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Journal of Epistemology: Education as a Quest for Truth

We are all on a journey, a quest if you will. Some journeys improve our reality, and others might harm us. Our educational institutions should continually study themselves to help those engaged move closer toward an improved reality. What if all of our institutions adopted the idea that they were on a quest for Truth? We believe that a key role of educational institutions in society is to help the population acquire knowledge and arrive at a more clear picture of the Truth. Have educational institutions considered what knowledge is, what the sources of knowledge are, and how to validate knowledge effectively? Join me on this intellectual, philosophical, and empirical journey on a quest for truth to improve the application of knowledge in our educational systems at all levels.

Welcome to the Journal of Epistemology, a scholarly platform dedicated to advancing our understanding of the Theory of Knowledge within the realm of educational research and theory. In this scholarly endeavor, we aim to unravel the intricacies of knowledge within educational contexts, examining how the educational landscape shapes the pursuit of truth. At the heart of our thematic focus lies the conviction that education serves as a catalyst for understanding knowledge's nature, sources, and validity. We also acknowledge that the only knowledge worth investing in is that which guides us to a deeper understanding or clarity of truth. The classroom, the lecture hall, and the research laboratory become crucibles where ideas are forged, challenged, and refined. In exploring the symbiotic relationship between knowledge and the quest for truth. The better we understand how learning environments mold and shape the minds of learners, the more effective our systems will be at applying the epistemological theory of knowledge.

Purpose of the Journal

Epistemology, a cornerstone of philosophical inquiry, delves into the essence of knowledge, posing fundamental questions that challenge our understanding of reality. What is the nature of knowledge? What are the sources of knowledge? What determines if knowledge is valid? Theoretical and empirical investigations of educational communities are appropriate studies that will accomplish the purpose of this journal. These inquiries lie at the heart of our scholarly pursuits within the Journal of Epistemology. Addressing these questions will help us build effective learning environments that guide us all closer to the truth.

Exploring the Nature of Knowledge

The Nature of Knowledge, a thematic focus of this journal, engages with intricate queries that have captivated the minds of philosophers for centuries. Here, we scrutinize the foundations of reality and probe into truth's relative and absolute aspects. As we embark on this intellectual journey, we aim to cultivate a comprehensive dialogue across disciplines, welcoming contributions from education researchers who seek to unravel the mysteries surrounding the nature of knowl-edge.

Unraveling the Sources of Knowledge

The quest for knowledge encompasses a diverse array of sources, ranging from empiricism and revelation to authority, reason, and intuition. We recognize that many institutions and individuals use a variety of sources to acquire knowledge. The Journal of Epistemology serves as a conduit for scholarly exploration into these sources, fostering a rich tapestry of research that illuminates the origins and pathways through which knowledge is acquired.

Validating Knowledge: Theoretical Perspectives

The validation of knowledge introduces another layer of complexity, and our journal invites rigorous investigations aligned with key theoretical perspectives. Whether through the Correspondence theory, the Coherence theory, or the Pragmatic theory, researchers are encouraged to contribute insights that shed light on the intricate processes through which knowledge is validated and deemed trustworthy. Researchers should use theoretical frameworks anchored in learning or educational theory.

Conclusion

As we embark on this scholarly expedition, the Journal of Epistemology invites researchers, educators, and philosophers to engage in a collaborative discourse that transcends disciplinary boundaries. By fostering a nuanced understanding of the Theory of Knowledge within the context of education, we aspire to contribute meaningfully to the broader academic landscape and propel the dialogue on epistemology to new heights.

Join us in this intellectual odyssey as we explore the essence of knowledge, its diverse sources, and the intricate theories that underpin its validity. Together, let us cultivate a community of thinkers dedicated to unraveling the profound mysteries of epistemology.

Call for Submissions

We warmly invite submissions from researchers, educators, and philosophers across all educational environments. Whether your expertise lies in preschool, primary, secondary, or higher education, we encourage you to contribute your insights and research findings to this interdisciplinary dialogue. Together, let us unravel the symbiotic relationship between education and the timeless pursuit of truth, contributing to a deeper understanding of the epistemological foundations that shape our worldview.



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How Smartphones Affect the Social-Emotional Development of Adolescents Dmitriy Balan

Abstract

This project examined the associations between adolescents' social-emotional development and smartphone use. Some studies conducted between 2011 and 2019 suggested smartphone use may be associated with externalizing and internalizing difficulties among adolescents, such as depression and impulsivity. Such adverse mental health symptoms may make adolescents less sociable and hinder their social-emotional development. This project evaluated various studies conducted between 2019 and 2023 to find what data suggested about the associations between smartphone use and well-being. The project examined different pathways by which smartphones may affect adolescents, including general smartphone use, social media, and sleep. Recent studies produced mixed results. Thus, the research of this paper deduced, there is insufficient evidence to conclude that general smartphone use or social media is directly associated with adverse mental health symptoms. However, substantial evidence indicated smartphone use before bedtime is likely to negatively impact the sleeping patterns of adolescents. Poor sleep quality is associated with various adverse mental health symptoms. Therefore, informing teachers, parents, and adolescents as to the importance of limiting smartphone usage before bedtime is essential. Lastly, future studies should examine the pathways by which smartphones could impact adolescents and pursue to determine causality to produce more rigorous data.

Chapter 1: Introduction to the Project

Background

Technology influences our lives in unprecedented ways. According to Twenge (2019), in 2016, the duration of time spent online among teenagers had doubled compared to 2006. In 2016, older adolescents spent approximately six hours daily using social media, texting, and electronic devices during their free time. According to "America's Children" (2021), since 2011, there has been a steady rise in adolescents who experienced a major depressive episode (MDE). Girls, in particular, have experienced an uptick in MDEs. In 2011, about 12% of girls experienced an MDE and by 2019, the percentage rose to 23% ("America's Children," 2021). If smartphones negatively impact adolescents' well-being, educating young people on the importance of abstinence or restricted use of technology would be essential. Although some researchers identified associations between mental health and smartphone use, the topic remains a matter of considerable debate (Twenge, 2019).

The effects of smartphone use on adolescent mental health have been the subject of much research. Among academics, studies with mixed results have been produced (Orben & Przybylski, 2019; Twenge et al., 2022). One study suggested smartphones have an inverted U-shape impact on adolescents' mental health, meaning, adolescents would experience a positive mental health impact if they use their phones moderately (Przybylski & Weinstein, 2017, as cited in Girela-Serrano et al., 2022). Other researchers found linear correlations between mental health and digital technology in longitudinal and cross-sectional studies. According to Twenge (2019), since 2011, there has been a correlation between smartphone usage and depression among adolescents. Thus far, researchers have been unable to establish a causal link between smartphone use and depressive symptoms. However, Twenge (2019) suggested that the existing associations in data could explain the ways digital media might cause poor mental health. In her publication, Twenge (2019) proposed cyberbullying mediated by social media, upward social comparison, sleep displacement, disruption of face-to-face interaction, melatonin inhibition caused by blue light emission, and reduced physical activity mediated by technology may all serve as possible explanations for the associations found between smartphone use and mental health symptoms (Twenge, 2019).

This research paper will examine the current stance of available studies on the impact of smartphone technology on adolescents. The paper aims to investigate whether smartphone usage impacts adolescents' mental health and to find variables which might affect the mental well-being of smartphone users. The following document analyzes general smartphone use, the use of social media, and how smartphones might affect adolescents' sleep.

Statement of the Problem

With the introduction of handheld devices into people's daily lives, many have inquired about the effects such technology might pose on teenagers' mental well-being. There are mixed results in conducted studies about smartphones' impact on adolescents' mental health. However, if there is sufficient evidence to conclude smartphones might have a negative effect, it would be crucial to respond accordingly. Some studies established an association between smartphone use and mental health, which may suggest smartphones could displace adolescents' circadian rhythm, leading to poor mental health and sleep disorders (Poulain et al., 2019; Twenge, 2019). Heavy smartphone use might also interfere with face-to-face communication, facilitate a reduction in physical activity, and cultivate depression among adolescents, especially girls (Twenge, 2019). Such outcomes would inhibit the social-emotional development of adolescents. Depression hinders mental health, harms interpersonal relationships, and may result in poor academic performance. In the social constructivist theory, Vygotsky (1978) outlined that social interaction is essential for a person's ability to develop higher-order thinking, problem-solving skills, and personality growth. Depressed individuals, however, are less driven to seek out social interactions and report negative interactions more frequently than others (Steger & Kashdan, 2009). If the claims about the negative impacts of smartphone technology are valid, educating adolescents, parents, and educators on responsible usage of smartphones and the importance of using such technology moderately would be necessary to promote adolescent social-emotional development.

Purpose of the Project

The purpose of this project is to examine how smartphones affect the social-emotional development of adolescents. The study will explore how smartphone use might affect the mental well-being of adolescents. Social-emotional development of adolescents heavily depends on the activities they decide to engage in and how they feel. This paper aims to inform teenagers, parents, and educators about smartphone technology's impact on adolescents. Depending on the findings, the paper will propose possible solutions and appropriate guidance on the moderation of smartphone use to minimize any potential harm such technology may have on the development of adolescents.

This paper divided the literature review into three strands. First, the literature review analyzes how general smartphone use might impact the well-being of adolescents. General smartphone use refers to overall smartphone usage; however, it does not entail looking into any specific type of activity on a smartphone. The second strand focuses on studies investigating the impact social media might have on adolescents' mental health. Social media has become an integral part of people's lives, with adolescents primarily using smartphones to actively participate in various social media platforms. The last strand examines how smartphones might impact the sleep patterns of adolescents. Sleep quality is a better predictor of mental health symptoms than diet, sleep quantity, and physical activity (Wickham et al., 2020). The research questions this paper aims to answer are:

> 1. What impact do smartphones have on the social-emotional development of adolescents?

> 2. Do specific activities, such as social media use or smartphone use before bed, have varying levels of impact on adolescents?

3. Based on the research findings, is there a necessity to advocate for abstinence or limitations in smartphone usage?

Theoretical Framework of the Project

The theoretical framework of this project is the socio-constructivist approach to people's social development. According to Vygotsky (1978), individual development and higher-order thinking take root in social interactions. Vygotsky (1978) proposed that a person internalizes social interactions to produce higher psychological functions, such as thinking, language, and problem-solving. Hence, the environment in which a child develops dramatically contributes to developing the child's personality and cognitive abilities.

A critical concept Vygotsky (1978) emphasized is that human activity often aims to influence their environment, both physically and socially. Vygotsky (1978) referred to how people try to influence their environment as tools and signs. Tools are the external instruments humans use to influence nature. Signs, in contrast, are symbolic representations used to master the environment and oneself. According to Vygotsky (1978), language, thought, culture, and memory are all examples of signs. Tools and signs are humans' advantage compared to animals in transforming their environment using physical objects (tools) and symbolic representations (signs). In the theory, Vygotsky (1978) stated that signs, in particular, enable children to develop cognition and internalize the knowledge already present in society.

Through engaging in collaborative activities and internalizing the results of cooperation, children can develop new skills and expand their understanding of the world and society. One of the critical concepts social constructivism proposed was the zone of proximal development (ZPD); it described the gap between a child's current and potential levels of development. Generally, ZPD can be determined through assessments, observations, and interactions with the learner and can be used to guide instruction. Vygotsky (1978) stated that introducing a knowledgeable individual, such as a teacher, into the child's environment would result in the child developing cognitively through social interaction and collaboration. According to Vygotsky (1978), cognitive development includes abstract reasoning, critical thinking, higher-order thinking, and problem-solving. Hence, proper interactions can direct children toward their potential level of development.

The social constructivist theory of learning and development by Vygotsky (1978) asserts that human mental abilities are shaped by how they interact with others. Vygotsky (1978) wrote that humans transmit knowledge and culture through social interactions. The zone of proximal development assumes that the learner with growth potential must turn to someone with greater skills or knowledge, and receive necessary help. According to Vygotsky's (1978) social constructivist theory, social interaction is vital to learning because people learn new skills, learn languages, exchange ideas, and develop cognition through communication.

In conclusion, the social constructivist approach to learning and development emphasizes the critical role of social interaction in shaping cognitive abilities and the overall development of a child. Vygotsky's (1978) theory stated that learning and higher-order thinking come from social interactions, tools, and signs. He sets forth an important goal for educators: helping students reach their zone of proximal development (ZPD). One way of doing this is by getting students to interact with others, which leads to the learner's growth. The social constructivist theory emphasizes that learning is a social process when people talk to each other, share skills, and exchange ideas (Vy-gotsky, 1978).

Definition of Key Terms

Social Emotional Development (SED): The process by which individuals learn how to understand and regulate their emotions, establish healthy relationships, and communicate effectively with other people. The social-emotional development of an adolescent could be affected by internalizing and externalizing difficulties, poor well-being, depression, low life satisfaction, and other variables which may negatively impact a person's emotional state.

Socio-constructivist approach: A theory of learning which highlights the significance of social interaction in shaping cognitive abilities and overall development.

Technology: Refers to any tool, device, software, or application used to electronically create, edit, or transmit data.

Internalizing Symptoms: Refers to a person's internal experiences such as suicidal ideation, depression, anxiety, and self-harm (Girela-Serrano et al., 2022).

Externalizing Symptoms: Psychological conditions which are characterized by a person's outward expression or behavior, including, poor conduct and inattention (Girela-Serrano et al., 2022).

Well-being: Characterization of an individual's self-esteem and quality of life-related to their health (Girela-Serrano et al., 2022).

Problematic Smartphone Use (PSU): Excessive use of smartphone technology could potentially lead to detrimental mental health outcomes. PSU is commonly determined using various questionnaires (Pereira et at., 2020).

Fear of Missing Out (FOMO): A form of anxiety that one may experience if one becomes disconnected from the digital realm, driven by fear of losing touch with the ongoing events and developments online (Brown & Kuss, 2020).

Social Media Use (SMU): Refers to social network sites that are used for messaging, posting content, and viewing content made by other individuals (Boer et al., 2022).

Summary

The debate around smartphones' impact on adolescents' social-emotional development harnessed much attention over the past few years. Researchers have published many studies to find answers to this topic. "America's Children" (2021) published statistics on major depressive episodes (MDEs) among adolescents. Between 2011 and 2019, the percentage of girls who experienced a major depressive episode (MDE) increased from 12% to 23%, while the percentage among boys increased from four to nine percent ("America's Children," 2021). Twenge (2019) highlighted that the amount of time adolescents spent on their smartphones in 2016 had doubled since 2006. Though researchers found associations between poor mental health and smartphone use in the research conducted between 2011 and 2019, the results were mixed. Researchers have widely debated this topic, often citing and replying to each other's criticisms. As was the case in a recent publication by Twenge et al. (2022), which scrutinized an often-cited study Orben & Przybylski (2019) conducted.

In her journal publication, Twenge (2019) provided an overview of the existing research conducted on smartphone use as of 2019. In the paper, Twenge (2019) acknowledged that the causality between smartphone use and adolescents' mental health is unknown. However, Twenge (2019) outlined some possible risks smartphones might pose to adolescents. According to her publication, upward social comparison, melatonin inhibition caused by blue light emission, cyberbullying, disruption of face-to-face interaction, and sleep displacement might explain the correlations between poor mental health and smartphone use among adolescents.

Previous research was inconclusive about the associations between poor mental health and smartphone use. Poor mental health is likely to hinder the social-emotional development of adolescents. Vygotsky (1978), in his socio-constructivist theory, highlighted that social interactions are essential to developing a child's personality and problem-solving skills. Individuals who are depressed, however, are more likely to report that their social interactions are negative and are less likely to interact with others (Steger & Kashdan, 2009). Therefore, if recent research can provide evidence of the negative effects of smartphone use, it would be crucial to educate teenagers, parents, and educators about the significance of using smartphones moderately.

In conclusion, this project examines recent research on smartphones' impact on adolescents' well-being. The project analyzes particular factors that might impact adolescents, including the usage of smartphones before sleep and engagement with social media. Lastly, the research of this project examines if abstinence or limited use of smartphones promotes adolescents' mental health.

Chapter 2: Review of Related Literature

Introduction

Between 2011 and 2019, researchers conducted many studies to examine smartphone use's impact on adolescents. The studies were inconsistent in their findings; some research suggested a correlation between smartphone use and adverse mental health among adolescents. Other studies, however, were unable to find any meaningful associations. The purpose of this project is to examine what recent research was able to find on this topic. This project begins by analyzing the overall influence of smartphones on adolescents. Subsequently, it investigates the impact of smartphones on adolescents mediated by social media usage and, finally, sleep patterns. If recent studies established causality, then limited use of smartphones or abstinence might serve as an answer to adolescents who increasingly suffer from mental health symptoms.

The project focuses on longitudinal and cross-sectional studies conducted domestically and internationally among adolescents. The rationale behind this decision was that the internet united people across the globe. Adolescents in other countries use smartphones to access the same social media platforms as adolescents in the United States. The impact a smartphone could have on an adolescent's sleep or general well-being is likely universal no matter where the adolescent lives because people of all races and nationalities share a common biological makeup.

Research History

Girela-Serrano et al. (2022) published a systematic review on the effects of mobile phones and other electronic devices on adolescents' mental health. The authors examined 25 studies published between 2011 and 2019; of the 25 studies, ten were longitudinal. The average participant age across these studies was 14.6 years old, 53% were males, and 47% were females.

The results found by Girela-Serrano et al. (2022) were mixed, as they examined studies that researched the impact of phone use on internalizing difficulties. The studies between 2011 and 2019 often contradicted each other. Some suggested an association between internalizing symptoms, such as depression, and phone use, while other studies did not find any links.

Girela-Serrano et al. (2022) found more consistent results when examining studies on the impact of phone use on externalizing difficulties, indicating a higher degree of agreement among previous research. Most longitudinal and cross-sectional studies Girela-Serrano et al. (2022) reviewed found an association between the frequency of phone use and externalizing symptoms such as behavioral issues, concentration difficulties, and hyperactivity. However, in one study, when parents or teachers reported externalizing symptoms, they did not find the previously identified association between the symptoms and the relevant factors (Guxens et al., 2019, as cited in Girela-Serrano et al., 2022).

Another category Girela-Serrano et al. (2022) analyzed was the impact phones may have on adolescents' well-being. The longitudinal studies they examined also revealed mixed results. Some studies revealed a significant association between phone use and poor well-being; indicating a decline in positive self-concept and reduced overall well-being (Girela-Serrano et al., 2022). However, one longitudinal study reported a positive indirect effect on the well-being of the participants when they used their phones for social communication after one and two-year follow-ups (Bae, 2019, as cited in Girela-Serrano et al., 2022). Likewise, the cross-sectional studies Girela-Serrano et al. (2022) analyzed, which examined well-being, resulted in mixed findings. A cross-sectional study found that adolescents who utilized social media on their smartphones exhibited lower levels of self-esteem (Calpbinici & Arslan, 2019, as cited in Girela-Serrano et al., 2022). In contrast, another study proposed that electronic devices had an inverted U-shape impact on the well-being of adolescents and noted that an adolescent would experience positive mental benefits if they used the device moderately (Przybylski & Weinstein, 2017, as cited in Girela-Serrano et al., 2022).

