will perform better in their online courses regardless of their motivation level or self-regulatory abilities. (p. 80)

With this understanding of the role of academic self-efficacy should be considered in designing and conducting online courses to ensure that the students' learning environment is one that fosters the development of a students' academic self-efficacy (Çetin, 2022). "In turn, students' learning and performance in these courses could be optimized" (Çetin, 2022, p. 95). Though it would appear that not all students possess the same aptitude for academic self-efficacy, Yuksleturk and Butul (2009) identified that male students struggled with self-efficacy in online courses, indicating that a students' gender may play a role in the students' success in online education.

Studies indicate that students with higher self-efficacy tend to employ more effective cognitive and metacognitive learning strategies, express greater satisfaction with their learning experience, are more likely to enroll in future online courses, and achieve better academic performance (Artino & Ioannou, 2008). Similarly, learners' task value beliefs, which

pertain to their perception of a task's interest, importance, and usefulness, have been linked to the use of adaptive self-regulatory strategies in both traditional and online classrooms (Artino & Ioannou, 2008). Students who exhibit a stronger personal interest in a subject and consider the activity valuable or significant are more inclined to employ effective self-regulatory strategies (Artino & Ioannou, 2008). Research in online settings has further supported the positive relationship between task value beliefs and students' use of cognitive and metacognitive learning strategies, overall satisfaction with their learning experience, and their decisions to enroll in future courses (Artino & Ioannou, 2008).

Research shows that students' self-efficacy benefits students in an online environment due to the highly independent learning environment (Artino, 2007). Research suggests that self-efficacy is important in challenging learning environments, especially online environments (Cho et al., 2010; Shen et al., 2013), with evidence indicating that students' self-efficacy in the online environment related to academic performance (Ergul, 2004; Lynch & Dembo, 2004; Tsai et al., 2011) and a predictor of final course grades (Lynch & Dembo, 2004; Bell & Akroyd, 2006).

Basila (2016) collected MSLQ surveys from 127 university students, to examine the relationship between self-regulation, motivation, and self-efficacy and students' academic performance in an online classroom environment. Results of the study confirm the importance of students' self-efficacy in the online classroom, suggesting that students with high self-efficacy perform better academically in online environments than those with lower self-efficacy (Basila, 2016). Self-efficacy was highly related to student success regardless of other major factors, self-regulated learning and motivation; "academic self-efficacy is the

most important factor in explaining variations in students' grades" (Basila, 2016, p. 80). This means that the students' belief about their ability to accomplish a task and their confidence in their skills to perform that task directly correlates with how they perform in their online environment, regardless of their motivation or self-regulated learning skills (Basila, 2016). The greater the students' self-efficacy, the better the student performed in the online environment, which identifies the need for strategies for developing self-efficacy in an online environment.

Wang et al. (2013) examined the relationship between self-efficacy in technology and students' academic success in an online environment and identified strategies for increasing self-efficacy in technology in an online learning environment. In this study, 2139 university students were administered several questionnaires, a Demographic questionnaire, a course satisfaction questionnaire (CSQ), modified motivation strategies for learning questionnaire (modified MSLQ), and an online technology self-efficacy scale (OTSES), to identify students' self-efficacy in technology (Wang et al., 2013). The results of this study found that "students with higher levels of technology self-efficacy tend to receive better grades" (Wang et al., 2013, p. 317). Wang et al. (2013) identified two dimensions of technology self-efficacy, general computer self-efficacy, and online learning platform-related self-efficacy, which suggest that students with general computer and online learning platform skills are more likely to have success in an online learning environment (Wang et al., 2013). In addition, students that previously participated in online courses had higher levels of technology self-efficacy (Wang et al., 2013). These findings indicate that teachers "should pay more attention to those students in their first online course to encourage them to participate and

persist” (Wang et al., 2013, p. 304). Wang et al. (2013) suggest that teachers should provide three forms of direct instruction at the beginning of the course to promote direct instruction: (1) Instruction on using the discussion board, checking grades online, how to download/upload documents, sending/receiving emails, and other elements of the online learning platform so students will be more comfortable in using the online learning platform; and (2) an introduction to conducting an Internet search through a search engine and using online library. Setting clear expectations and providing instruction to students on the technology they are expected to utilize in their course creates an environment where students feel comfortable and confident in the online learning environment, effectively increasing their self-efficacy.