In summary, the systematic review conducted by Girela-Serrano et al. (2022) identified three studies indicating a positive impact of smartphones on adolescents' mental health. The remaining 22 studies reported either no association or suggested a negative impact on mental health. The three studies were cross-sectional and rated as high-risk by Girela-Serrano et al. (2022). Based on their findings, the systematic review's authors suggested that the associations found were not caused by adolescents using their phones but rather by the content they were accessing. Multiple studies Girela-Serrano et al. (2022) reviewed found an association between phone use and adverse mental health when phones were used for social media. The systematic review's authors highlighted that not enough longitudinal studies were conducted by researchers to conclusively determine what elements of social media could potentially harm adolescents.

In conclusion, Girela-Serrano et al. (2022) reported that the studies they reviewed between 2011 and 2019 did not have sufficient evidence to conclude that phones or electronic devices fostered poor mental health due to mixed results. According to Girela-Serrano et al. (2022), one factor that appeared to influence adolescents' mental health but was not studied enough was sleep disturbance caused by prolonged electronic device use. The authors of the systematic review noted that the way adolescents use a device might better predict mental health outcomes, but significant gaps in research remain (Girela-Serrano et al., 2022).

General Smartphone Use

Excessive smartphone usage has been attributed to many different unfavorable outcomes. Numerous researchers identified that smartphone use is directly associated with adverse effects in adolescents. Pereira et al. (2020) highlighted adolescence as an essential stage of development for a young person's physical and physiological traits. The authors hypothesized that smartphones would negatively impact students' academic performance, affect their mental health, and hinder their interpersonal relationships if not used correctly. As Poulain et al. (2021) noted, by 2021, many cross-sectional studies linked associations between problematic smartphone use and negative psychosocial and psychological characteristics. According to Pereira et al. (2020), many adolescents have developed addictive traits toward their social media, particularly Instagram, because of the like system in place. Such systems created an environment in which some adolescent users obsessively seek followers, engage in immoderate self-presentation, assess Instagram selfies, and encounter cyberbullying comments from other users (Pereira et al., 2020). Additionally, some evidence suggests that smartphone addiction may disproportionately affect females (Kim et al., 2019; Pereira et al., 2020; Forte et al., 2022; Twenge et al., 2022). However, there are distinctions in the approaches different researchers took.

Often the studies used different types of questionnaires. Pereira et al. (2020) used self-evaluation questionnaires such as the Brunel Mood Scale (BRUMS) and the Beck Depression Inventory (BDI). Poulain et al. (2021) used Strengths and Difficulties Questionnaire (SDQ) and Smartphone Addiction Proneness Scale (SAPS). In contrast, Forte et al. (2022) used the Quick Inventory of Depressive Symptomatology (QIDS) to assess depressive symptoms. The use of different questionnaires among studies was a common theme among the papers examined in this literature review. The studies varied in design, with some being longitudinal, others cross-sectional, and many were conducted internationally. The studies looked for associations between adverse impacts smartphones could have on adolescents, including internalizing and externalizing difficulties.

Internalizing and Externalizing Difficulties

The examination of the associations between smartphone usage and difficulties externalizing or internalizing yielded mixed results. Pereira et al. (2020) conducted a study in Brazil on how smartphones may affect adolescents' mental health among 667 participants in Brazil. Their findings showed an association between problematic smartphone use (PSU) and poor mental health in both males and females. Likewise, Forte et al. (2022) reported similar findings; when they explored the effects of different technologies on adolescent mental health. Forte et al. (2022) conducted their study in Ireland, examining the data of 1,756 adolescents. They divided screen time into three categories: TV, computer, and phone. Forte et al. (2022) found that depressive symptoms had the strongest association with phone use. There was also a significant association between higher physical activity and lower depressive symptoms in the entire sample, both for girls and boys (Forte et al., 2022). Additionally, Kim et al. (2019) found that adolescents with problematic smartphone use also showed externalizing difficulties. Symptoms of externalizing difficulties include inattention, anger, and impulsivity.

An association between externalizing difficulties and smartphone use emerged in several studies. According to Kim et al. (2019), their research aimed to see if there was an association between depression, ADHD symptoms, anxiety, and phone use. The study designers divided the results based on whether the students smoked or used alcohol. Kim et al. (2019) found that 7.5% of the adolescents who participated in the study had smartphone addiction. Those with a smartphone addiction were more likely to experience anxiety, symptoms of depression, and ADHD. They were also more likely to smoke and use alcohol than the standard group. The research of Pereira et al. (2020) exapnded the findings of Kim et al. (2019). Pereira et al. (2020) highlighted a statistically significant difference between the mental health of adolescents who used their smartphones in a problematic way and those who had no problematic smartphone use. Adolescents who used their smartphones problematically measured higher in anger, mental confusion, fatigue, tension, and symptoms of depression (Pereira et al., 2020). A later study conducted by Poulain et al. (2021) noted that when adolescents experienced externalizing difficulties, such as aggression and inattention, their smartphone usage also increased. However, individuals with ADHD may have the strongest association with smartphone problematic smartphone use.

Among the associations, Kim et al. (2019) found, the strongest association with smartphone addiction was the presence of ADHD. Participants with ADHD had a more challenging time controlling their behavior. ADHD is associated with a lack of patience, impulsivity, and inattention. The authors claimed that smartphones might provide ADHD participants with the instant rewards and motivation boosts they desire (Kim et al., 2019). Supported by Poulain et al. (2021), who put forth a comparable proposition; they suggested that adolescents who do not have ADHD but have externalizing difficulties might turn to smartphones to seek immediate gratification. According to Poulain et al. (2021), adolescents with externalizing difficulties might be more impulsive; therefore, such adolescents would naturally have less control over the time spent on their smartphones. Kim et al. (2019) also found that cigarette smoking was statistically significant in its association with smartphone addiction, while alcohol use did not show statistical significance. Moreover, researchers observed males and females reported symptoms disproportionally.

A recurring pattern observed among researchers was that girls generally reported more adverse symptoms than boys. According to Kim et al. (2019), the problematic smartphone use (PSU) rate was higher for females than males. The study conducted by Forte et al. (2022) found that girls reported higher symptoms of depression than boys, similar to the findings of America's Children publication ("America's Children," 2021). Correspondingly, Pereira et al. (2020) found that girls, compared to boys, showed more negative mental health symptoms and were more likely to use their smartphones problematically. Twenge et al. (2022), in their findings, emphasized a particularly strong association between social media use and mental health among girls. The association they found was stronger than the connections observed between mental health and other factors, such as obesity, hard drug use, binge drinking, and sexual assault (Twenge et al., 2022). Nonetheless, conflicting studies and inconclusive findings make data interpretation complicated.

Inconclusive and Conflicting Findings

Authors of the studies often concluded that their research publications were inconclusive for various reasons. For instance, Poulain et al. (2021) were unable to find any conclusive associations between internalizing difficulties, such as loneliness, symptoms of depression, and problematic smartphone use in the long term. Likewise, Pereira et al. (2020) concluded that, though they found associations between poor mental health and the problematic use of smartphones in adolescents, their study was inconclusive because it was not longitudinal. Forte et al. (2022) noted that their study lacked adjustments for sleep and socioeconomic status variables. None of the researchers could establish a causal link between smartphone addiction and the symptoms examined in their studies. Additionally, other studies conducted on the impact of smartphones on adolescents yielded conflicting data, further adding to the complexity of the findings.

Different studies that attempted to find possible associations between technology and adolescent mental health problems could not find any connections. The study conducted by Vuoree et al. (2021) used longitudinal and cross-sectional data from three data sets, resulting in a total number of 430,561 participants. According to the researchers, associations between technology use (specifically television and social media) and depression have become consistently less harmful over time (Vuoree et al., 2021). Another study undertaken the same year by George et al. (2021) examined how text messaging impacted adolescents. They found little evidence that text messaging had meaningful associations with internalizing symptoms. However, George et al. (2021) found an insignificant association between adolescents who frequently sent text messages and externalizing symptoms. The impact of smartphones on adolescents has sparked a heated debate among academics, particularly between Przybylski and Twenge.

One widely cited paper from 2019 attempted to find associations between technology use and negative impacts on adolescents' psychological well-being. Orben & Przybylski (2019) used Statistical Causal Analysis (SCA) to analyze three datasets with 355,358 participants. The research paper's authors found that adolescents were more negatively affected by bullying, marijuana, binge drinking, getting into fights, and other factors, compared to technology. Orben & Przybylski (2019) discovered that although there was a statistically significant relationship between technology use and the mental well-being of adolescents, the actual impact was small and had little practical significance when compared to other factors that influence adolescents' mental health. They claimed that regularly eating potatoes would have a comparable impact on the mental health of adolescents as technology (Orben & Przybylski, 2019). Three years later, other researchers responded to this study.

Some researchers raised concerns regarding the measurement and categorization of the data in the study by Orben and Przybylski (2019). Twenge et al. (2022) led an independent study to evaluate the findings of Orben and Przybylski (2019). Twenge et al. (2022) stated that the research Orben and Przybylski (2019) presented was inconclusive; because it did not account for different types of technology, it did not separate the sexes and calculated the data in a way that may have resulted in skewed statistics. In particular, Twenge et al. (2022) argued that even though Orben and Przybylski (2019) used four different scales to measure the impact of technology on adolescents, the Strengths and Difficulties Questionnaire (SDQ) accounted for about 73% of the data they presented in their paper. Twenge et al. (2022) attempted to reanalyze the data, and in their readjusted analysis, they found a significant association between screen time and poor mental health in adolescents. The association they found was stronger and more substantial than the links observed between mental health and factors such as hard drug use, obesity, sexual assault, and binge drinking. Also, girls had a stronger association with poor mental health symptoms than boys (Twenge et al., 2022). To explain why girls might be more affected than boys, Kim et al. (2019) highlighted the possibility that females might use their smartphones for social networking more often than males, while men are more likely to use their phones for work-related tasks.

Social Media

Identified Associations

According to some researchers, social media might be responsible for the adverse mental health observed in adolescents. Twenge and Farley (2021) took the initiative to research the differences between how different media impacted males and females. Their research consisted of a large sample of 11,427 adolescents in the UK. Twenge and Farley (2021) kept separate tracks of the types of media males and females used. They also employed various questionnaires to measure their depressive symptoms, self-esteem, life satisfaction, and self-harm behavior. In an earlier study, Kim et al. (2019) proposed that females and males use their smartphones differently; Twenge and Farley (2021) confirmed their proposition. According to Twenge and Farley (2021), one out of four boys spent five hours a day gaming, and one out of four girls spent five hours on social media, see Table 1.

Table 1

Screen Activities

	<1 h	1–1.99 h	2–4.99 h	5+h	Mean h/day (SD)
Social media, girls	24.1% 1376	15.6% 892	34.1% 1945	26.2% 1492	3.28 (2.56)
Social media, boys	45.3% 2592	18.2% 1039	24.6% 1407	11.9% 680	2.05 (2.19)
Internet, girls	9.1% 522	12.5% 713	40.9% 2333	37.5% 2139	4.26 (2.48)
Internet, boys	13.3% 762	16.9% 968	38.9% 2226	30.8% 1764	3.79 (2.51)
Gaming, girls	67.5% 3854	12.8% 731	14.5% 829	5.1% 293	1.17 (1.76)
Gaming, boys	20.2% 1155	17.6% 1003	38.9% 2223	23.3% 1334	3.25 (2.46)
TV, girls	11.5% 657	18.5% 1056	49.0% 2796	21.0% 1197	3.38 (2.16)
TV, boys	14.3% 817	21.8% 1249	46.4% 2652	17.5% 1000	3.10 (2.10)

Mean hours for all four activities were significantly different between boys and girls at p < .001, *n*'s are given in each cell SD = standard deviation

Note. Reprinted from "Not all screen time is created equal: associations with mental health vary by activity and gender," by J. Twenge. and E. Farley, 2021, *Social Psychiatry and Psychiatric Epidemiology*, *56*(2), p. 210. Copyright 2021 by Springer.

Girls were more likely to experience adverse mental health symptoms. Twenge and Farley (2021) discovered that users of different types of media scored differently on the health indicators. In general, there was an association between adolescents' time on screen media and problematic mental health symptoms. On average, girls reported more problematic mental health symptoms than boys, see Figure 1. According to Twenge and Farley (2021), girls who used the internet and social media displayed a strong link with depressive symptoms, which frequently manifested after two hours of use. The category of girls who spent five hours or more on social media had twice the number of individuals with low life satisfaction compared to the category that used social media for only an hour. Also, girls who spent five hours or more using social media had twice the prevalence of depressive symptoms compared to those who spent more time gaming or watching TV (Twenge & Farley, 2021). Correspondingly, other studies stated that girls overall reported lower life satisfaction and lower well-being than boys and more frequently participated in upward social comparison (Boer et al., 2022; Barthorpe et al., 2020; Viner et al., 2019). Research done by Nick et al. (2022) also found that girls reported adverse symptoms more often. According to their yearlong study with 680 participants, females responded slightly more negatively to digital stress. Among the publications that examined social media's impact on adolescents' mental health, boys generally reported better well-being.

Figure 1

Low Life Satisfaction and Screen Media



Note. Hours per day of four types of screen media and percent low in life satisfaction, girls and boys. From "Not all screen time is created equal: associations with mental health vary by activity and gender," by J. Twenge. and E. Farley, 2021, *Social Psychiatry and Psychiatric Epidemiology, 56*(2), p. 215 (https://doi-org.ezproxy.jessup.edu/10.1007/s00127-020-01906-9). Copyright 2021 by Springer.

Overall, boys reported less mental health symptoms. Twenge and Farley (2021) noted that adolescent males were less likely to show problematic mental health symptoms until they reached the five-hour mark of screen time; 35% of boys who used social media for over five hours had low self-esteem, while for girls, it was 88%. Likewise, Viner et al. (2019) highlighted that boys reported fewer mental health symptoms, with approximately a 12% association between social media use and depression. However, Twenge and Farley (2021) noted that high levels of social media and internet use were significantly associated with self-harm behavior among boys, while gaming and watching TV showed no significant association. Likewise, Barthorpe et al. (2020), in their study with 4,032 participants, found an increased risk of self-harm in participants who spent long periods on social media. Nonetheless, the aforementioned studies had limitations, and their findings may not be definitive.

The researchers made several noteworthy remarks. Twenge and Farley (2021) acknowledged that their research was cross-sectional and did not provide enough evidence to determine whether social media use caused problematic mental health symptoms or if problematic mental health symptoms led to increased social media use. Longitudinal studies conducted by Viner et al. (2019) and Nick et al. (2022) also could not establish causality. Researchers pointed out that an unknown third variable may be at play (Twenge & Farley, 2021; Viner et al., 2019; Kelly et al., 2018). According to Viner et al. (2019), cyberbullying and poor sleep may have mediated the relationship between depressive symptoms and social media use. However, other researchers could not reproduce some of the findings discussed in this subsection.

Mixed Findings

Certain studies yielded mixed findings, particularly when employing different data analysis approaches than those utilized in the aforementioned studies. Boer et al. (2022) undertook a longitudinal investigation among 1,419 Dutch adolescents over four years. The study aimed to measure the participants' well-being over four years as they logged their social media use. In their research, Boer et al. (2022) tracked the types of social network sites the participants used and if they used them for messaging or viewing other people's content. The life satisfaction of the participants was measured using questionnaires. They found an association between higher social media use (SMU) and lower life satisfaction across both genders. However, Boer et al. (2022) noted that some participants did not demonstrate an association between their reported life satisfaction and higher levels of SMU. Participants who used social media for posting various content versus viewing the content others posted reported higher life satisfaction than the latter. Nevertheless, the association's presence depended on the interpretation of the data.

The results differed once the researchers analyzed the statistics using an alternative approach. When Boer et al. (2022) examined the participants' life satisfaction on an individual level, they could not find a strong association between time spent on social media and life satisfaction. The researchers only found the association when they compared the participants to each other. For example, among two groups of ten participants with different SMU levels, the ones with lower SMU, on average, reported higher life satisfaction than the higher SMU group. Likewise, Coyne et al. (2020) found a moderate association between social media use and mental health issues. However, the association disappeared when the researchers looked at the participants individually (Coyne et al., 2020). Still, other studies had different findings. The study conducted by Beeres et al. (2021) found no longitudinal association between mental health and social media but was able to establish a cross-sectional association. Puuko et al. (2020) found that depressive symptoms were associated with increased social media use but highlighted that the association was statistically weak and inconsistent. However, the studies had certain factors that the researchers considered important to address.

The authors of the studies outlined the limitations of their research and variables that could have affected the results. Boer et al. (2022) noted that they collected data with a one-year interval over four years, relied on self-reporting, and had a high dropout rate of approximately 65% due to school withdrawal (Boer et al., 2022). The longitudinal study conducted by Puuko et al. (2020) focused on active social media users who posted content, sent messages, and liked other people's content. Overall, researchers agreed that there is a complicated relationship between social media use and the mental health of adolescents; factors such as self-esteem, gender, and background may play crucial roles (Plackett et al., 2023; Puukko et al., 2020; Schemer et al., 2021; Coyne et al., 2020; Beeres et al., 2021). Still, several researchers failed to establish significant links between mental health and social media.

Absence of Links

Numerous alternative studies have failed to establish a significant association between social media use and the well-being of adolescents. For instance, Beyens et al. (2020) found no connection between their participants' well-being and the use of social media. The study's authors found significant differences in how each participant was affected individually. Only a small fraction of participants experienced a negative or positive impact, while most were unaffected. The study was longitudinal, conducted over a week, and tracked the well-being of 63 adolescents (Beyens et al., 2020). Correspondingly, Schemer et al. (2021) concluded that social media neither benefits nor harms adolescents long-term. Jensen et al. (2019) also found no correlation between mental health and technology use; their study comprised 388 participants. A recent longitudinal study conducted by Plackett et al. (2023) found an association between mental health and social media use among adolescents; however, it disappeared after they adjusted for covariates. However, the studies have some complexities that warrant consideration.

It is necessary to highlight some elements of the aforementioned re-

search publications. Schemer et al. (2021) analyzed adolescents across nine years; however, the starting point for the data was 2008, when smartphones were not yet widespread. Similarly, Plackett et al. (2023) collected data between 2009 and 2019. The study by Jensen et al. (2019) was among 388 adolescents. It used the Ecological Momentary Assessment (EMA) sent out via phone to each participant to measure their depressive symptoms. Each participant submitted three surveys daily for 14 days. Jensen et al. (2019) did not collect data from all participants at once but instead collected data from one participant at a time. It took the researchers 5,270 days to conduct their study (Jensen et al., 2019). Among all the studies discussed in this strand, none of the studies were able to establish causality. To establish causality, researchers need to attempt to change one of the variables in the study; for example, entirely restrict or limit the amount of time adolescents spend on their devices and measure potential changes in mental health symptoms.

Limited Use and Abstinence

Several studies researchers conducted examined whether smartphone or social media use reduction or abstinence would improve the well-being of the participants. Research conducted by Brailovskaia et al. (2023), with a sample size of 619 over four months, found that reducing smartphone use led to increased physical activity and improved overall well-being (Brailovskaia et al., 2023). Likewise, Reed et al. (2023) published their findings, in which they identified an increase in the well-being of the study's participants and a reduction in their symptoms of depression. They conducted their study with 70 participants over three months (Reed et al., 2023). Nevertheless, these findings contradict what Przybylski et al. (2021) found in their research, with a sample size of 600. The findings of Przybylski et al. (2021) revealed that implementing a digital detox for two days resulted in a noticeable decline in the well-being of the participants. (Przybylski et al., 2021). Though, the findings of Brown & Kuss (2020) may offer a solution to the problem identified by Przybylski et al. (2021). Brown & Kuss (2020) analyzed the impact of smartphone abstinence on the mental health of 61 participants for seven days. They found that social media abstinence led to the fear of missing out (FOMO). However, FOMO gradually decreased over time with improvements in the participants' mental well-being and offline social connectedness (Brown & Kuss, 2020). Nevertheless, one fundamental difficulty exists.

The studies mentioned above are not representative of the impact abstinence might have on adolescents. The aforementioned studies primarily focused on participants aged between 18 and 63, thereby revealing a research gap. Little to no research was conducted on the impact of smartphone and social media abstinence among adolescents. Amidst these contradictory findings, one older study proposed a potential solution to the inconsistencies among the research publications.

Potential Solution

Researchers conducted an important study on social media use in 2018. Kelly et al. (2018) performed their study in the UK using a large sample size of 10,904 adolescents and had comparable findings to Twenge and Farley (2021). In their findings, Kelly et al. (2018) established an association between social media use and depressive symptoms among the participants. One peculiar difference between this study and other studies was that it not only established a link between social media use and mental health symptoms but also weighed the impact of different interconnected variables on adolescent mental health. Kelly et al. (2018) attempted to find links between factors such as body image satisfaction, self-esteem, sleep, and online harassment. They also adjusted for confounders such as age, internalizing symptoms, family structure, and income. Kelly et al. (2018) found that girls were more likely to report lower self-esteem than boys. Girls also experienced more sleep disruption and bodyweight dissatisfaction and were more likely to be harassed online. The authors created a figure that displayed the complicated nature of how social media might indirectly impact adolescents' mental health, see Figure 2 (Kelly et al., 2018). The validity of the proposition Kelly et al. (2018) made could be tested, by examining one of the identified third variables, such as sleep.

Figure 2

Pathways



Note. Social media use and depressive symptoms – summary of path analysis. From "Social Media Use and Adolescent Mental Health: Findings From the UK Millennium Cohort Study," by Y. Kelly et al., 2018, *EClinicalMedicine*, 6, 59-68 (https://doi.org/10.1016/j. eclinm.2018.12.005). Copyright 2018 by Elsevier Ltd.

Sleep

Impact of Sleep

Various researchers confirmed that sleep quality affects the mental health of adolescents. A study by Jamieson et al. (2020) found a significant positive association between poor sleep quality and psychological distress in the 60 participants they examined. Similarly, Clement-Carbonell et al. (2021) sought to find any relationships between sleep quality and physical, mental, and overall health. Their findings concluded that poor sleep quality strongly correlates with mental health symptoms (Clement-Carbonell et al., 2021). According to Wickham et al. (2020), sleep quality is better at predicting poor mental health than physical activity, diet, and sleep quantity. A longitudinal study by Shimizu et al. (2021) found an association between adolescent mental health outcomes and childhood sleep problems. They performed the study with a sample size of 199 participants in the United States (Shimizu et al., 2021). Poulain et al. (2019) noted that an irregular circadian rhythm has health implications. For instance, long-term sleep disruption could lead to chronic sleep disorders (Poulain et al., 2019). Among previously mentioned studies, Kelly et al. (2018) and Viner et al. (2019) found that adolescents' mental health was strongly associated with poor sleep. Thus, Jamieson et al. (2020) suggested that future researchers try to account for smartphones' impact on adolescents' sleep quality.

Mixed Findings

Two studies that examined the links between smartphone use and sleep could not establish any significant associations. Goldstone et al. (2020) performed a longitudinal study with a sample size of 11,670; they investigated the relationship between sleep disturbances and mental health symptoms. In contrast, Shimoga et al. (2019) conducted a cross-sectional study with a sample size of 43,994 across 420 schools. The studies used various questionnaires. Goldstone et al. (2020) had the parents employed in the study; the parents reported the sleep quantity, the Sleep Disturbance Scale for Children (SDSC) data, and their children's screen time.

The researchers' findings initially appeared to build a case against smartphone use before bed. For instance, Shimoga et al. (2019) found that adolescents with sleeping problems exacerbated their poor sleeping patterns through frequent use of social media. The researchers observed that some adolescents who slept well were affected by the frequency of their social media use (Shimoga et al., 2019). Likewise, Goldstone et al. (2020) noticed that participants who initially had difficulties falling asleep and maintaining sleep were more likely to have higher externalizing scores at the follow-up assessment. Also, the participants who experienced excessive sleepiness were more likely to have higher internalizing and depression scores at the follow-up assessment. The researchers also found that sleep disturbances had a more significant impact on girls than boys (Goldstone et al., 2020). Still, the researchers were unable to establish any significant links.

Both research teams concluded that smartphones did not cause poor sleeping patterns. Shimoga et al. (2019) found that generally, good sleepers continued to get adequate sleep. Meanwhile, Goldstone et al. (2020) concluded that adding screen time to their model did not improve the results. Therefore, no significant link was established between mental health and sleep disturbances caused by screen time (Goldstone et al., 2020). However, the findings of other researchers were able to establish significant associations.

Social Media, Smartphone, and Sleep Associations

Various studies established an association between adolescents' sleep and smartphone use, especially before bed. The studies employed questionnaires to measure sleep quality or quantity and screen time. According to Poulain et al. (2019), adolescents consumed more media in 2019 than in 2009. They also highlighted that higher media use levels increased problems associated with sleep and daytime sleepiness (Poulain et al., 2019). Kim and Lee (2022) conducted a cross-sectional study in Korea with 54,948 adolescents. They found that those who spent between two and eight hours using their smartphones reported higher sleep satisfaction than those who used their phones for over eight hours (Kim & Lee, 2022). In another cross-sectional study that examined 2016 national survey data among 43,755 people, Twenge et al. (2019) found that the impact of non-portable devices diminished in participants 10 years and older. Portable devices, in contrast, affected participants' sleep across all study ages. In comparison to the findings of Kim and Lee (2022), Twenge et al. (2019) reported that, on average, adolescents were 51% more likely to get inadequate sleep if they used a portable device for four hours or more (Twenge et al., 2019). Other researchers found that participants who reported the highest social media use were likely to fall asleep late, sleep fewer hours, and wake up during the night (Scott et al., 2019; Twenge et al., 2019). Additionally, the researchers linked adverse mental health symptoms to poor sleep quality and under-sleeping.

Researchers reported concerning outcomes associated with smartphone use and sleep of adolescents. Evers et al. (2020) conducted a longitudinal study in Taipei among 2,462 adolescents. They found that adolescents who were heavier social media users before bedtime were more likely to experience burnout at school. The results of the Evers et al. (2020) study consistently showed a positive association between burnout and disrupted sleep due to social media usage. There were similar findings in a longitudinal study conducted by Poulain et al. (2019) among 467 adolescents in Germany. Poulain et al. (2019) suggested that sleep problems may affect adolescents' academic performance, mood regulation, cognitive function, and physical health. Likewise, the findings of Kim and Lee (2022) supported Poulain et al. (2019). Kim and Lee (2022) suggested a potential link between depression, smartphone overuse, and sleep quality (Kim & Lee, 2022). Additionally, some researchers also found that girls spent more time on social media and reported a lower sleep quality than boys (Kim & Lee, 2022; Scott et al., 2019). The researchers also made several noteworthy remarks about their research.

The authors highlighted certain limitations present in their studies. Scott et al. (2019) recognized that their research was limited in two ways: it was not conducted longitudinally and relied on self-reporting measures. According to Evers et al. (2020), the constraints of their study were limited time points, non-random school selection, cultural dependence, and the need for additional covariates. Poulain et al. (2019) highlighted the imprecision of questionnaires and the smaller sample size they used. Additionally, the studies could not definitively establish causality. To establish causality, it would require researchers to reduce or restrict smartphone use among adolescents and measure the impact it would have on their sleep quality.

Reduction of Smartphone Use

Few studies attempted to reduce or restrict smartphone use among adolescents to examine its impact on their sleep and, consequently, their mental health. However, two studies conducted by Eijnden et al. (2021) and Perrault et al. (2019) made that attempt. The implications of their studies suggest a causal relationship between smartphone use before bed and poor sleeping patterns. The research by Perrault et al. (2019) observed several key findings.

The study conducted by Perrault et al. (2019) set out to examine if a reduction in screen time would positively impact the sleep quality of 569 adolescents. The research took place in Switzerland for a month. To collect data, the authors utilized questionnaires and separated the participants into active and passive categories. Active participants were the adolescents who restricted their screen use for at least seven days, and passive participants were the adolescents who did not meet the designated criteria. Perrault et al. (2019) found that screen time in the evening resulted in participants going to sleep later, getting less sleep, and reduced vigilance during the day. Possible variables that may have impacted the sleep quality were blue light emitted by the screens, increased stress, and emotional arousal. Perrault et al. (2019) made a similar remark to Poulain et al. (2019). Perrault et al. (2019) stated that chronic sleep deprivation may lead to psychological distress and other disorders. The researchers concluded that restrictions helped the participants fall asleep faster, improved their daytime alertness, and increased their sleep duration (Perrault et al., 2019). The study's reliance on questionnaires and small sample size limited the findings. Eijnden et al. (2021), however, were able to gather a larger number of participants for their study.

Eijnden et al. (2021) conducted a longitudinal study with 2,708 adolescents. However, 678 participants dropped out of the study due to a school withdrawal. They examined the impact of internet use before bed on sleep. The research authors conducted a two-wave study in which parents implemented strict rules on their children's internet, social media, and smartphone use before bed. Like Perrault et al. (2019), Eijnden et al. (2021) found that restrictions imposed by their parents resulted in adolescents going to bed earlier. The authors also reported that sleep quality improved for the participants in the study, and there was an association between a poorer perceived quality of sleep and problematic social media use. However, heavy social media users among adolescents did not observe this impact, as their sleep did not see any improvement. The authors proposed that adolescents who struggle with problematic smartphone use may experience anxiety or fear of missing out when restrictions are put in place (Eijnden et al., 2021). Some limitations of their study included: a relatively significant dropout rate, utilization of self-reporting, and mental health symptoms were not measured.

Summary

Similar to the findings of Girela-Serrano et al. (2022) in their systematic review of the research conducted between 2011 and 2019, the research produced on general smartphone use post-2019 is inconclusive. Due to the mixed findings in the studies this literature review examined, there is insufficient evidence that smartphone use negatively impacts adolescents' mental health. Though some studies have found associations between internalizing and externalizing difficulties and heavy smartphone use, the studies could not establish a causal relationship. There is an ongoing debate among academics about the impact of smartphones, but major gaps remain.

One concern is that many studies rely on questionnaires, which may result in bias. Additionally, the examined studies often employed different types of questionnaires; some used the BDI, others the MASC, and one study primarily used the SDQ. Consequently, the way internalizing difficulties were measured is different across these studies. Many studies suggested that smartphones might not cause any adverse effects; instead, whether participants use their smartphones for work or social media might better predict mental health. The impact of social media on adolescents' mental well-being also revealed mixed results. Though many studies have found a correlation between social media use and poor mental health, eight out of thirteen studies analyzed in the social media strand could not provide sufficient evidence to establish a definitive connection between mental health and social media use. Additionally, researchers have not thoroughly studied adolescents' abstinence and restricted use of smartphones and social media; thus, there is little research on the restrictions' impact. Filling in this research gap would help establish if social media and smartphone use cause poor mental health.

As for the impact smartphones and social media might have on adolescents by disturbing their sleep patterns, two studies examined in this literature review found no associations. Among the studies that found no associations, one study was cross-sectional, and the other was longitudinal. The remaining seven studies found a correlation between poor mental health and device use. Additionally, among these seven studies, two longitudinal studies found that decreasing smartphone use improved adolescent sleep quality. The available evidence strongly suggests that smartphones may harm adolescent sleep. Consequently, poor sleep may lead to adverse mental health symptoms.

In conclusion, out of the three strands examined by this research project, there were mixed findings for general smartphone use and social media. As for sleep, based on the available evidence, there is a strong indication that smartphone use is likely to have adverse effects on the sleep patterns of adolescents. The studies that implemented restrictions on smartphone usage before bed demonstrated that adolescents experienced improved sleep.

Chapter 3: Implications

Introduction

This project examines the impact smartphones have on the social-emotional development of adolescents. The inspiration for this research topic was the mixed findings of academics on the impact of smartphones. Twenge (2019) mentioned in her publication that there had been a rise in adolescent mental health symptoms recently. Twenge (2019) listed some possible variables that may mediate between smartphones and adolescents' poor mental health. Some variables Twenge (2019) identified were screen-induced sleep disorders, reduced physical activity, and social comparison.

Research conducted between 2011 and 2019 could not conclude whether smartphones negatively impacted adolescents. This project's literature review set out to analyze the data available from recent research on how smartphones may impact adolescents' mental health mediated by general use, social media, and sleep. Hence, if enough evidence exists to conclude that smartphones negatively affect youth, educating teenagers, parents, and educators about the risks of imbalanced smartphone use is crucial. The following are the research questions this project aims to address:

> 1. What impact do smartphones have on the social emotional-development of adolescents?

> 2. Do specific activities, such as social media use or smartphone use before bed, have varying levels of impact on adolescents?

3. Based on the research findings, is there a necessity to advocate for abstinence or limitations in smartphone usage?

Conclusions

General Smartphone Use

Girela-Serrano et al. (2022) examined studies conducted between 2011-2019 and could not establish a causal link between smartphone use and adverse mental health symptoms among adolescents. In contrast, except for one research paper, most of the studies this project examined were conducted in 2019 or later. This project's findings are similar to those of Girela-Serran et al. (2022).

Studies on general smartphone use had a substantial agreement on the link between smartphone use and externalizing difficulties. Heavy smartphone use was associated with externalizing difficulties in cross-sectional and longitudinal studies (Poulain et al., 2021; Kim et al., 2019; George et al., 2021). Adolescents who frequently used their smartphones had trouble paying attention and were likelier to exhibit impulsive behavior (Poulain et al., 2021). Kim et al. (2019) found in their study that the strongest association between smartphone addiction was the presence of ADHD. Participants addicted to smartphones also had other addictions, such as smoking (Kim et al., 2019). Suggesting that a person's level of impulsivity might better predict how heavily one uses their smartphone. However, researchers could not establish a definitive causal link between smartphone use and externalizing difficulties. Poulain. et al. (2021) and Kim et al. (2019) described that inattention and impulsive behavior might result in heavier smartphone usage or the other way around. In a similar manner, the data produced about internalizing difficulties was inconclusive.

Academics found mixed associations between smartphone use and internalizing difficulties. Some studies found an association between screen time and poor mental health (Pereira et al., 2020; Forte et al., 2022; Twenge et al., 2022; Kim et al., 2019). At the same time, other studies could not establish any significant associations (Poulain et al., 2021; Vuoree et al., 2021; George et al., 2021; Orben & Przybylski, 2019). Nearly all studies that differentiated their results based on sex agreed that girls were more likely to report higher smartphone use and experience negative mental health symptoms (Pereira et al., 2020; Forte et al., 2022; Twenge et al., 2022). Academics from various parts of the world conducted cross-sectional and longitudinal studies but could not come to a consensus about the impact of smartphones on adolescents' mental health.

Orben and Przybylski (2019) conducted a commonly cited study; their findings did not show any meaningful associations between smartphone use and mental health. They stated that smartphones' impact on adolescents' mental health is comparable to eating potatoes regularly (Orben & Przybylski, 2019). A few years later, Twenge et al. (2022) reevaluated the findings of Orben and Przybylski (2019); they used the same database but accounted for different sexes and readjusted the impact of the questionnaires on the statistics. As a result, Twenge et al. (2022) found a significant association between smartphone use and mental health. Their results showed that smartphone use is associated more strongly with mental health than obesity, binge drinking, hard drug use, and sexual assault (Twenge et al., 2022).

The reevaluation conducted by Twenge et al. (2022) is a prime example of the issue that exists in the body of research that is currently available. Academics can adjust the covariates in a way that may, intentionally or not, produce desired results. Twenge et al. (2022) pointed out that the study by Orben and Przybylski (2019) used data from four different questionnaires; however, one questionnaire accounted for 73% of the statistics presented to the reader. Furthermore, most studies used different types of questionnaires, such as the Strengths and Difficulties Questionnaire (SDQ), Beck Depression Inventory (BDI), Quick Inventory of Depressive Symptomatology (QIDS), and others. As a result, adolescents' mental health was not measured equally among the studies. Additionally, most studies used self-reporting questionnaires to record screen time, which may have resulted in biased or incorrect screen time numbers. In conclusion, there is no evidence to definitively claim that the general use of smartphones negatively impacts adolescents' social-emotional development.

Social Media

Authors of several studies suggested that researchers analyze the impact of social media (Twenge et al., 2022; Kim et al., 2019). Social media is a mediator between smartphones and adolescents' mental health. This project's literature review examined thirteen studies conducted between 2019 and 2023; the researchers had mixed findings.

Five of the thirteen studies this literature review examined found an association between social media use and poor mental health. Twenge and Farley (2021) found that 88% of the girls who used social media for over five hours reported low self-esteem. Some studies identified that social media use did not have the strongest association with depressive symptoms; instead, other variables were at play. Social media use had more significant associations with poor sleep, online harassment, poor body image, and poor self-esteem, and these four had strong associations with depressive symptoms (Kelly et al., 2018; Viner et al., 2019). Nonetheless, the studies that found associations between social media and poor mental health were unable to establish causality (Twenge & Farley, 2021; Kelly et al., 2018; Barthorpe et al., 2020; Nick et al., 2022; Viner et al., 2019).

Two studies found that the association between social media use and poor mental health only appeared when comparing the participant groups. The association vanished when the researchers examined the participants individually (Coyne et al., 2020; Boer et al., 2022). The data revealed that, on average, a group of adolescents who are heavy social media users reported lower well-being levels than those with low social media engagement. However, if researchers examined an adolescent on an individual level to see how much time they spent on social media, they could not predict the teenager's well-being levels. Most studies that reported an association between social media use and adverse mental health symptoms also reported that females were more likely to report mental health symptoms (Twenge & Farley, 2021; Kelly et al., 2018; Barthorpe et al., 2020; Nick et al., 2022; Viner et al., 2019; Boer et al., 2022).

The remaining studies were unable to establish a significant association between social media use and adolescent mental health (Plackett et al., 2023; Puukko et al., 2020; Schemer et al., 2021; Beeres et al., 2021; Jensen et al., 2019; Beyens et al., 2020). However, it is important to highlight some elements of their research. Beeres et al. (2021) found no longitudinal association but were able to establish a cross-sectional association. Schemer et al. (2021) analyzed adolescents across nine years; however, the starting point for the data was 2008, when smartphones were beginning to get adopted and social media was less widespread. Puuko et al. (2020) conducted a longitudinal study; however, the focus was on active social media users who posted content, sent messages, and liked other people's content.

It is possible to draw some conclusions from the available data. First, the studies that found an association were unable to establish causality. Second, the role between social media and adolescents is complicated. Kelly et al. (2018) made a great observation that social media use may have a weak association with poor mental health, but instead, third variables, such as sleep, may be at play. Other authors made the same proposition (Twenge & Farley, 2021; Viner et al., 2019). If the argument Kelly et al. (2018) set forth is confirmed, researchers should instead examine how cyberbullying, sleep, self-esteem, and poor body image mediated by social media and smartphone use relate to depressive symptoms.