CHAPTER III: DISCUSSION AND CONCLUSION

Summary

Prior to the 2020 COVID outbreak, online learning environments were not widely utilized in K-12 education, and 57% of online learning for K-12 in the United States was used to help students recover from missed or failed courses (Roberts, 2021). However, online learning is becoming more popular, with a projected industry increase of 20% from 2022 to 2028 (Wadhvani, 2022). With this significant increase in online learning of K-12 students, there is a need to identify best practices to ensure student success. Until this recent shift in online learning utilization, the majority of research in this area was conducted in postsecondary education, and the connection between these age groups needs to be examined.

As the online learning environments expand, several challenges have been identified, particularly due to the lack of teacher to student interaction, which is key to online learning for both student engagement (Lu, 2021) and identification of student learning styles (Graf et al., 2009). Research has been conducted to identify solutions to these challenges, primarily in postsecondary settings. To address these challenges, this thesis sought to answer the following question: What are best practices for online learning environments? To answer this question the research focused primarily on incorporating strategies for engaging learning style and increasing self-regulated learning and self-efficacy.

Learning Styles in Online Learning Environments

Over the past several decades, a significant amount of literature has been developed based on learning styles. All learning theories agree that individuals learn differently and have certain learning modalities that serve them best. Learning style assessments typically survey the

learning preferences, to assist individuals in identifying their learning style based on the learning style model the assessment is based on. These assessments are a useful tool for learning style identification in online learning environments. In addition to these assessments, teachers are able to utilize the advances in technology and algorithms to assess students' learning styles with accuracy (Graf et al., 2009; Zajac, 2009).

When designing learning environments and creating learning activities, it is important to know how a student learns (Muir, 2001), which holds true in online learning environments. In a study by Manochehr (2007), it was determined that students' learning styles are statistically significant for knowledge performance. In addition, students vary their learning activities based on the differences in their learning styles, such as discussion board posts, use of communication tools, and problem-solving (Esichaikul & Bechter, 2010). It is important to provide a variety of activities, learning strategies, and interactions in online course creation to engage learners of different learning styles.

To engage learner's different learning styles online, Bonk & Zhang (2006) introduced the Read, Reflect, Display, and Do model, or R2D2 model, for adapting online instruction to accommodate student learning styles. Each component of R2D2 engages different learning styles and has been incorporated into online education, particularly for students in supported environments. By combining a mixture of approaches and teaching methods, students will be able to choose the instructional style that best serves their learning style (Zapalska & Brozik, 2006). Incorporating a variety of activities and strategies into an online learning environment engages more students in learning.

Self-Regulated Learning in Online Learning Environments

Online learning environments are an independent environment and rely heavily on the student's ability to monitor their learning process. For this reason, research has focused on the impact and strategies for improving self-regulated learning in online learning environments. Self-regulation is the skill that students use to set their own goals and manage their learning (Zimmerman, 2008). Self-regulated learning is the initiative-taking process used by students to acquire academic skills through defining tasks, setting goals, and implementing strategies to reach their academic goals (Whipp & Chiarelli, 2004), which has been argued to be an essential skill for online learning.

Mantuga (2021) incorporated the US National Education Association's Guidelines for Online High into introductory college courses in the sciences for high school students to investigate self-regulation, goal orientation, and academic achievement. Data from this study indicates that students were less likely to try to figure out materials if they were confused, as the semester progressed, students struggled to stick to a schedule, and they were less likely to ask for help (Matuga, 2009). Average and high-achieving students became "less confident in their ability to self-regulate their own learning as the semester progressed" (Matuga, 2009, p. 9). In contrast, low-achieving students became more confident in their own belief to self-regulate their own learning. This indicates that previous academic achievement may not be a significant indicator of self-regulation. Similarly, gender was not statistically significant in determining self-regulated learning in an online learning environment (Yuksleturk & Bulut, 2009).