Research conducted by Kelly et al. (2018) was highlighted as a possible solution because it proposed an alternative, more complex approach that appeared to fit with the findings of other researchers. Gauging for third variables may significantly change studies' results. For instance, Boer et al. (2022) and Coyne et al. (2020) found no associations between social media use (SMU) and mental health symptoms (MHS) among adolescents when they examined their data on an individual level. That may be related to third variables not being taken into account. For example, imagine two study participants who use social media for four hours; one participant mainly uses social media in the morning, while the other before bed. The participant who uses social media in the morning shows no serious MHS. In comparison, the other participant with the same SMU level has serious adverse MHS. However, since the study did not account for sleep and when the participants used their smartphones, the associations between SMU and MHS might appear random, especially on an individual level. To accurately gauge the associations between MHS and SMU, researchers should also collect data on the specific times of usage, such as before bed or in the morning. Thus, a more complex approach, like the one described by Kelly et al. (2018), may result in higher-quality data.

A different issue with the data in the studies above is that most of them utilized questionnaires. Generally, cross-sectional studies were more likely to establish an association between adverse mental health symptoms and social media use than longitudinal studies. However, overwhelmingly most longitudinal studies found no association. Additionally, most studies did not account for different types of social media, such as WhatsApp, YouTube, and Instagram. The studies also have yet to distinguish whether the use of social media is passive or active among participants.

Some of the studies analyzed data across many years. However, the

starting point for the data was when social media was less widespread, and smartphones were not as widely adopted. Another variable is the modern-day algorithms. Social media built-in algorithms often evaluate the type of media that keeps the user's attention and suggests other similar content. Even if the content is inappropriate or could lead to depressive thoughts, the algorithm recommends the media if the user appears engaged, further complicating studying social media use's impacts. As a result, one user might find uplifting and motivational content in their feed, while another might find depression-inducing content. Nevertheless, the literature review of this project also identified a research gap.

Certain researchers attempted to restrict or limit the use of social media and found that the participants' mental health improved; however, the studies were conducted among adults (Brailovskaia et al., 2023; Brown & Kuss, 2020; Reed et al., 2023). Studies that attempt to change a variable, such as the amount of time a participant spends on social media, are the studies that would be able to establish causality. Future social media studies should focus on going in that direction.

Sleep

Researchers established that sleep impacts the mental health of adolescents (Jamieson et al., 2020; Clement-Carbonell et al., 2021; Wickham et al., 2020; Shimizu et al., 2021; Goldstone et al., 2020). One study found that sleep quality predicts the mental well-being of adolescents better than diet, sleep quantity, and physical activity. The literature review examined whether smartphone or social media usage affected adolescents' sleep.

The most significant link to mental health symptoms was related to sleep, which is affected by smartphone and social media use. The literature review looked at nine studies. Seven of the nine studies found a clear link between sleep and mental health symptoms. One study had mixed findings, and the remaining study found no associations. Shimoga et al. (2019), in their study, which yielded mixed results, found that adolescents with poor sleeping patterns exacerbated their sleep complications by using social media before bedtime. However, except for a small population of adolescents, most teenagers who slept well continued to sleep well (Shimoga et al., 2019). In their research, Goldstone et al. (2020) could not establish a link between sleep disturbances and screen time.

Cross-sectional studies found a link between sleep and mental health among adolescents. In their study, Scott et al. (2019) found that heavy social media users reported going to bed later and waking up at night. Adolescents who used their smartphones for over eight hours reported lower levels of sleep satisfaction (Kim & Lee, 2022). Non-portable devices, however, were associated with poor sleep quality in children up to ten years old (Twenge et al., 2019). A few longitudinal studies had similar findings. Evers et al. (2020) found that the participants of their study who experienced school burnout were heavier social media users before bedtime. Heavy media consumers were more likely to experience sleepiness during the day (Poulain et al., 2019). Girls reported lower sleep satisfaction levels and more sleep disturbances (Kim & Lee, 2022; Goldstone et al., 2020; Scott et al., 2019). However, none of these studies could definitively establish causality between smartphone or social media use and sleep quality.

Among the studies that this literature review analyzed, two longitudinal studies examined the impact of social media and smartphone restrictions on adolescents. Eijnden et al. (2021) found that the imposed limitations improved sleep quality among the participants, except for heavy social media users. Participants with problematic smartphone use might experience fear of missing out (FOMO) when restrictions are applied (Eijnden et al., 2021). In a similar study, Perrault et al. (2019) divided the participants into active and passive groups. The active participants were teenagers who limited their screen time for a minimum of seven days, while the teenagers who did not meet the specified criteria were considered passive participants. Perrault et al. (2019) found that screen time restrictions before bed helped the active participants increase their sleep duration, improve daytime vigilance, and fall asleep sooner (Perrault et al., 2019).

The studies mentioned above could benefit from several areas of improvement, such as employing a variety of questionnaires and avoiding the sole reliance on self-report methods, as that may introduce potential bias into the findings. Though not all studies used self-report questionnaires, Eijnden et al. (2021) had parents report their children's sleep quality after applying restrictions. Additionally, not all studies had sample sizes representative of broader populations. The findings of Eijnden et al. (2021) and Perrault et al. (2019) imply a causal link between smartphone or social media use and poor sleeping patterns.

Further research must confirm a causal link between sleep and device use. However, considering that most studies have established an association between sleep and screen activity, and two studies strongly suggested causality, it is reasonable to conclude that social media or smartphone use before bedtime is likely to adversely affect adolescents' sleep quality. Which, in turn, may lead to internalizing and externalizing symptoms. Abstinence is not required; however, based on these findings, educating the youth, parents, and educators about the importance of moderation of social media and smartphone use before going to sleep is necessary.

Practice Implications

The literature review of this project showed that smartphone and social media use before bedtime is likely to impact the sleep quality of adolescents. Adolescents can establish regular bedtime schedules by consistently falling asleep and waking up at the same time each day. Following a consistent sleep schedule will readjust their circadian rhythms accordingly. If adolescents have an inconsistent sleep schedule with random bedtimes, it can lead to lower-quality sleep.

Another measure adolescents could implement is leaving their smartphones in a different room when going to bed. By abandoning their smartphones, adolescents will mitigate the temptation to check their notifications or go on a content consumption spree before bed. Similarly, creating a technology curfew, a set time at which adolescents stop engaging in smartphone or social media activities could help them develop self-discipline and use their smartphones responsibly.

Alternative activities before bed, like reading, journaling, or praying, could help adolescents develop healthier bedtime routines. Parents can also implement a family device-free time, during which the family spends time together. Such an implementation will improve their sleep quality and could bring the family closer by promoting face-to-face communication and allowing time to share their worries, goals, and experiences.

Policy Implications

Educators could implement sleep hygiene education as an intervention. Adolescents who limit their smartphone use before bed are likely to be more vigilant throughout the day, experience less internalizing and externalizing symptoms, gain the ability to fall asleep sooner and improve their overall well-being (Jamieson et al., 2020; Clement-Carbonell et al., 2021; Wickham et al., 2020; Shimizu et al., 2021; Perrault et al., 2019) Though some adolescents with problematic smartphone use (PSU) may experience fear of missing out (FOMO), there is some evidence among older populations that FOMO gradually decreases over time and results in a healthier social connectedness offline and improved well-being (Brown & Kuss, 2020; Eijnden et al., 2021).

Variables such as increased stress, blue light, and emotional arousal mediated by smartphone use may all impact sleep quality and lead to chronic sleep disorders (Perrault et al., 2019). Though there is insufficient evidence that social media directly impacts adolescents' mental health, one study found that variables such as cyberbullying and social comparison via social media may impact the sleep quality of adolescents (Kelly et al., 2018).

Wolfson et al. (2015) conducted a study that divided their sample into two groups. One group was enlisted into a Sleep Smart program, while the other continued their usual sleep routines. The group that received education on better sleep habits and hygiene practices reported earlier bedtime, improved their internalizing symptoms, used less caffeine, and maintained their grades at school. The academic performance worsened among the group not part of the Smart Sleep program. However, the paper's authors noted that their study had a small sample size and relied on self-reporting (Wolfson et al., 2015).

Educators could implement school policies that instruct students about better sleep hygiene. The primary goal would be to help adolescents initiate preventative steps without parent intervention to improve their sleep quality and overall well-being. However, educating parents would also be beneficial since parents would help support their children in their sleep hygiene steps. Parents can establish boundaries around smartphone use before bed and encourage their children to use their devices responsibly. Furthermore, some schools have implemented later start times to facilitate students in getting more sleep.

Research funding and industry policies could also help adolescents with their sleep routines. Research funding would allow academics to spend more time studying the intricacies of technology's impact on sleep, which could help change the policies in the smartphone and social media industries accordingly. By 2023, many smartphone companies have implemented a blue light filter to protect people from circadian rhythm disruption. Some social media apps, such as TikTok, send notifications to their users to remind them to take breaks. Smartphone and social media industries could continue integrating systems and tools to help users with their sleep schedules. Industries can implement various systems and tools to promote better sleep habits and reduce smartphone usage before bed. These include features like notification reminders to remind individuals to limit their smartphone use, a sleep mode that turns off non-essential notifications during specific hours, a parent mode that allows parents to restrict their children's access to certain apps during designated times, and screen time tracking to monitor and manage overall screen usage. Social media platforms should also step away from "autoplay" models, which automatically continue to load content.

Directions for Future Study

Future studies should focus on establishing causality between smartphone use and mental health symptoms. Most research mentioned in the literature review, cross-sectional and longitudinal, attempted to find associations between mental health and smartphone or social media use among adolescents. The data helps see if the two variables are related; however, such studies cannot establish causality. To see if smartphone or social media use impacts adolescents, it would be essential to adjust one of the variables. The most practical approach would be to adjust the amount of time adolescents can use their smartphones or social media and then measure their mental health symptoms longitudinally.

Future studies should also create a framework that will be used by other researchers when conducting research related to technology use and mental health symptoms among adolescents. The framework could standardize the questionnaires to use in the studies; this will help with comparing study results. Self-reporting poses another issue because the results could be biased. However, having parents report mental health symptoms may result in the children lying. Hence, if resources permit, it would be best practice if professionals screened the adolescents.

The literature review of this paper identified some research gaps. Re-

searchers conducted many studies on the impact of technology on adolescents outside of the U.S. Even some prominent American researchers, such as J. Twenge, who made countless contributions to this field of study, often worked with populations outside the U.S. This may relate to policies that make it difficult to perform studies among adolescents in America. Another research gap was that few studies attempted to limit or restrict adolescent social media or smartphone use while measuring mental health symptoms. The overwhelming number of available studies were among adults. As a result, the literature review included only two sources that attempted to measure the impact smartphone and social media use restrictions would have on adolescents' sleep. As the number of studies that attempt to limit adolescent social media and smartphone usage increases, a growing body of data will emerge. The data will provide valuable insights into the interrelationship between smartphones, social media use, the sleep quality of adolescents, and their mental health.

Summary

The goal of this project was to examine if smartphones have an impact on the social-emotional development of adolescents. The literature review examined numerous sources to see if smartphones might affect adolescents' mental health and if smartphones mediated by social media or sleep might impact their well-being. The project aimed to find if such an impact exists, what the level of impact is, and see if, based on the findings, abstinence or restriction of social media and smartphone use is necessary.

The paper's findings revealed a complicated interrelationship between smartphones, social media, and sleep. There was insufficient evidence to establish that general smartphone usage or social media negatively impacted adolescents' externalizing or internalizing symptoms. However, Kelly et al. (2018) described a model that best fits with other findings in the current project. According to Kelly et al. (2018), social media has a mild association with adolescents' mental health. Instead, there are third variables at play. Their research found that social media has stronger associations with sleep and social comparison, which the researchers linked to depressive symptoms (Kelly et al., 2018).

According to the available data, smartphones are likely to impact adolescents' sleep quality. Consequently, poor sleep quality results in adverse mental health symptoms in adolescents (Jamieson et al., 2020; Clement-Carbonell et al., 2021; Wickham et al., 2020; Shimizu et al., 2021; Goldstone et al., 2020). While there may be some disagreement among sources, most research indicates an association between smartphone use and the sleep quality of adolescents. Additionally, two studies that attempted to restrict smartphone use before bedtime for adolescents found that after imposing restrictions, the sleep quality of the adolescents improved (Eijnden et al., 2021; Perrault et al., 2019). The current project revealed that there are significant research gaps.

Few studies exist that attempt to restrict or limit smartphone or social

media use among adolescents. Conducting more studies of this nature would permit academics to establish causality. Current data suggests that smartphones are likely to impact the sleep quality of adolescents; however, as more research data becomes available, the level of certainty will change accordingly. This project also identified another research gap: researchers did not perform enough studies in the U.S. on this topic, most research is international.

Adolescents can develop healthier mental states by being educated about the risks of smartphone and social media use before bedtime. Implementing an education program would encourage adolescents to cultivate self-discipline and develop responsible smartphone usage habits by refraining from device use before bedtime. Improvements in research funding and policy changes within the smartphone and social media industries could also help achieve this goal. Smartphone and social media industries can take steps, such as implementing a sleep mode and sending out reminders to minimize smartphone usage before bed. These policy changes can help adolescents with their sleep routines and overall well-being.

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Technology in the Classroom: An Exploration of the Impact of Technology Use on Engagement of Middle School Students in Reading Daniel Bubela

Abstract

Digital educational technology has been around for over half a century. Much research has been conducted on technology use and student achievement. During the COVID-19 pandemic technology became a core classroom element when schools were shut down for in-person instruction. After COVID-19, technology was no longer seen as a supplemental resource. This research paper sought to re-explore technology use and its effects on engagement for 10-13-year-old students in their reading skills. However, much research still needs to be conducted on the impact of educational technology on 10-13-year-old students' reading skills. The methodology used for the research was a literature review that examined teacher technology knowledge, technology use and engagement, student technology perception, and student technology use. Findings showed that students 10-13 can effectively work independently and engage with learning content, specifically when a teacher is there, whether virtually or in person. Several other findings also concluded that students committed more to learning content through technology when they were given a choice as to how they would engage with the learning content. Some recommendations for teachers would be to focus on implementing educational technology that promotes student collaboration and student agency. Despite modern innovations in educational technology, research confirms that educators are still essential in the classroom.

Chapter 1: Introduction to the Project

Background

During the COVID-19 pandemic, schools closed and provided instruction through technology in a digital learning environment. In the United States, post-pandemic, the National Center for Education Statistics shows a decline in reading skills for 5th and 8th-grade students. Reading skills are essential to developing other literacy skills, such as digital literacy. Digital literacy can be defined as information, visuals, software, technology, and computer (Çam & Kiyici, 2017). Students need reading skills to engage with digital reading materials. With such a variety of online resources available to educators, it is overwhelming to discover which technology to use for which class skills. Digital literacy has become as important as any type of literacy in college and career preparation standards (CDE, 2021). Research has shown that the heavy reliance on multimedia learning via technology may decrease the time students engage with deeper learning because of its convenience (Lin et al., 2022). During the COVID-19 pandemic, students had to learn in a distance-learning format, which did not allow meaningful interaction with the teacher or the content. Teachers can lead students to develop reading skills, which results in higher engagement with reading skills across disciplines. Recent studies reveal the need to develop the boundaries of technology balance in learning through systems such as flipped/hybrid learning environments, which give students more agency over their learning by allowing them more time to engage with the content independently (Winter, 2018). Researchers found that newer technology does not always mean it is better for student achievement (Kim, 2022). Students in middle school (6th-8th grade) may be unable to manage independent technology use (Winter, 2018). In the same study, researchers observed how middle school students could develop reading skills when their teacher facilitated technology use (Winter, 2018).

The obstacles that modern-day teachers face are students' attitudes towards technology use as a recreational rather than an educational resource. Other obstacles include many technology resources and little training to use the new tools introduced in the schools. With the heavy reliance on technology in the learning environment, educators must prepare students with the technology skills needed to develop reading skills. California has Common Core State Standards (CCSS) for reading, listening, speaking, and writing but nothing specifically for technology-integrated standards. However, the CCSS is broad enough to allow the educator to use technology resources and skills to develop reading skills. The California Department of Education (CDE) has already made efforts in developing the Digital Learning Integration & Standards Guidance (DLISG). The DLISG was created as a source to help educators move standards-aligned instruction seamlessly between the in-person and virtual learning spaces. Reading and math skills were the two skills heavily focused on by the DLISG. During the pandemic, the education system in the U.S. shifted its focus on technology as a supplementary resource, to technology being a core element in the classroom (CDE, 2021). With a shift in how technology is viewed in education, there is now a new chapter for how students can develop their reading skills. This study explores the impact of technology use on middle school students' reading engagement.

One of this topic's challenges is connecting the effect of technology use on the development of 10-13-year-old students. There needs to be more research when looking for studies conducted on middle school students in the United States. Many of the studies found in the literature review in Chapter Two of this project were primarily done in higher education. Several studies were found to focus on the middle school grades. Another gap in the literature is that most studies look at the short-term effects of technology. In contrast, this study attempts to synthesize studies that can create a blueprint for the long-term effects of technology use in the learning environment.

Statement of the Problem

After the pandemic, schools have shifted their focus to technology being a core element of the classroom. Nationwide, students in the United States have experienced a decline in reading skills (NCSE, 2022). The problem of declining reading scores had already been present before the pandemic, as seen in the 2019 Nations Report Card reading scores. The pandemic created a more significant decline in reading scores amongst eighth graders that will take more effort to get back on a growth track. Most educators may assume that students in middle school years, specifically 10-13 years old students, have the skills needed to use the technology resources in class for literacy development. They rely on students' technology literacy to foster meaningful engagement in skills such as reading. Not all students know how to use technology such as Chromebooks, typing, or the internet for digital literacy development. Students in middle school know how to use technology for play, but when it comes to reading skills, they need to be taught specific technology-based skills. Further obstacles exist as education shifts to a more technological approach to learning. Access to technology can create gaps between students who have access to technology resources and students who may not have access to the same resources because of socioeconomic or geographical barriers. The CDE created the DLISG to allow equitable access to education regardless of technology access. Educators must teach and facilitate technology skills as much as other study skills taught in the classroom. Teachers in the modern-day classroom must teach digital literacy skills such as Information Literacy, Visual Literacy, Software Literacy, Technology Literacy, and Computer Literacy alongside educational standards (Cam and Kivici, 2017). Most digital literacy skills needed for the modern world require reading skills. A lack of reading skills can result in students not understanding the content in almost all subjects. If students are not fully engaging with the content, they cannot transfer their knowledge into higher-order thinking processes such as evaluating, synthesizing, and creating. Even though students can engage meaningfully with online learning, that engagement remains on a surface level. For example, in reading, students can learn a word's definition but may not know how to apply that definition in one subject matter and will not be able to use that word in another subject. In a study, researchers designed a questionnaire to explore factors influencing engagement in online learning (Lin et al., 2022). According to Lin et al. (2022), if students have not developed their digital literacy skills for higher-order thinking, their online engagement with content remains superficial because they will lack the skills to apply their knowledge. Another obstacle can be teachers overestimating middle school students' digital literacy skills. A teacher might expect a middle-school student to know how to research a definition of a word they do not know. Still, if the student does not see the process of searching online dictionaries, then that will hinder their self-control during their independent technology use. Studies showed that students' self-control ability influenced their learning engagement in an online environment (Haoqun, 2022). If students do not have the digital literacy skills needed to complete assignments, their engagement with the content is negatively affected. This research project seeks to explore the development engagement in the learning environment using technology.

This study will assist future studies in looking deeper into technology use in the classroom for middle school students 10-13 years old. By synthesizing the literature on educational technology and student engagement, future research can collect specific data in areas where gaps exist, such as gender-specific data on engagement with educational technology or socioeconomic status as a factor influencing student engagement with technology. This research project will examine the literature on teacher knowledge of technology, how technology affects engagement, student perception of technology, and student use of technology.

Purpose of the Project

The goal of this project is to show that reading skills can be developed using various modern technology resources. This research project explores the long-term effects of technology engagement in the classroom by researching technology in education from the primary grades to higher education. After the pandemic, research shows that reading support for students reached a record high compared to previous pre-pandemic year-to-year data (Soland et al., 2022). Meaning that students' reading skills were negatively affected in their reading skills during the pandemic. Many factors can influence increased reading intervention and support during the pandemic, such as a lack of engagement in the learning environment or access to technology to engage with learning. The California Department of Education has tried to remedy the adverse effects of COVID-19 on reading by developing the DLISG (CDE, 2021). The pandemic forced most schools to adopt some form of distance learning implemented with a heavy demand for home technology usage. Therefore, if technology is becoming a prevalent core element in the classroom, educators must recognize how vital it is to teach students reading skills to improve overall literacy skills in a digital world.

A gap in the research exists evaluating the reading skills of students 10-13 years of age after the pandemic (Soland et al., 2022). This research project explores the long-term effects of technology engagement in the classroom by researching technology in education from the primary grades to higher education. This study looks at several levels of factors that may influence student achievement while using educational technology. First, the literature review explores recent data on declining reading scores in the United States. Next, the literature on technology and classroom engagement is synthesized to find connections between higher engagement and technology use. According to Mayer (2021), when students effectively engage with their learning content, they are more likely to understand the content taught to them. The next factor that needs to be considered when exploring technology use and its effects

on engagement is student perceptions of and student use of technology in the learning environment. This information is valuable to the education field to determine how to use technology resources that are needed for students to achieve literacy standards. Most current research explores technology use among higher-education students, but the developmental stages of college and middle school students are very different. This research project explores the long-term effects of technology engagement in the classroom by researching technology in education from the primary grades to higher education.

Theoretical Framework of the Project

The theoretical framework that will guide the research in this project comes from Mayer's (2021) multimedia learning cognitive theory from their book *Multimedia Learning* (Mayer, 2021). Multimedia learning occurs through two channels of information gathering, words, and pictures, which can have various modes of presentation (Mayer, 2021). Throughout this research, multimedia learning will be substituted by learning done through technology use, because technology is primarily used in today's classroom to present information in words and/or pictures such as slideshows, videos, and visual graphics. To maintain essential processing in technology-centered learning, Mayer (2021) explores three principles used throughout this research project. The three principles that Mayer introduces in their multimedia learning cognitive theory are: 1) segmenting 2) pre-training, 3) and modality (Mayer, 2021). Each principle can help students enter the generative process of information, which is manage essential information processing and lead them into higher-order thinking (Mayer, 2021).

Segmenting Principle

Technology allows users to access and engage with information at their own pace. The segmenting principle is a principle that states, "People learn better when a multimedia message is presented in user-paced segments rather than as a continuous unit" (Mayer, 2021, p.175). Segmenting is vital for essential processing because students can engage with content at their own pace, hence learning more of it, which can lead to higher-order thinking. Digital literacy skills are required for students so that they can manage learning at their own pace using the segmenting principle. For example, an educator is needed to demonstrate and facilitate the technology skills needed in researching credible information, or even simple computer literacy. The lesson for the online use of credible sources can be created in a segmented manner, and allow the students to practice research skills via the internet, which in turn will give them the skills needed for when they are required to research information on their own. Again, the onus lies on the educator to teach and facilitate the specific technology skills needed to learn content in a segmented manner.

Regarding reading skills, students can be given segmented lessons that will allow for a deeper comprehension of the material because the reading is

segmented. For example, if students are given an informational text on the biological response to fear, they can first read an article to build some knowledge, or they can watch a short video clip that demonstrates the biological response to fear through multimedia. According to the principles of multimedia learning, literacy of the informational text will be developed more from the video rather than just the article (Mayer, 2021). The article is presenting information in one mode, while the video is presenting information in both pictures and words; in other words, information that is seen and heard. According to the segmenting principle, students will be able to engage in essential and generative processing if they are given the video and allowed to view it at their own pace. Again, between the two modes of information, the multimedia mode will have more engagement, mainly when segmented for the user's pace. Finally, if the students were given a written assessment, which required them to read an article about the biological response to fear, they now will have prior knowledge of the topic that they can access and be able to answer those comprehension questions that are drawn from the informational text.

Pre-training Principle

Before introducing a system of concepts, the pre-training principle requires the learner to first engage with the key terms and characteristics involved in the content. Pre-training is the principle where, "People learn more deeply from a multimedia message when they know the names and characteristics of the main concepts" (Mayer, 2021, p. 189). Digital literacy skills can help students identify concepts and key terms included in the multimedia source. When using multimedia in the classroom teachers are relying on the digital literacy skills of students to engage with the content, but if students do not have that knowledge, then according to the pre-training principle, students enter into cognitive overload because their brains are not able to process the presented information (Mayer, 2021). Once the required digital literacy skills are taught, then students will engage more with the content being presented in the pre-training lesson. The pre-training principle can help students develop literacy skills once the students have established the digital literacy skills needed to engage with the multimedia content.

Modality Principle

The classroom yields a diverse set of students that require content engagement through various modes of instruction. The last principle of Mayer's (2021) principles of multimedia learning for managing processing is the modality principle. According to Mayer (2021), the modality principle is when, "people learn more deeply from pictures and spoken words than from pictures and printed words" (Mayer, 2021, p. 281). Through the modality principle reading skills can be better developed through listening skills. Modality allows for higher engagement when it comes to delivering content through multimedia. Studies showed that when students were engaged in the learning environment they performed better (Fox-Turnbull, 2019; Gamage et al. 2022; Haoqun et al., 2022; Lin et al., 2022). Modality can also refer to student agency, where students are given a choice of how and when they access the learning material. Other studies explored how personalized technology could fit student needs, which could support student achievement (Marsh et al., 2021; Moore et al., 2023). Personalized instruction can offer various modalities of access to the learning content, which can assist learning engagement.

Definition of Key Terms

The following terms will be referenced throughout the project when covering the development of reading skills through technology use in the classroom.

Reading skills: "Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words" (CCSS, 2010).

Middle school: 6th, 7th, 8th grade students.

Multimedia: Multimedia learning is learning through words and pictures, which can have various modes of presentation (Mayer, 2021).

Literacy: "Literacy is the ability to use printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential" (White, 2003).

Summary

Reading skills declined during and after the COVID-19 pandemic (CDE, 2022). COVID-19 forced class environments to be fully technology-based (Randolph, & Liu, 2022). The post-pandemic learning environment has created a need for reading skills. Multimedia learning can create more engagement in reading skills (Mayer, 2021). Therefore, developing reading skills can support literacy development through higher individual engagement with content across various subjects. Teachers must move from presenting content via multimedia to teaching students how to use technology to collaborate with peers and interact with content (Reimann & Aditomo, 2020). Mayer's theoretical framework is essential regarding technology use and classroom engagement. Future research can use Mayer's theory of multimedia learning to collect data that can fill the gaps in the literature when it comes to students 10-13 years of age and their engagement with technology. This research project explores the long-term effects of technology engagement in the classroom by researching technology in education from the primary grades to higher education.

Chapter 2: Review of Related Literature

Introduction

Reading skills in the United States have declined for the past five years (NCSE, 2022). In 2020, the COVID-19 pandemic forced schools to move to a form of distance learning that caused a heavy toll on student engagement. This research project has observed the effects of the pandemic through data reported on the National Assessment of Educational Progress (NAEP). According to the NAEP, reading scores have dropped a noticeable amount after the pandemic, indicating a learning loss during the pandemic (NCSE, 2022).

Research showed that middle school students who effectively engage with content have higher student achievement (Maureen et al., 2018; Reimann & Aditomo, 2020; Soland et al., 2022). During the pandemic, the education system in the U.S. shifted its focus from technology as a supplementary resource to technology being a core element in the classroom (CDE, 2021). Schools should not ask if they need specific technology; instead, they should seek the best technology resources to fit their academic needs.

This literature review aims to compile various studies to navigate a path that can help educators develop the reading skills of middle school students using modern technology resources in the classroom. Technology gives the educator the ability to teach lessons on a multimedia scale as well as planning lessons. Hence the prefix 'multi-', indicating various methods of content acquisition. The literature review seeks to synthesize Mayer's (2021) cognitive learning theory called "multimedia learning" with research on reading skills and technology use. Multimedia learning is learning through various channels using words and pictures. The specific principles used for the synthesis will be the Pre-training Principle, Segmenting Principle, and Modality Principle (Mayer, 2021). This study uses the three principles as the "principles for managing essential processing in multimedia learning" (Mayer, 2021, p. 243).

Technology Can Assist Development of Reading Skills

Post-Pandemic Reading Skills

The pandemic proved that regardless if a student is at home or in-person in a learning environment, they could still access their learning content and teacher if they had access to technology. Technology integration in the classroom created equitable access to the development of reading skills (Marsh et al., 2021; Soland et al., 2022). In various studies, educators were limited to one or two programs used in the classroom, and it made it difficult for educators to have a choice as to which technology resources to include in their classes because they were only trained to use particular programs (Betz-Hamilton, 2021; Marsh et al., 2021; Temple, 2019). There are many different kinds of technology tools available to assist students with cognitive processing through segmenting a visual text, various modalities and access to information, and

lastly, various programs that allow students to practice specific skills before applying them (Marsh et al., 2021; Mayer, 2021; Temple, 2019). Unfortunately, the COVID-19 pandemic forced schools worldwide to adopt a form of distance learning, which eliminated a very important aspect of engagement for the student; the teacher. During distance learning, schools that did not have access to technologies such as Chromebooks for each student did not have the opportunity to engage with their students. Packets and other printed resources allowed students to access learning while away from school, but a lack of engagement with the teacher was missing. As a response to the sudden shift in learning, The California Department of Education created the Digital Learning Integration & Standards Guidance (DLISG) as a means to standardize education during distance learning (CDE, 2021). The DLISG focused on reading and math skills that would be taught even if students were not able to be in the classroom. The CDE wanted to ensure that schools have a written guide as to which standards to focus on even if students were not present at the school. Unfortunately, according to the NCSE, the NAEP scores for eighth graders in reading had dropped 3% from 2019 to 2022 for those scoring at the basic level (NCSE, 2022). Out of the 70% who scored at the basic level during the 2022 results, only 31% of U.S. eighth graders scored at the proficient level (NCSE, 2022). Refer to Table 1 to see the overall trends in reading scores for eighth graders in the last five years. If comparing the assessment achievement level descriptors to state standards, the basic level of reading was where the student needed to be at the beginning of the year, and the proficient level is the level necessary to be able to succeed at the next grade level (CDE, 2013; NCSE, 2022). Therefore, in 2022 only 31% of American eighth graders were ready for ninth grade. It is important for educators and schools to determine which educational tools will benefit the development of reading skills in middle school students.

Table 1

Eighth Grade NAEP Scores Last Five Years

	2015	2017	2019	2022
	2010	2020	2010	
Below level	30%	24%	27%	30%
D 1 1	7.04	760/	720/	700/
Basic level	/6%	/6%	/3%	70%
Proficient level	34%	36%	34%	31%
Proficient level	34%	36%	34%	31%

Note. When compared to the 2019 year, there was only about a three percent change in 2022, which might not seem a lot, but out of the total number of students in the U.S. one percent equals to about 37,480 eighth grade students. Therefore, a three percent change means that over 100,000 U.S. eighth graders were not able to reach the basic level of reading. However, the trend in the last five years has been the lowest since the beginning of the documentation of reading assessment scores in the United States. Results retrieved from National Center for Education Statistics (2022). The nation's report card: 2022 mathematics & reading assessments. National Center for Education Statistics.

Another study attempted to compare and contrast student performance in an online and in-person learning environment (Randolph & Liu, 2022). During the pandemic, students had to use some form of technology to connect to their learning. The study showed that students' GPAs did not change when they moved from in-person to online instruction during the pandemic (Randolph & Liu, 2022). The conclusion showed that the shift from in-person to virtual learning during the pandemic did not affect the student's GPA (Randolph & Liu, 2022). As students began to return to hybrid education, the students who stayed in the virtual learning environment performed significantly less than those who chose to return to an in-person learning en-

tion, the students who stayed in the virtual learning environment performed significantly less than those who chose to return to an in-person learning environment (Randolph & Liu, 2022). One factor that may have influenced student performance was that the virtual learning environment did not provide as much interaction with the teacher as the hybrid model did.

Shift in Focus on Technology Use in the Classroom

Many schools shifted their focus on how technology was used in the classroom after the pandemic. The California Department of Education had also created a source for seamless instruction of standards regardless of modality (CDE, 2021). Post-pandemic had provided an opportunity for schools to restructure their focus on technology as being an essential element in the classroom. Winter (2018) studied the flipped learning model that was used at various schools during the pandemic. According to Winter (2018), flipped learning was learning done by students individually in an online setting, as well as learning done collaboratively in person in the classroom. The goal of flipped learning was to allow students to learn skills and concepts at their own pace in the virtual setting. After independently interacting with learning content, they could apply their knowledge and skills during the in-person portion of their class (Winter, 2018). Other studies showed that the online/ hybrid learning model promoted independent learning ability, where the onus of content engagement fell on the students (Li, 2022). Hybrid or online learning made the teacher a facilitator of the student's education. A hybrid-learning environment offered a differentiation in instruction that proved to help the average achieving students only when teachers were engaging with their students in the hybrid or online learning environment (Winter, 2018; Williams & Corwith, 2021). Other studies sought to examine technology use in different countries. Findings showed that countries that had governing bodies that supported technology use in education had students who considered educational technology useful (Cohen et al., 2022).

Technology Assisting in the Engagement of Content

In light of the evolution of technology in the education field, Lin et al., (2022), sought to observe student engagement with content in the virtual learning environment. The results of their study indicated that students' social and technological abilities did not have much of an influence over students'

ability to engage deeply with the content, but the social and technological skills did show an increase in surface-level engagement. Engagement with educational content through technology also could develop a student's psychosocial identity through autonomy (Rice & Cun, 2021). However, independent technology use is not enough for a student to engage with the content deeply (Lin et al., 2022; Rice & Cun, 2021). Studies showed that students with educational ability demonstrated both surface level and deep level of engagement with the content (Lin et al., 2022). For students without the academic ability to use technology, their independence while using technology resulted in an ineffective engagement with content (Rice & Cun, 2021). Therefore, simply knowing how to use a Chromebook or an iPad would not result in students learning reading skills (Flewitt et al., 2015). So regardless of technology knowledge, students could still engage with the content in a virtual setting, meaning that the curriculum was accessible to students via technology. Other studies showed that mobile devices allowed students to engage in higher-order thinking skills using mobile devices when facilitated by trained teachers (Crompton et al., 2019; Flewitt et al., 2015). Technology can help in the development of reading skills in middle school students if they have a teacher who can enhance the student's ability to engage with the content.

Student engagement was vital to student success in the classroom. Various discussion models were used to assist in student engagement. According to Jacobs (2006), the highest form of student-teacher engagement at the school was when the students and the teacher engaged in a dialogue discussion (Jacobs, 2006). During the pandemic, research showed that students in virtual classroom settings struggled to create interpersonal connections with their teachers (Williams & Corwith, 2021). If students could not receive important feedback in the virtual environment, then there was less engagement with the content (Lin L. et al., 2022; Williams & Corwith, 2021).

Other studies have revealed more insight into the development of technology-supported learning to support student achievement. In an overview study of various meta-analyses, Reimann & Aditomo (2020) researched different meta-analyses to examine if technology makes a difference in the academic success of students. Reimann & Aditomo (2020) found that classrooms that used computer technology had higher achievement than classrooms without technology. Reimann & Aditomo (2020) then analyzed and summarized another meta-analysis focused on computer technology in mathematics classes. Computer technology had "statistically significant positive effects of CT (computer technology) on mathematics achievement" (Reimann & Aditomo, p. 304, 2020). In another study, findings suggested that students' attitude toward math was enhanced through technology (Cetin et al., 2019). The technology gave students the modality of learning in a collaborative way (Cetin et al., 2019). Lastly, Reimann & Aditomo (2020) analyzed a meta-analysis that reported 38 empirical studies on the effect of technology on reading achievement. The report showed findings that reading interventions produced

a positive effect on the sample size (d = 0.57) (Reinmann & Aditomo, 2020). However, Reinmann & Aditomo (2020), concluded that "further research would need to examine the quality of support/training and implementation as moderators in effects of technology use on reading/literacy" (Reimann & Aditomo, p.305, 2020). Other studies confirmed that students who participated in writing activities in the middle of a multimedia lesson performed better than students who passively participated in a multimedia lesson (Lawson & Mayer, 2021). Another study reported that the use of technology alongside the constructivist learning environment drastically grew the effect size from (d = 0.46) to (d = 0.90) (Reinmann & Aditomo, 2020). Therefore, research showed that technology alone could not improve student achievement; there still needed to be some sort of educator intervention in administering the various lessons or assessments.

Throughout the research on technology implementation in the classroom, researchers sought to observe the effects of student-teacher interaction on student achievement. In various meta-analyses, researchers found that teachers could engage more with their students using technology-based content delivery (Reimann & Aditomo, 2020). A recent study conducted by Baucum (2022) showed the effect an online learning environment had on students' career interests. Baucum (2022) demonstrated the importance of teacher-student interaction by measuring the level of interest in STEM careers between the two groups. The teacher-student interaction positively affected student engagement in the FTF and online learning environment (Baucum, 2022). Although, students reported that it was easier to connect with their teacher in an FTF learning environment (Baucum, 2022). Students in the FTF learning environment scored higher on the question about their interest in STEM careers for the future (Baucum, 2022). Four students, who had done both the FTF and the online camp, all reported that they preferred the FTF camp rather than the online camp (Baucum, 2022). However, students in the online camp did demonstrate a higher engagement with the STEM professional during the panel presentation (Baucum, 2022). Baucum (2022) confirmed the findings of Lin et al. (2022) in regard to the surface-level engagement students encounter when in a virtual setting. The additional activities offered in the FTF camp may have created deeper connections with STEM to prompt more interest. Other studies sought to explore the effects class size has on technology use, and findings showed that the bigger the class, the more students who used technology for non-educational reasons (Zaza & Neiterman, 2019). Students in bigger classrooms felt less connected to their teachers and were distracted by recreational technology use (Zaza & Neiterman, 2019). Therefore, findings show that regardless of the learning environment, students can still engage meaningfully with their instructors (Baucum, 2022; Lin et al., 2022; Zaza & Neiterman, 2019).