Artino and Stephens (2006) found that students' use of learning strategies in online courses are affected "by their motivational belief and attitudes towards the learning task" (Artino & Stephens, 2006, p. 7). This suggests that supporting and scaffolding self-regulated learning strategies for mastery should be incorporated into the design of online courses. Several studies have been conducted to determine how to scaffold learning through both explicit and implicit instruction, providing the following strategies: helping students activate their prior knowledge, goal planning task and writing, task analysis and strategic planning, questioning and searching for information, summarizing, and organizing graphically (Harris et al., 2013; Clearly et al., 2008; Guthrie et al., 2004; Purdie et al., 1996).

In contrast, Basila (2016) and Çetin (2022) determined that self-regulated learning did not have a significant effect on a student's academic success. These studies potentially indicate that self-regulated learning is not a significant factor in a student's success in online learning but only one aspect of a student's online experience.

Artino and Ioannou (2008) identified key findings and instructional implications for online learning that develop self-regulated learning. In this study, two instructional implications have been identified: (1) Assess components of students' self-regulated learning and supply individual feedback; and (2) Provide students with differential support. These findings support previous research, promoting scaffolding self-regulated learning strategies and providing a variety of learning activities to meet individual student needs in an online environment.

Self-Efficacy in Online Learning Environments

Self-efficacy is one's ability to organize and implement the necessary actions to achieve the skill performance specified for certain tasks (Zimmerman, 2000). Research indicates that

self-efficacy impacts one's confidence in their skills to perform a task, in addition to their judgment about one's ability to accomplish a task (García & Pintrich et al., 1991). Studies have shown that there is a relationship between students' academic achievement and self-efficacy beliefs (Zimmerman, 2005). In online learning environments, students' motivational beliefs, such as self-efficacy and task value, play a crucial role in their academic performance (Artino & Ioannou, 2008). Students who feel successful in their learning are more likely to work harder, participate more readily, persist longer, and have a higher level of achievement compared to students who doubt their learning capabilities (Pajares, 1996). Students with high self-efficacy performed significantly better in the online course than the students with lower self-efficacy (Çetin, 2022).

Students' self-efficacy concerning technology and their use of technology in online learning is a critical element in measuring whether students are prepared for online learning (Wang et al., 2013). Torkzadeh (2002) determined that it was possible to increase the self-efficacy level of online technologies through educational processes. Wang et al. (2013) identified two dimensions of technology self-efficacy, general computer self-efficacy and online learning platform-related self-efficacy, which suggest that students with general computer and online learning platform skills are more likely to have success in an online learning environment. In addition, students that previously participated in online courses had higher levels of technology self-efficacy (Wang et al., 2013).

Professional Application

As families and students' look to customize their education experience, they are relying on online learning and online learning is a growing field in K-12 education. Providing an

individualized curriculum and strategies for students to be successful in this environment is crucial. This expansion is not just in the classroom but allows them to expand where and who they learn from, even globally. Based on the research cited there are several applications to current online learning that could create a more individualized learning environment for students.

Design for Learning Styles in Online Learning Environments

When designing an online course, teachers should know their own learning style. This will allow the teacher to understand their own preferences and tendencies to design courses with those preferences. In addition, students should be surveyed at the beginning of the course to help themselves to understand the learning style, so that when provided with learning activities, they are able to choose the activity that is appropriate for them.

Zapalska and Brozik (2006) suggested the following techniques to promote a successful online learning process with different learning style in mind:

- use short-term and long-term, individually written assignments
- combine individual assignments with group assignments
- provide step-by-step instructions and directions whenever they are needed
- provide written comments on homework assignments
- allow students to work in groups and help each other to discuss, analyze, and solve problems
- use games, simulations, and/or active learning in combination with lecturing
- allow students to gain extra credit points from their oral presentations and active participation in class discussion or group learning

- provide oral assignments
- use video and computer assignments in combination with other teaching techniques

By creating a combination of activities and learning opportunities, with choice, all students will be engaged in the course and be provided the opportunity to learn in their preferred learning style.

Another strategy that could be incorporated is the Read, Reflect, Display, and Do model, or R2D2 model, which was designed by Bonk and Zhang (2006) specifically for adapting online instruction to accommodate student learning styles. This strategy scaffolds the learning process to meet the needs of all learning styles with each learning objective.