Teacher's Knowledge of Technology

With so many changes in the pedagogy of teachers, finding a consistent set of ways to teach students is challenging. Teachers use practices that fit their learning environment; what worked in one classroom might not work in another school. Many obstacles arise when teachers begin to plan and integrate technology into their lessons. For example, Pacheco-Guffrey, (2021) charted the complexity involved in their Technological Pedagogical Content Knowledge (TPACK) framework. The TPACK in Figure 1 creates a visualization of the complexity teachers face in teaching standard-based lessons using technology. Each part of TPACK overlaps and creates the various combinations that make up the elements of the framework (Pacheco-Guffrey, 2021). Technology training for teachers usually only accounts for the short-term use of the programs, but teachers need plans for long-term use training (Beschorner & Woodward, 2019). Studies have shown that technology is not a simple tool to be used as a supplemental alternative; rather, teacher planning must integrate technology into their pedagogy and the curriculum (Beschorner & Woodward, 2019; Pacheco-Guffrey, 2021). Studies even sought to track teacher preparation programs and their effectiveness in teaching future teachers practical technology skills (Arya, 2022). Student achievement was positively affected when teachers were well-trained and prepared to lead with specific technology resources (Archer et al., 2014; Flewitt et al., 2015; Shahbazi, 2020). Many teachers still felt not prepared because of various barriers that still stood in the implementation of technology in the classroom (Kormos, 2021). Hence, teacher preparation for technology integration is something for schools to consider.

Figure 1 The TPACK framework.

Technologica Pedagogical Content (TPACK) Technologica Technological Content Technologica Knowledge (TK) Pedagogica Knowledge (TPK) Knowledge (TCK) Conten nowledge (CK) Pedagogical Content Knowledge Contexts

Figure 1. The TPACK framework. Retrieved from: Pacheco-Guffrey, H. (2021). Cultivating Digital Literacy. Science & Children, 58(5), 11.

Teachers' knowledge of the technology needed in their classrooms was important because it influenced their interaction with their students. As mentioned before, there was a study where teachers could not engage with their students because of technology problems, which affected the students' interpersonal ability (Lin et al., 2022). In another study, students preferred a hybrid online learning environment mainly because of the interaction between peers and the instructor (Haoqun et al., 2022). Teacher engagement positively influenced student engagement in the virtual environment; therefore, it was still important to have teacher involvement with students virtually (Haogun et al., 2022). Research also shows positive engagement influences students' connectedness to the school (Centers for Disease Control and Prevention, 2009). Technology allows teachers to offer feedback more conveniently, resulting in a more meaningful engagement between the teacher and student (Fox-Turnbull, 2019; Haoqun et al., 2022; Shahbazi, 2020). Another study showed how teachers struggled to engage with their students because of a lack of training or knowledge of technology in virtual and hybrid settings (McQuirter, 2020; Abdulrahman Nami Alshaikh, 2022). Other studies showed that teachers were more effective when properly trained because the technology saved them time and was easy to use (Carrruana Martín et al., 2022; Shahbazi, 2020). When teachers understood how to use the technology resources used in their classrooms, then they were more effective (Carrruana Martín et al., 2022; Fox-Turnbull, 2019; Haoqun et al., 2022; Lin et al., 2022; Shahbazi, 2020). During the pandemic, a study on high school students in New Zealand found that they were less motivated to complete their work in a distance-learning environment (Yates et al., 2021). However, when given support from the teacher, students were more effective in using technology for collaboration and engagement in learning tasks (Yates et al., 2021). In other words, regardless of modality, teacher knowledge of technology is crucial because they can better engage with their students through particular technology.

Students' Knowledge of Educational Technology Student Perception of Technology

When considering the development of 10-13-year-old students' reading skills, it is essential to explore their perceptions of educational technologies. One study interviewed students and found that students had a positive response to hybrid learning as opposed to entirely in-person or fully online instruction (Betz-Hamilton, 2021). Students argued that the hybrid mode of instruction gave them flexibility in teaching and assignments and a way to engage with the instructor and peers when needed (Betz-Hamilton, 2021). Bipper, K. (2019) stated in their research that "...adolescent reading involves not only decoding and comprehension skills but also the social engagement and interactions connected with texts" (Bippert, 2019, p. 2). Several studies concluded that students who had more agency and social interaction while using technology resources positively affected student motivation (Bippert, 2019; Betz-Hamilton, 2021). One study found that student perception of technology convenience and usefulness were factors when students considered rejecting or accepting the technology resource (Staddon, 2023). Results did show that students showed positive engagement with an online program when they were allowed to choose what they could read (Bippert, 2019). Interestingly, students also stated that technology could be overused and boring (Staddon, 2023).

When considering student engagement with technology, some researchers looked at the effects of learning technologies on student emotions. For example, Adams and Toh (2021) sought to compare the use of video games in learning on student emotions. The study concluded that video games and textual content prompted similar emotional arousal, which indicated meaningful engagement with the content presented (Adams & Toh, 2021). Studies also showed that students view technology tools and resources as beneficial for the acquisition of information (Lai, 2021). In another study, student's perception of their technology competence influenced their self-efficacy in the learning environment (Popa & Topală, 2023). Students had higher satisfaction with being in the classroom when teachers allowed their students more agency and freedom over which technology the students were allowed to use (Popa &Topală, 2023). One study showed that high school students were more motivated for learning when they were in a classroom environment and routine (Yates et al., 2021). Student perception of the technology they use is also essential to consider when exploring 10-13-year-old students' achievement in reading skills.

Other researchers have studied the use of technology projects such as service learning. Yusof et al. (2021) looked at the instructional strategies of service learning and examined if technology enhanced students' engagement in service learning. Yusof et al. (2021) sought to investigate the potential of gamifying the hybrid service learning process. The study highlighted that hybrid service learning was enhancing the service learning process because it created avenues of convenience and accessibility for students through technology (Yusof et al., 2021). Hybrid service learning taught students to apply their skills and knowledge to practical situations in order to develop practical solutions (Yusof et al., 2021). Results showed that students were highly engaged through the Gamified Hybrid-Service Learning model (Yusof et al., 2021). In conclusion, the hybrid-learning model that was gamified did enhance student engagement with higher-order thinking skills. Service learning projects require students to engage in higher-order thinking in order to solve problems within a given community.

Students' Technology Use

Relevant and engaging activities are essential for teachers to create rapport with their students. For example, Gamage et al. (2022) conducted research to study student engagement in an online and hybrid learning model during the COVID-19 pandemic. The study attempted to identify areas of improvement in the various learning models. Gamage et al. (2022) tried to observe what students considered engaging in learning activities via the various learning models. Students who received digital story-telling lessons performed better than students who received non-digital story-telling lessons (Maureen et al., 2018). Other researchers sought to observe how various apps prompted students to participate in activities before and during class (Retnaningsih et al., 2023). English as a second language students who participated in the flipped learning environment showed better results on a Test for Standard English (TSE) because they interacted with class content using the WhatsApp app (Retnaningsih et al., 2023).

Several studies highlighted that students preferred a hybrid or online learning environment, mainly because of the interaction between peers and instructors (Fox-Turnbull, 2019; Gamage et al. 2022; Haoqun et al., 2022; Lin et al., 2022). In the online learning environment, teacher engagement positively influenced student engagement, which influenced student achievement (Gamage et al. 2022). Therefore, teacher-student interaction is essential in the learning environment. Another study showed that non-educational technology such as social media was used for communication and collaboration (Cohen et al., 2022).

Artificial intelligence (AI) technology and virtual reality (VR) have recently advanced in ways that can benefit teachers and students in practicing reading skills. In a recent study, Kim (2022) examined 496 first-year students in college who studied the Test of English for International Communication (TOEIC) using computers or mobile devices that integrated AI. The results for the TOEIC listening and reading were all positive in the post-test (Kim, 2022). Meaning that regardless of mode, be it mobile, computer, or traditional engagement (control group), scores went up because of intentional engagement (Kim, 2022). However, scores did vary among computer, mobile, and traditional groups. Out of the three groups, students that engaged with AI in computer groups scored higher than the other two groups. Kim (2022) noted that despite the advancement in AI technology, the control group outperformed the group using mobile-assisted AI programs. In another study, mobile devices helped students engage with higher-order thinking skills in various grade levels and subject areas (Crompton et al., 2019; Flewitt et al., 2015). AI and VR could also enhance the learning environment for teachers and students, by providing personalized access to places or practices that were once out of reach (Sharrab et al., 2023). Researchers also found that students were able to use newer technology such as AI, with minimal training (Lee et al., 2023). Students were more motivated in science by experimenting with the newer AI technology (Lee et al., 2023). However, AI technology resources did not result in a significant increase in student achievement or knowledge (Kim, 2022; Lee et al., 2023)

In another attempt to grasp the advancement of AI educational tech-

nology, Moore et al., (2023) synthesized 12 articles in a systematic review specifically related to AI integration within a K-12 learning environment. In their literature review Moore et al., (2023) examined research on various AI technologies that were used in education. For example, tools such as intelligent tutoring systems (ITS), machine learning, and gamification of learning to teach machine learning to students were examined. AI was also used as an ITS and provided feedback during reading tasks for students showing off-task behavior (Moore et al., 2023). Studies explore how personalized technology could fit student needs, which could support student achievement (Marsh et al., 2021; Moore et al., 2023). Not only could AI support students, but it could also support teachers by making it easier to give feedback to students on their assignments (Moore et al., 2023). Researchers examined student attitudes toward AI and showed that students resisted machine intelligence (Moore et al., 2023). Overall, there is still a gap in research as to what kind of AI resources educators can implement effectively in learning environments.

One important aspect of technology use in the learning environment is access to non-educational technology resources that can distract from learning. Studies showed that students admitted that they often used technology devices or resources for non-educational reasons while in class (Cohen et al., 2022; Zaza & Neiterman, 2019). Students also felt distracted by other students typing during lectures (Zaza & Neiterman, 2019). Researchers also found that students who wrote out their notes by hand recalled the content better than students who typed their notes on a keyboard (Mueller & Oppenheimer, 2014). A more recent study replicated the study done by Mueller & Oppenheimer (2014) and found that there were no significant results favoring the longhand notes over the typed notes (Morehead et al., 2019).

Summary

Research shows that teacher-student engagement is still important for student achievement (Betz-Hamilton, 2021; Gamage et al., 2022; Kim, 2022; Maureen et al., 2018). Therefore, teachers will not be replaced by AI robots anytime soon. Another important aspect of technology integration is that students and educators need to understand how to optimize their learning with the integration of technology (Marsh et al., 2021; Staddon, 2023; Zaza & Neiterman, 2019). Technology can help develop reading skills in middle school students if they have a teacher who can enhance the student's ability to engage with the content. Schools must not wait for state policymakers to mandate or approve some sort of technology for educational use. Instead, schools must begin to search and compile technology resources that cater best to their school culture and environment. It is not a simple task to integrate technology in the classroom, but attempts to try new resources do influence the effectiveness of the resources (Pacheco-Guffrey, 2021; Popa & Topală, 2023). Teacher knowledge of technology is also important because they can better engage with their students through particular technologies. Hence, it is important for

schools to examine data and determine which technology resources are helping best with the development of reading skills. Unfortunately, socioeconomic barriers do exist in schools all over the world, so access to technology in one environment might look different in another environment (Kormos, 2021).

There is a limit on how much technology should be used in the classroom. Data shows that students get bored when there is over usage of technology resources (Staddon, 2023). Technology was also a distraction in some cases. Data also showed that students in larger classrooms got easily distracted by other students' typing during a lecture (Zaza & Neiterman, 2019). Technology was also a barrier for teachers who did not know how to navigate newer resources (Kormos, 2021). Studies showed that students liked being in a classroom with a teacher who gave them agency and freedom in technology use (Popa &Topală, 2023). Student agency played a significant role when it came to student engagement in a technologically reliant learning model (Adams & Toh, 2021; Betz-Hamilton, 2021; Bippert, 2019; Crompton et al., 2019; Yusof et al., 2021). Depending on the student's motivation and academic skill level, too much student agency could result in wasted academic time (Yates et al., 2021).

Studies also confirmed that modality of engagement is important. Researchers examined that there were no significant differences between handwritten notes and typed notes; reflecting, that students should be given a choice as to what kind of note-taking is most effective for them (Morehead et al., 2019). In conclusion, the literature review confirms that technology use in the classroom has become an essential component of learning and that there is not a one-size-fits-all solution for reading skill development for middle school students.

Chapter 3: Implications

Introduction

In a technologically advancing world, the modern learning environment is transforming in many different ways. There are now more resources to assist the development of reading skills in 10-13-year-old students. Reading scores have declined in the last five years, specifically during the COVID-19 pandemic (NCSE, 2022). With a shift in how technology is viewed in education, there is now a new chapter for how students can develop their reading skills. This study explored the impact of technology use on students' and teachers' engagement in the learning environment. Even though there have been many recent advancements in educational technology, there were still declining reading scores for eighth graders before and after the pandemic in the U.S. (NCSE, 2022). Reading skills are essential for students 10-13 years old because those skills are used across all disciplines. Therefore, students in middle school grade need to get a grasp on proficient reading skills to become effective lifelong learners. To better prepare students for the modern world, educators must also plan to implement some form of technology in their learning environments.

This project aimed to explore the effectiveness of technology use in a modern-day educational setting. In a modern-technologically advanced world, students must know how to engage with learning content and communicate using technology. This project looked at teacher perception of technology to support educators in using technology in more effective ways, teacher use of technology, student perception of technology, and student use of educational technology. The literature review in chapter two found that student-teacher relationships, student agency, student collaboration, and teacher training supported effective educational technology use.

Conclusions

The literature review shows educators are still essential to the learning environment regardless of technological innovations. Students engage and are more motivated to learn when a teacher interacts with them (Haogun et al., 2022; Lin et al., 2022). Despite modality, students reported positive feedback about their learning experience because of teacher interaction (Baucum, 2022; Lin et al., 2022; Winter, 2018; Williams & Corwith, 2021; Zaza & Neiterman, 2019). In addition, students that had more choice in their learning also showed better results than students who did not have agency (Adams & Toh, 2021; Betz-Hamilton, 2021; Bippert, 2019; Crompton et al., 2019; Yusof et al., 2021). Therefore, schools need to train their teachers to effectively use the technology required because when teachers are more confident, they can focus on the students more. It is essential to allow students to have agency over their path to demonstrate their learning of a particular skill or concept. Technology offers the resources to personalize ways of showing learning for the students (Marsh et al., 2021; Moore et al., 2023). Teachers must move from using technology just to present content to giving agency to students to interact with the content.

Not all technology influences student achievement (Kim, 2022). Several studies showed that technology alone did not improve the learning environment (Kormos, 2021; Morehead et al., 2019; Lee et al., 2023; Reinmann & Aditomo, 2020; Staddon, 2023). Throughout the literature review in chapter two, a pattern of how technology was used was more important than what technology was used. Regardless of recent advancements in educational technologies, many in education fear AI tools because of the risk of plagiarism. However, researchers found that some AI tools may benefit both teachers and students (Kim, 2022).

Practice Implications

Some recommendations to schools would be to avoid getting distracted by trying to implement the newest kind of educational technology. Educational technology marketing paints romanticized pictures of progress and efficiency. Some educational resources might fulfill the purpose of collecting data for the district, but may not be user-friendly for the teachers and/or students. Various educational technologies can fit various schools; therefore, districts must consider which resources work best for each site. Teachers typically are trained with an introductory lesson but not for long-term use of the educational technology resources with follow-up training (Beschorner & Woodward, 2019). If a teacher does not feel confident, they must speak up and let their administration know they need more training.

If teachers feel they need to be fully trained in the resources they are supposed to use in their classrooms, they must first be open to learning the technology. Openness to newer teaching tools can benefit teacher effectiveness and convenience (Kormos, 2021). Second, teachers should voice their concerns about needing to be fully trained, and lastly, find an approach that works best for their specific learning environment. When a teacher feels confident in their ability to teach using educational technology resources, then they are more effective (Carrruana Martín et al., 2022; Fox-Turnbull, 2019; Haoqun et al., 2022; Lin et al., 2022; Shahbazi, 2020). Teachers are still an essential part of the classroom.

Teachers should consider how they use technology resources in their classrooms. Research showed that students with more freedom to explore their learning had a more positive perception of their learning environment (Reinmann & Aditomo, 2020; Rice & Cun, 2021). Student agency allows students to use technology tools using their schema (Rice & Cun, 2021; Winter, 2018; Williams & Corwith, 2021). Research also showed that newer technology only sometimes resulted in positive results for student achievement (Cohen et al., 2022; Kim, 2022; Zaza & Neiterman, 2019). Teachers should also consider giving students agency over how they use the various technology resources. Technology resources can be used to personalize student engagement with their learning (Marsh et al., 2021; Moore et al., 2023). Researchers found that technology could create meaningful connections and collaboration between students and their peers (Fox-Turnbull, 2019; Gamage et al., 2022; Haoqun et al., 2022; Lin et al., 2022 Bippert, 2019; Betz-Hamilton, 2021; Cetin et al., 2019).

Policy Implications

Governing bodies must also consider supporting flexible technology implementation in districts and schools. Findings showed that countries with governing bodies supporting technology use in education had students who considered educational technology useful (Cohen et al., 2022). At the same time, countries that did not support technology use had teachers and students who considered educational technology unimportant (Cohen et al., 2022). According to the California Department of Education (CDE), public schools funded by the government must spend a portion of that money on technology resources (CDE, 2021). Districts must consider which programs balance the needs of the school and district to foster long-term student achievement. Districts should communicate with one another to share best practices regarding devices and programs used in the classroom that create life-long learners. Students' achievement should be the primary goal; therefore, it is advisable to consider the needs of the students through surveys and votes for new technology resources.

Before schools and districts implement new educational technology resources, they should consider the perceptions of their teachers, students, and community; do a pilot trial, and get feedback and data. Another recommendation from the research is the importance of teacher preparation. Research showed that teachers who were not adequately trained in using educational technology did not maximize the use of that technology in their classrooms (Abdulrahman Nami Alshaikh, 2022; Arya, 2022; Beschorner & Woodward, 2019; Kormos, 2021; McQuirter, 2020; Pacheco-Guffrey, 2021). Therefore, to maximize the use of effective technology use in the learning environment, teachers need to be better trained. Districts should also consider the training of their staff when adopting new educational technology resources. Many districts only train teachers once with introductory training in technology, which is not enough.

Directions for Future Study

One crucial aspect to be explored, specifically for the 10-13-year-old age group, is how the developmental stage of middle school students corresponds with their ability to use technology resources independently. As middle school students develop, it would be beneficial to know if they need more autonomy or facilitation when completing learning tasks using technology resources.

Further research should also be conducted to collect data on what type of programs work best for long-term success regarding educational technology and its effects on engagement. A lot of different technology is available to be used across subject areas. Still, it would help educators to know which resources to turn to when wanting to focus on long-term reading or math skills development. Other important factors must be considered when considering engagement in technology use, such as gender, socio-economic status, personal interests, and learning ability. Future researchers can use Mayer's theory of multimedia learning to collect data that can fill the gaps in the literature when it comes to students 10-13 years of age and their engagement with learning content through multimedia learning. This research project explores the long-term effects of technology engagement in the classroom by researching technology in education from the primary grades to higher education.

Summary

Technology integration in the classroom can provide active student engagement in the learning environment if the educator uses technology intentionally. The pandemic had resulted in many schools transitioning into hybrid learning models, which showed that students could still engage with content independently but not effectively without teacher engagement. Teacher engagement with students was still a vital aspect of virtual and hybrid learning environments. If a student can manage their processing of the multimedia learning content, they can develop reading skills across various subjects through increased engagement. Technology can support student development in reading skills if it allows students to collaborate with peers and interact with educational content rather than just presenting content (Reimann & Aditomo, 2020). Therefore, students and educators must understand how to optimize their learning with technology integration. Lastly, the latest technology cannot guarantee that it will support a specific school site or group of students. Therefore, the educational field must approach newer technology resources with an open-mind, but also with caution.