Design for Self-Regulated Learning in Online Learning Environments

Self-regulated learning has been identified as important to success in an online learning environment. When designing an online course, teachers should remember that both high-achieving students, as well as poor-performing students, struggle with self-regulated learning skills (Bjork et al., 2013), and previous academic success is not an indicator of self-regulated learning skills in an online environment (Matuga, 2009). Self-regulated learning skills are important to teach all students at all achievement levels (Whittlesey & Steiner, 2021).

To incorporate self-regulated learning into an online learning environment, explicit and implicit learning can be used, but supporting and scaffolding self-regulated learning strategies for mastery should be incorporated. Whether utilizing explicit or implicit learning, courses should include, helping students activate their prior knowledge, goal planning task and writing, task analysis and strategic planning, questioning and searching for information, summarizing, and organizing graphically (Harris et al., 2013; Clearly et al., 2008; Guthrie et al., 2004; Purdie et

al., 1996). Finally, scaffolding self-regulated learning strategies and providing a variety of learning activities to meet individual student needs in an online environment will help students to increase their self-regulation and success in online environments.

Design for Self-Efficacy in Online Learning Environments

When designing an online course it is important to consider that students who exhibit a stronger personal interest in a subject and consider the activity valuable or significant are more inclined to employ effective self-regulatory strategies (Artino & Ioannou, 2008). In an online environment providing instruction at the beginning of a course on using the discussion board, checking grades online, how to download/upload documents, sending/receiving emails, and other elements of the online learning platform so students will be more comfortable in using the online learning platform (Wang et al., 2013), could significantly increase the student's self-efficacy. In addition, introduction to conducting an Internet search through a search engine and using online libraries could significantly lower barriers for students and increase their feelings of aptitude to complete the course. By setting clear expectations and providing instruction to students on the technology, students' feelings of comfort and confidence in the online learning environment would effectively increase their self-efficacy.

Limitations of the Research

There are several limitations in this research, most prominently that until COVID, the major research in this area was conducted on postsecondary students. This means that though the research is valid and the strategies outlined should be considered, the research has not

been validated for the K-12 age group. Though this does not invalidate the research for this group, it does leave gaps in the implications for this research.

In the topic of self-regulated learning in online learning environments, many of the methods used in the research were similar in both methodology and justification. In addition, many of the researchers used similar literature and often relied heavily on the same research or their own previous research. This creates many similar conclusions and very little variety in research results. This does not mean that the results are invalid, only provides space for additional research.

Self-efficacy was identified as being highly impactful for students in online learning environments; yet, very little research has been conducted on strategies to increase self-efficacy. In addition, a large portion of the studies that reported the significant impact of self-efficacy were primarily focused on strategies for increasing self-regulated learning. This means that though research shows a clear correlation to student success and high levels of self-efficacy, there are very few solutions to assist students in their own success.

Implications for Future Research

Researchers should conduct more studies examining the impact of these strategies on the K-12 online learning environment, particularly in more mainstream courses. Ideally replicating previous studies for the K-12 age group in an online learning environment to validate current beliefs and correlations to success markers for the different developmental stages, as well as, creating new strategies specifically for the K-12 age groups in online learning environments. As the expansion of online learning in K-12 continues, it will be even more

important to students' educational success to have research and best practices specifically for them.

Also, research should be conducted to specifically identify what encourages self-regulated learning and self-efficacy in K-12 online learning environments, both in relation to one another and separately. This is particularly true in regards to self-efficacy which was stated in multiple studies to greatly impact student success. This gap in the research begs the question: what strategies could be implemented in online learning environments that would promote academic self-efficacy?

Conclusion

As online learning becomes increasingly popular and K-12 students utilize this form of education, considering the best practices for instruction should be considered. Providing a course with diverse learning strategies and choice could provide significant engagement of learning styles and development of self-regulated learning and self-efficacy. Structuring an online course to include learning styles, self-regulated learning, and self-efficacy should include both explicit and implicit use of strategies and tools in order for students to be successful.

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