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The Impact of Incentive Use on Intrinsic Motivation to Read in Elementary-Aged Boys Natalie Carrillo

Abstract

Incentive based classroom management systems are commonly used in classrooms. Educators have turned to extrinsic motivators as an attempt to keep their students engaged with their learning in hopes that it will lead to academic success. But, the identifiable gender gap that currently exists between the reading achievement of elementary aged boys and girls, has sparked debate over the type of impact incentives may have on intrinsic motivation to read in elementary-aged boys. Intrinsic motivation has been closely connected with academic achievement. With this knowledge, it is pivotal to discover the impact extrinsic reward has on the level of intrinsic motivation in elementary aged boys, if the gender gap is to be diminished. Research has allowed insight into what factors have an impact on the motivation to boys and aimed to identify possible causes for their lower motivation to engage in reading tasks. Studies found that elementary-aged boys were less motivated to read due to lower levels of perceived ability, lower task value and the limitations produced by gender stereotyping. These findings align with the expectancy-value theory, which suggests that individuals are motivated by value and perceived ability. Additionally, research that assessed the impact incentives had on students found that the effects are potentially detrimental. Although incentives may provide immediate compliance and task completion, it diminishes the opportunity for autonomy and creative thinking. These findings support the conclusion that incentive use has a negative impact on the intrinsic motivation to read in elementary-aged boys. Educators, administrators and parents alike should focus on connecting male students with books related to their interests, should focus on exposing them to various genres of books, and should actively establish reading as a task that is not gender congruent. When boys are free from the confines of believing reading to be a traditionally feminine task and are able to have easy access to books that meet their interests, they will engage in reading as a choice activity. When they spend more time reading, their skills will develop, and the gender gap between elementary-aged boys and girls for reading achievement will experience an observable decrease.

Chapter 1: Introduction to the Project

Background

Reading instruction and developing deeper reading skills in students is a main focus of early education; however, this can be difficult for educators to accomplish without a strong system in place that maintains student behavior, engagement and expectations. Classroom management systems are adopted by teachers with the hopes of increasing student success behaviorally and academically. Research has shown that management systems that foster a sense of classroom control are connected to not only positive student achievement but also teacher self-efficacy. (Hoffman et al., 2009) Over the years, teachers have searched for the most optimal method of managing student behavior and increasing reading motivation in a way that is low cost and obtainable to uphold daily. One method that educators have implemented in their classrooms is the use of incentives as reward for positive behavior and/or the absence of negative behaviors. Although these systems have become deeply rooted and prominent in classrooms, some argue that rewards and incentives have a negative impact on the intrinsic motivation of students. Some studies assert that when students are aware they are working towards a reward, they have less interest in the task and consequently may have a negative impact on long term intrinsic motivation (Gneezy et al., 2011; Froiland, 2021). Conversely, many teachers have found there is a positive connection between the use of a reward system and overall student engagement (Hoffman et al., 2009). When viewing student motivation through the lens of reading success, it is critical to acknowledge the measurable gender gap in reading achievement for elementary aged boys. Researchers have identified motivation to be one of most significant factors that determine reading achievement. The motivation to read is pivotal in the development of strong reading skills and literacy abilities for young readers. (Logan & Johnston, 2010; Edmunds & Tancock 2003). However, motivation to read is significantly lower in elementary aged boys than in that of girls the same age (Burchard & Pilonieta, 2017). This begs the question, does the use of incentives and rewards for reading impact the intrinsic motivation to read in elementary aged boys?

Statement of the Problem

Classroom management is one of the most important aspects of teaching. Without having a system in place that fosters an environment where students are held to clear and concise expectations, they may not learn. It is because of this that many teachers have searched for the best management tool that will allow them to focus more on their students' education and less on their behavior. Many educators have found that the use of a reward based management system is what allows them to focus on teaching (Hoffman et al., 2009). With this type of system, students complete an action with the expectation of an incentive in return. Although this trade off may encourage students

to complete their work, it is important to consider the lasting impact that this type of system may potentially have on a student's intrinsic motivation.

Research has shown that elementary aged boys are less academically successful in the area of reading than their female counterparts (Burchard & Pilonieta 2017; Logan & Johnston 2010; Marinak & Gambrell 2010). One way that teachers have attempted to combat a lack of desire to read is by offering incentives to students in return for minutes spent reading. This poses the question whether incentive use has an impact on the reading motivation in a population of students who have historically struggled with reading, such as elementary aged boys.

Purpose of the Project

This research examines the level of impact that incentive use in the classroom may have on the long-term motivation to read, particularly for male students, ages 5 through 10. While there has been research conducted to prove that boys typically have a lower sense of motivation to read than girls, there is a lack of research that examines the impact that one of the most popular behavioral management strategies in classrooms may have on long-term motivation to read. It is pivotal to determine the impact of this strategy on reading motivation in boys because reading skills are a benchmark for education and literacy skills are needed to achieve academic success. In order to close the gap in gender reading achievement, long lasting intrinsic motivation must be fostered in elementary aged boys. Research has produced conflicting results on the impact that reward use in the classroom has on students. However, it can be suggested that if students are growing more successful in reading solely due to the extrinsic motivation of rewards, then genuine reading achievement may be limited. Therefore, it is necessary to acknowledge the impact that reward based management system has on students' long term intrinsic motivation.

Theoretical Framework of the Project

When considering the impact that extrinsic motivation strategies has on the intrinsic motivation of elementary aged boys, it is important to view this topic through the lens of the expectancy-value theory. This theory suggests that motivation is determined by two factors, an individual's perception of a task's value and the individual's expectancy for achievement of that task (Eccles & Wigfield, 2002). An individual's perception of value is determined by a number of external factors. Those factors include whether or not the task is something that will bring them joy, whether it is something that will benefit them in the future and whether completing the task will present an opportunity to compete with others around them. Additionally, an individual's perceived ability at accomplishing a task and whether or not they will do so successfully plays a role in motivation (Struder & Knecht, 2016).

Classroom behavioral management systems often have a goal of fostering motivation within their students, motivation to listen to their teacher,
motivation to complete work and motivation to work well with others. It is through a systemic process that these forms of motivation are achieved within a classroom. Yet many have speculated about the type of system used and whether or not the motivation being encouraged is extrinsic or intrinsic. With an incentive based system, students are offered rewards in exchange for their participation, cooperation and effort given within the classroom. Through the lens of expectancy-value theory, it could be argued that the incentive system is shaping the perceived value of a given task.

According to expectancy-value theory, it is also important to recognize that an elementary aged boy's perception of their ability to accomplish a task may also play a role in their motivation to read. A child's own self-concept of reading abilities has an impact on whether or not he is motivated to do that activity. For example, if an elementary aged boy believes that he is not a strong reader, then he will be less motivated to read. Even further, if he believes that he is the worst reader in his class, he will be less motivated to engage in reading in the classroom for fear of embarrassment. (Eccles & Wigfield, 2002).

It is the combination of perceived task value and expectancy for success that result in higher achievement and motivation (Struder & Knecht, 2016). The use of incentives as a management tool in classrooms has the potential to increase elementary aged boys' perception of the task value for reading. However, it is important to determine whether this increase in task value is paired with an increase in the student's expectancy for success in reading. According to expectancy-value theory, this is when substantial increases in motivation are possible.

Definition of Key Terms

In this project there will be terms used that are related to the topic of research and are important to be defined to ensure understanding.

Intrinsic Motivation: the doing of an activity for its inherent satisfaction rather than for some separable consequence. When intrinsically motivated, a person is moved to act for the fun or challenge entailed rather than because of external products, pressures, or rewards (Deci & Ryan 2000).

Incentive: something that incites or has a tendency to incite to determination or action (Merriam-Webster.com) In this paper incentives will refer to predetermined rewards that students earn in return for completed tasks.

Reading Achievement: The ability to use skills that are needed to read grade-level text fluently and with comprehension.

Gender Congruent: Behaviors, actions, skills and interests that are seen as being in line with the expectations of each gender (Elmore & Oyserman, 2012).

Summary

Reading achievement is a key factor in academic success. While many things can impact a student's reaching skills development, motivation has been

found to be one of the most impactful. In an attempt to encourage student engagement with learning and accomplishment of reading goals, educators have relied on incentive based management systems within their classrooms.

Classroom management systems are pivotal in allowing teachers and students alike to develop self-efficacy and autonomy. Without a strong system in place, teachers may struggle to lead their students towards success with their academic goals. In the search for the strongest and most efficient system, some educators have utilized the incentive based management system. Students are offered a predetermined reward in return for a specific task. Oftentimes these incentives include stickers, class points, candy, lunch with the teacher, extra play time with a friend, etc.

The focus of this research is to examine how the use of these incentives impacts long lasting intrinsic motivation to read in elementary aged boys. Previous research regarding incentive use in the classroom and its connection to motivation will be acknowledged. The nature of motivation and how it plays a role in reading achievement will be discussed. The goal of this research is to inform readers on the effective or ineffectiveness of incentive use to improve reading motivation in elementary aged boys with the aim to determine a more successful strategy that has the potential to close the gap in gender reaching achievement and inspire long lasting motivation.

Chapter 2: Review of Related Literature

Introduction

In an attempt to improve student engagement and overall academic success, educators have turned to a variety of methods for classroom behavior management. One method of management is the use of incentives. Incentives have been defined as rewards that students earn through the completion of given tasks. This has looked like a student receiving a sticker for completing a specific amount of reading in their chapter book or a teacher giving a student a ticket for a physical prize if they are finishing their assigned worksheet. The goal of this method has been to motivate students to complete the work required of them. Many researchers have identified a connection between motivation and learning, but there has been controversy over the impact that incentive use has on a student's motivation and whether or not it fosters longterm intrinsic motivation. Some have argued that students may merely become motivated to complete a task for the one motivation of receiving the reward. One area of academics that incentives have often been utilized is with reading. Educators have incorporated incentive based systems where students earn pre-determined rewards when they read for a specific amount of time.

With the identified gap in reading achievement between elementary aged boys and girls, current research has provided educators with background knowledge and further insight into the topic of incentive use and its impact on motivation to read for elementary boys. The purpose of this research is to establish background information on incentives, types of motivation, and reading achievement. The chapter is concluded with an analysis of the impact that incentive use has on motivation in elementary aged boys to read.

Motivation

Motivation has been recognized as a key element of academic success (Borah, 2021). Theorists have searched for an explanation as to what inspires or hinders motivation. For years, educators had debated the benefits of the two types of motivation, intrinsic and extrinsic and which one is most beneficial for the educational experience (Lemos & Veríssimo). Eccles (2000) identified a relationship between an individual's expectation for success at a task and that specific task's perceived value. She termed this relationship the Expectancy-Value theory. This theory provided a framework through which to view motivation in education. Specifically, the motivation of elementary-aged boys to read. When a student's expectancy for success or self-belief, as well as the value they perceive the task to have, are considered, motivation in elementary-aged boys could potentially be measured.

Intrinsic Motivation vs. Extrinsic Motivation

With regards to motivation among male students in the elementary classroom, researchers have discovered two types of motivation. Intrinsic motivation has been described as the desire to complete tasks driven by only the internal desire to do so and the absence of external rewards (Deci, 1975; Cameron et al., 2001; Atkin-Little & Little, 2009). Extrinsic motivation has been described as the type of motivation that is driven by the desire to accomplish a task to earn a reward. Within the context of education, intrinsic motivation is the desired form of motivation due to the independence and self-efficiency that were produced (Verstuyf & Lens, 2009; Williams & Stockdale, 2004). Intrinsic motivation is long-lasting, whereas extrinsic motivation does not inspire long-term motivation to succeed (Cameron et al. 2001).

Gottfried (1985), examined the impact motivation has on academic achievement in students ranging from elementary-aged to middle school aged. Gottfried's research established a connection between a student's intrinsic motivation and success academically and their own self-perception of their academic abilities and lower anxiety around school. In another study, the researchers analyzed intrinsic motivation and extrinsic motivation and measured their impact on elementary students as two independent variables. The research indicated a positive relationship between intrinsic motivation and student academic success by the end of elementary school. Their findings suggested that both forms of motivation can in fact coexist. (Lemos & Veríssimo, 2014). Research has shown the significance for educators to have considered the two types of motivation and how they impact motivation and have been established through research that identified a positive relationship between intrinsic motivation and academic success (Retselford et al., 2011, Becker et al., 2010, Froiland & Oros, 2014).

Expectancy-Value Theory and Motivation

Theorists have sought to determine an explanation for what exactly conjures motivation within individuals. Eccles and Wigfield (2000) have studied motivation and identified aspects of the human experience that they believe influence motivation. This research explored the academic motivation of elementary students. Principles of the expectancy-value theory have revealed that motivation in elementary-aged students impacted their expectancy to be successful at a task, their beliefs about their academic abilities and the value that students place on the tasks they face (Eccles & Wigfield, 2000). The study found that student belief about their own academic abilities as well as the perceived value students place on academic tasks, decreased. Eccles and Wigfield (2000) credited the declines to outside influences such as how children become capable of comparing their abilities to their peers as they progressed through their schooling. These findings have provided educators with insight into student motivation and how extrinsic factors may impact it.

Academic Motivation

Motivation, both intrinsic and extrinsic, within the academic setting have been found to be a key element of overall student success regardless of gender (Gottfried, 1985; Lemos & Veríssimo, 2014, Foiland & Oros, 2014). Within the scope of academic motivation are measurable aspects such as goal orientation, self-efficacy and task value (Eccles & Wigfield, 2000). While these specific contributions to motivation are consistent across research, Borah (2021) suggests that how these aspects of motivation are experienced is unique to each individual and can be influenced by outside factors such as school environment and home life. Additionally, Borah (2021) supported the importance of academic motivation by connecting motivation with skills needed to achieve academic success. When students are motivated to actively participate in their academic experiences, they are more likely to achieve impactful learning outcomes (Borah, 2021). This study expanded the concept that academic motivation plays an important role in the success of students.

Goal Orientation

Students who have shown motivation were often engaged in the development and measurement of their academic goals. Motivation has been found to increase when students are allowed to be involved in the creation and tracking of their own academic goals. Froiland (2021) found that when students were given a role to play in the goals they aim to achieve, they developed a deeper sense of responsibility. This study measured the impact student involvement made on upper elementary student's academic experience when they were included in the creation of academic goals (Froiland, 2021). The students in the study developed goals that were intrinsic in nature. The goals focused on the enjoyment of learning, inspiring creativity, fostering persistence and helping others. Overall, the findings from this research identified a positive relationship between elementary-aged student involvement in the development of academic goals and academic achievement (Froiland, 2021). Vansteenkiste (2005), measured the impact made on elementary aged students when intrinsic goals were set versus the use of extrinsic goal setting. The results revealed that when students were given the opportunity to practice autonomy in their goal-setting process, learning was enriched.

Self-Efficacy and perceived ability

According to Froiland and Oros, (2014) an individual's self-perception of what they are capable of has been found to be connected with their motivation. Student's have been found to form awareness of their own strengths, abilities and their limitations at an early age (Burchard & Pilonieta, 2017). Logan and Medford (2011), found that if a child has perceived their own abilities to achieve a goal or accomplish a task as limited, it impacts their level of engagement in a task. Students who were less willing to engage in tasks limited themselves from the opportunity to learn and expand their abilities. The findings presented in their research are congruent with the idea that boy's perceived ability impacts their actual abilities. Additionally, they suggest that elementary aged boys connect their beliefs about perceived ability with their reading skills (Logan & Medford, 2011).

Task Value

Eccles and Wigfield (2001) theorized that motivation is influenced by an individual's perception of value for a given task. They suggested that value for a specific task can be influenced by the individual's perception of how important the task is, how enjoyable the task will be, how it can benefit their own goals, and the cost including time and energy of completing the task (2001). Studies have identified that the value students place on an academic task influenced their performance (Marinak & Gambrell, 2010; Olivier et al., 2020). Espinoza and Strasser (2020), found that personality traits and gender stereotyping are connected to the variation in value that male and female students place on reading tasks.

Incentives

Incentives used as rewards for positive student behavior have become a deeply ingrained part of our society, especially in academic settings. In the effort to support their students to meet high academic expectations, teachers had to think creatively in order to find methods that motivated their students to not only engage with their learning but to also achieve academic success. While there has been debate over the effectiveness of the use of incentives in the elementary classroom, Hoffman (2009) revealed that a vast majority of teachers utilize some sort of reward system in their classrooms to facilitate positive student engagement. With the popularity of this method, researchers have identified a need for studying the type of impact it may have on students.

Tangible Rewards and Privileges

In an attempt to incorporate incentives within their classrooms, teachers have had to be creative when thinking of low-cost and manageable rewards for their students (Wheatley et al., 2009). Some rewards teachers have offered to their students through incentive based systems are tangible items and special privileges. Tangible items teachers have reported on using are items such as toys/trinkets from a prize box, food (candy, chips, etc.) stickers or stamps. (Hoffman et al., 2009). Special privileges students have earned included extra recess, lunch with the teacher and even homework passes. Deci et al. (2001) published a study regarding the topic of extrinsic rewards and its impact on intrinsic motivation. The authors found that while tangible rewards such as pizza parties and awards are commonly accepted and utilized, they diminish intrinsic motivation in students. For the purpose of this research, verbal praise was not included in the category of external incentives. Research collected for this study included discussions of physical incentives such as rewards, privileges, food or tokens. In summary, incentives or rewards have been described as something tangible that teachers give to their students when they have earned them through doing something positive (Hoffman et al., 2009).

Incentive Use in the Classroom

Deci (2001) found that many educators developed unique reward systems. Some even utilized multiple different reward systems such as ones that were task completion contingent, engagement contingent and task non-contingent. In the task completion contingent system, expectations for completion of an educational task were set by the teacher and if that expectation was met, then the student received a predetermined incentive for meeting that expectation. In these reward-based systems, students typically were made aware of what they are working towards and may even have had an option to select the reward that they prefer. Token economies, where students can earn or lose "money" or tickets that they can exchange for a reward have often been used in classrooms. As well as sticker charts where a student was able to add stickers to their chart which eventually earned them a reward once completed, pizza parties for reading and student-achievement awards (Deci et al., 2001; Hoffman et al., 2009). With the introduction of technology into classrooms, teachers have incorporated computer-based incentive tools such as Class Dojo where students have been able to earn instant points for their participation in the classroom. This system also typically has led to the earning of a reward once enough points were collected for completing certain tasks or for positive behavior.

Behavior Management

Kowalski and Froiland (2020), presented findings that reward based systems have been most commonly utilized as a strategy to manage student behavior in classrooms. Within their research, they identify one popular method among educators as being behavior clip charts or pocket charts. This method of behavior management includes displaying a student's level of behavior in front of their class in order to indicate good or bad behavior (Kowalski & Froiland, 2020). Many schools have established school-wide systems with the intention to promote universal expectations for behavior (Wheatley et al., 2009 & Hoffman et al., 2009). In Hoffman's (2009) research of teachers and their perspective on reward use in the classroom, the researchers were able to identify that a majority of teachers who used incentives for behavioral management also utilized rewards for academic achievement. This finding has encouraged theorists to consider the impact that rewards have on not only behavior but also academic achievement as research has suggested incentives are commonly used for managing both.

Are Incentives Effective?

Since the popularity of incentive use in the classroom increased, there has been debate among psychologists and theorists over the effectiveness of incentive use in the classroom (Deci et al., 2001; Kowalski & Froiland, 2020; Gneezy et al., 2011). However, when referring to the "effectiveness" of this method, some have argued it is subject to interpretation. While some believed the use of incentives to be effective because it encouraged students to complete required tasks and therefore aided teachers in their supporting students to meet the high standards expected of them. Some educators have credited the use of incentives for how they successfully manage their students (Hoffman et al., 2009). In one study, the researchers examined reward-based behavioral systems from the perspective of elementary teachers. The majority of teachers from their research incorporated some form of reward system within their classroom. Most used tangible rewards for behavioral management. This research found that the use of incentives increased the sense of classroom control for the teacher (Hoffman et al., 2009). In a separate study, Wheatley (2009) aimed to measure the effectiveness of incentive use on improving behavior. The researchers aimed to measure the impact positive reinforcement and use of reward had on students in the lunchroom. The results showed that student desired behavior in the lunchroom increased with the implementation of a behavioral management system. It is important to note that the reward system was paired with clear expectation setting and allowing time for students to practice desired behaviors (Wheatley et al., 2009).

While these studies have suggested positive relationships between the use of incentives and behavior management, other researchers have argued that the use of incentives could potentially undermine autonomy and motivation academically as well as creatively (Deci et al., 2001; Hidi, 2015; Gneezy

et al., 2011; Mutter et al., 2023). Akin-Little and Little (2009), suggested that extrinsic incentives had a harmful effect on intrinsic motivation only when the rewards were not closely connected to the task at hand and when rewards were not received, it implied the student had failed. These circumstances have the potential to be detrimental to intrinsic motivation because they do not acknowledge student competence and do not set students up for success with the task at hand (Akin-Little & Little, 2009). The effectiveness of incentives could not be determined without considering the impact they may have had on motivation and whether or not results of incentive use showed potential for long term benefits.

Students with Disabilities

Reward based systems have often been used to support students with academic or behavioral needs in the classroom. Carrick and Hamilton (2003) focused on classroom reward systems and how they impacted students with fetal alcohol syndrome disorder (FASD) and characteristics of Attention-deficit hyperactive disorder (ADHD), oppositional defiant disorder (ODD) and autistic-like traits (ALT). Carrick and Hamilton concluded that rewards are deemed as not helpful for these students for a number of potential reasons. One reason was that these students may have been unable to comprehend the rules or expectations set within reward based systems in the classroom (2023). Carrick and Hamilton's research suggested that educators and administrators should consider student's executive functioning when deciding to practice reward-based management systems (2023). These findings opened the discussion regarding the limited inclusiveness of incentive based systems in classrooms.

Gender Gap in Reading Achievement

Reading and literacy have long been primary goals for elementary education. Many teachers have strived to foster inspiration, interest and excitement for reading within their students. While many studies have aimed to identify best practices for teaching early literacy, there is a lack of research regarding the gender gap in reading achievement and how to best support boys' motivation to read. Those studies that have focused on reading achievement, have found that the extent students achieve success in reading and literacy skills, is influenced by their gender and/or gender specific traits (Marinak & Gambrell, 2010; Acar-Erdol & Akin-Arikan, 2020; McGeown et al., 2012; Espinoza & Strasser, 2020). Espinoza and Strasser (2020) found that female students had higher levels of reading motivation through their high self-conet and the high value they place on reading tasks.

Boys Reading Achievement Decreases Over Time

As children moved through each grade, an identifiable gap formed between the reading achievement of boys and girls. (Marinak & Gambrell, 2010, Logan & Johnston, 2011, Espinoza & Strasser, 2020). Analysis of the reading assessment results for 4th grade students in the United States of America showed that male students have consistently scored lower than their counterparts for the last twenty years (NAEP, 2023).

NAEP Fourth Grade Average Reading Scores



Figure 1. Data collected from the National Assessment of Educational Progress (2023) reveals the consistent disparity between average male student and average female student reading scores.

Expectancy-value theory has encouraged educators to observe this problematic trend through the lens of motivation and the various factors that can impact boy's motivation (Wigfield & Eccles, 2000). Studies have found that male reading achievement and literacy development is closely tied to their motivation (Logan & Medford, 2011; McGeown et al., 2012). However, motivation within elementary aged boys to read has been found to decline as they progress throughout their schooling. Espinoza and Strasser (2020) identify this as an area of concern for educators. They argue that due to male student's lower levels of self-concept paired with lower perceived value of reading results in lower motivation to read. When a student's motivation to read is minimal, there is less time spent reading. Because boys are spending less time reading, the reading achievement gap between boys and girls is broadening. The authors suggest that expectancy-value theory has perpetuated the idea that motivation is influenced by "societal-beliefs" (Espinoza & Strasser, 2020).

Gender roles

Expectancy-value theory has suggested that individuals are driven, or motivated, by their own expectancy to succeed and the value they perceive a task to have (Eccles & Wigfield, 2001). When the motivation of elementary

aged boys was considered, a number of factors had the potential to influence their motivation. First, the matter of their own self-concept. Society has perpetuated gender roles and labeled aspects of education as best suited for male students or female students (McGeown et al., 2012). Gender stereotyping has been identified as a key factor in the development of student's self-concept (Espinoza & Strasser, 2020). Oftentimes, elementary aged boys have been encouraged to spend their choice time playing alongside friends in a physical format, while elementary aged girls have tended to choose reading a book. This labeling has the potential to limit both boys and girls (Scieszka, 2003; Espinoza & Strasser 2020).

Reading achievement becomes more difficult to obtain when less time is spent practicing to read. Additionally, when boys view reading as a "girly" task, they are then less likely to place value on reading skills and literacy. One study aimed to determine how reading skills were impacted by a child's tendency to show more feminine characteristics or masculine characteristics. McGeown (2012) found that reading motivation was most apparent with the presence of feminine traits when compared to the reading motivation connected with more masculine traits. In another study, Espinoza and Strasser (2020) linked self-concept about reading abilities with gender stereotypes. The study revealed that reading success of female students is not solely tied to their actual performance or the responses they receive from their teachers. Instead, the success female students found within reading is influenced by the strong connection between reading achievement and feminine identity traits. The study found that students who identified with traditionally female traits such as tenderness, emotional and sentimental, tend to place a greater value on reading that students who identify with traditionally more masculine traits . The authors from this study suggest that gender identity is a better predictor for reading motivation than biological sex (Espinoza & Strasser, 2020). This study shifted the focus from biological gender to gender-specific traits that potentially influence reading motivation in boys and how that has resulted in a gender gap in reading achievement.

Interest in Reading

When the value of reading achievement has been considered, researchers identified that value must be perceived by the individual. In a study completed by Marinak and Gambrell (2010) explored the relationship between motivation and reading and how it has affected the gender gap. They identified that a boy's motivation to read is strongly influenced by the value they place on reading. Marinak and Gambrell (2010) state that "...third grade boys who are average readers appear to be less likely than their girl counterparts to value time spent reading and social interactions about books" (p.137). Their findings showed that girls placed value on spending time reading as well as engaging in social interactions about reading, such as reading alongside a friend or even being in a book club. Meanwhile, boys did not value time spent reading and did not value engaging in social interactions about reading or books (2010). This inspired a need for deeper understanding as to what determines perceived value. Boys' perceived task value of reading has strongly influenced their motivation to engage in reading tasks. Elmore and Oyserman (2012) found that students will find academic engagement to be more successful if that engagement is in line with gender expectations. They argue that gender-congruent behavior is more expected of males than of females and that males receive greater backlash when engaged in behavior that is perceived as not in line with masculine traits.

Researchers have also found that an aspect of reading that influences male motivation to read is genre (Ives et al., 2020; Burchard & Pilonieta, 2017). One study measured the interest level of third-grade students reading nonfiction versus fiction books. Their results concluded that students were more motivated to read not only fiction books but also books that matched their personal interests and curiosities. The research also showed that the majority of boys included in the study favored nonfiction books (Gallo & Ness, 2013). This research supported the idea that while both female and male students are motivated to read books related to their personal interested, male students were more likely to read nonfiction books about their interests (eg. sports, animals, video games).

Closing the Gap

The underachievement in reading for boys brought educators, parents, and policy makers to attention. The various data presented on the limited success of elementary boys reading achievement, suggested that the methods in which were currently utilized to encourage male students to read were in need of re-evaluation (Marinak & Gambrell, 2010; Elmore & Oyserman, 2012; Burchard & Pilonieta, 2017; Espinoza & Strasser, 2020). Through this lens, reading motivation for boys should be considered with the following guidelines; boys self-concept about their own reading abilities and their perceived purpose or value of reading (Burchard & Pilonieta, 2017). Espinoza and Strasser (2020) found that female students show higher levels of motivation, specifically for reading, through higher levels of both self-concept and task value.

Using Incentives to Motivate Boys to Read

Incentive based systems in classrooms as well as school-wide, aimed to support students in academic success. A need for support among the male student population in regards to reading achievement has been identified (Marinak & Gambrell, 2010; Logan & Medford, 2011; McGeown et al., 2012;).

Incentive Use in the Classroom

In an attempt to meet the demand of the high expectations set on today's students, teachers have implemented reward-based strategies in their

classrooms. Hoffman et al. (2008), examined reward based behavioral systems from the perspective of elementary teachers. The majority of teachers from their research incorporated some form of reward system within their classroom. Most used tangible rewards for behavioral management. This research highlighted a connection between the use of incentives and classroom control for teachers (Hoffman et al., 2008). Although incentives have proved to be beneficial for providing teachers with a sense of control, other research argues that incentive use is in fact detrimental to students. Becker et al. () reviewed One study aimed to provide insight into the thoughts and opinions of parents on the use of rewards in their children's classrooms (Kowalski & Froiland, 2020). This mixed-methods study included surveys with parents of elementary aged students regarding how they view incentive use in the classroom. The survey consisted of quantitative questions such as how many times their student has received a reward from a teacher or school administrators. The survey also included quantitative questions that asked parents to describe the systems being used in their child's classroom and to describe how they feel their student is being impacted by those systems. The results from this study showed that a large portion of teachers are utilizing methods such as behavioral charts in their classrooms. Additionally, the research concluded that the majority of parents included in the study felt that reward systems resulted in their child feeling anxious and feeling negatively about school (Kowalski & Froiland, 2020).

School-wide Incentive Programs

Hoffman (2008) highlighted how schools across the country had implemented incentive based programs by stating, "Entire schools now participate in rewards programs. One of the largest is Pizza Hut's Book It program, which since 1985 has distributed more than 200 million free pizza coupons in more than 50,000 schools to students who reach monthly reading goals" (p. 843). This data reinforced the idea that tangible rewards are often being used as an attempt to get students motivated to read. Greenlee and Bruner, (2001) analyzed a school-wide reading incentive program known as Success for All (SFA) that has been implemented in Title-1 schools. The study did not show proof of students achieving proficiency in reading based on standardized testing from either SFA schools nor non-SFA schools. However, the analysis did provide insight into the debate regarding effectiveness of school-wide incentive reading programs. Greenlee and Bruner (2001) suggested that these types of systems fail due to their "one-size-fits-all approach".

Arguments for Incentive Use

Research that has been done on incentive use commonly agree that the type of incentive being given as well as whether or not the reward is related to the task, are what determine its effectiveness (Akin-Little & Little, 2009; Cameron & Pierce, 2001).

One study re-examined the controversial topic of extrinsic rewards and their impact on intrinsic motivation. The findings included the different effectiveness of verbal reward and tangible rewards as well as the impact of expected rewards and unexpected rewards. The research states that verbal and unexpected rewards are beneficial in supporting intrinsic motivation (Deci et al., 2001). Jovanovic and Matejevic (2014) argue that although students may find enjoyment and interest in a task initially, there is potential that those feelings will fade. That is when extrinsic rewards may be necessary to further students' engagement with said task.

Summary

Incentives have been described as rewards that extrinsically motivate students to engage in or complete an academic task. They have become widely accepted and implemented among today's classrooms. However, experts have debated over the impact that the use of extrinsic incentives have on a student's intrinsic motivation. Motivation is a key element of learning as it is what drives students to engage with the world around them and the information being taught to them. When a student population has been identified as in need of support for numerous decades, educators and policy makers alike must act. For elementary aged boys, reading and literacy scores have proven to be below the scores of elementary aged girls consistently over numerous years. Motivation to read has played a major role in reading achievement. When there is motivation to read, students were more engaged and excited about their reading. Expectancy-value theory provided a lens through which to evaluate current reading motivation for boys. When self-concept and self-belief as well as perceived value of reading was considered, educators could best identify how to close the gender gap for reading achievement and whether or not incentive use is conducive.

Chapter 3 of this project discusses the type of impact that incentives make on reading motivation in elementary aged boys. Suggestions for how educators, policy makers and parents can move forward using reinforcement based strategies to best support the population in need.

Chapter 3: Implications

Introduction

Motivation is influenced by a number of extrinsic factors. Within the past couple of decades, educators have turned to a classroom management system that utilizes incentives as a method to inspire students to accomplish and engage in academic tasks. When considering the effectiveness of these incentive based systems in classrooms, it is important to focus on a target population in need of support. The identifiable gender gap in reading achievement suggests that elementary-aged boys are in need of support strategies that could potentially close the gender gap. This project will discuss the impact that incentives have on intrinsic motivation to read in elementary-aged boys. It is vital that educators acknowledge the impact that incentives have on the intrinsic motivation to read in elementary aged boys. It is important to determine whether or not this behavioral management system has a positive or negative impact on intrinsic motivation and how teachers can use that information to best support the male student population to be successful in reading.

Conclusions

The underachievement in reading for boys has educators, parents and policy makers at attention. It is pivotal that the methods which are currently utilized to encourage male students to read, must be reevaluated. Through this lens, reading motivation for boys should be considered with the following; boy's self-concept about reading and their perceived purpose or value of reading (Burchard & Pilonieta, 2017). The effectiveness of incentive use, or rewards, on elementary-aged boys motivation to read is important to determine in order to best support this population of students. It has been found that supporting the motivation to read in students supports the reading achievement of those students (Van der Sande et al., 2023). However, there is a gap in research that measures the effects of rewards on intrinsic motivation to read in elementary-aged boys. This could be largely due to the fact that it is difficult to measure intrinsic motivation to read in students.

This project aimed to review the literature regarding intrinsic motivation and its importance for reading achievement as well as how incentives may be impacting the intrinsic motivation to read in a vulnerable student population. Research supports the belief that motivation plays an important role in academic success (Becker et al., 2010; Burchard & Pilonieta, 2017; Chen & Wu 2010; Edmunds & Tancuck, 2003; Fawson et al., 2009; Gottfried, 1985; Guryan et al., 2006). With this knowledge, it is important to consider the strategies educators implement in order to motivate their students, especially their male students, to engage in reading. The current incentive based systems being used in schools today have failed to inspire intrinsic motivation in boys to read. As evidenced by the persistent gender reading achievement gap. While incentives may effectively achieve student cooperation, they have the potential to muffle student creativity and autonomy (Borah, 2021; Vansteenkiste et al., 2005;). Becker et al. (2010) argues that students who engage in reading for the sake of extrinsic motivational factors have lower reading skills than children with less extrinsic motivation. The authors suggest that when children experience reading failure, they are more likely to be motivated extrinsically and possibly only engage in reading when they are required to. By only reading when they have to, the student will most likely have lower reading skills as opposed to students who engage in reading by choice (Becker et al., 2010).

Based on these studies, it should be known that incentives must be utilized intentionally and within the context of procedural tasks in order to be effective without hindering intrinsic motivation. Motivation to read should be inspired through involving boys in the development of their own reading goals, exploring a wide variety of genres and topics that match their interests and the societal adaptation of reading as being a gender-congruent task. (Froiland, 2021; Fawson et al., 2009; Elmore & Oyselman, 2012; Marinak & Gambrell, 2010). Incorporating methods that inspire intrinsic motivation in elementary-aged boys to read is critical to ensuring academic success. Improved reading skills will result in improved test-taking skills, homework completion, social skills and even career readiness.

Practice Implications

With the conclusion that incentives may have the ability to limit student's intrinsic motivation, educators must carefully consider the manner in which they incorporate incentives into their classrooms. Previous research has found that when incentives are used in thoughtful and intentional ways, they can in fact aid in academic motivation. Teachers and administrators should utilize incentives specifically for tasks that are more procedural in nature. Using rewards when students meet the expectations for classroom tasks and procedures such as lining up, turning in their work, etc., is likely to lead to an increase in student motivation to meet those expectations. Incentive systems where students are receiving a predetermined reward for a specific task can be useful when involved in rudimentary tasks. Tasks that require students to think independently and creatively, should not be encouraged through incentives. When task rules are implemented during times of academic exploration, it has the potential to hinder the student's experience and even decrease intrinsic motivation (Mutter et al., 2023).

Secondly, studies support the notion that students experience greater levels of success when they feel they are involved within their own education (Froiland, 2021). When students are afforded opportunities to engage with their own goal-setting and given a voice, they are more likely to achieve those goals. Vansteenkiste et al. (2005) found that when students are allowed to practice their independence and that independence is supported, they are more likely to experience an increase in understanding of key concepts. If educators incorporate an incentive system within their classroom, they should avoid establishing too many goals and expectations for behavior and especially for academics without the voice of their students. Teachers should work with their class to create expectations for behavioral and academic performance. This strategy could positively impact the influence that incentive systems have on intrinsic motivation. When these types of systems are used in classrooms, oftentimes the teacher determines the expectations and determines the reward for meeting that expectation without student input. This results in a disconnect between what the student is intrinsically motivated to accomplish and what they are completing to stay within the predetermined guidelines. Although studies have determined incentive systems may negatively impact intrinsic motivation, they acknowledge the power of verbal praise. Verbal praise has been

shown to produce many positive outcomes within the educational setting. Not only does it allow students to receive specific feedback, it also builds positive self-concept. This may influence reading motivation in boys because the use of verbal praise during engagement with reading tasks may result in a strong sense of perceived ability which then leads to greater levels of intrinsic motivation.

Teachers can positively influence change in the reading motivation of elementary aged students through a number of practical and achievable strategies. By acknowledging that gender specific characteristics do in fact impact reading achievement, educators and parents alike may actively combat the limitations of reading success within the male gender. Within the classroom, this can be done through the intentional and conscientious selection of reading material available within their classroom. Studies have found that boys are inclined to read books related to topics of their interest. Teachers should ensure access to books related to topics that the male students show interest in.

Policy Implications

School-wide reading programs should focus instead on intrinsic goals that foster quality reading as opposed to quantity that students read. Fawson et al. (2009) found that tracking the number of books or pages a student reads has little impact on reading motivation while other methods that support comprehension development such as reading across various genres, does promote motivation to read. Administrators and policy makers should turn their intentions on how to foster intrinsic motivation in children so that time spent reading is more beneficial for their long term success. Instead of offering rewards for simply hitting a target number of books or pages read, they should focus on exposing students to a wide variety of genres of books and manifesting a culture that is excited to explore the world of reading.

Additionally, administrators should pay particular attention to how incentives are being utilized across schools. Many teachers have received professional development focused on how to incorporate incentives into their daily instruction as well as how incentives will be used throughout the school community. Although studies may support that incentives have the potential to increase student compliance which is beneficial for a school wide culture, it is not conducive to inspiring students to achieve academic success fueled by their own internal desire to do well. Administrators should provide education and training to teachers which focus on methods of motivating students that focus on intrinsic motivation.

On a societal scale, gender roles and gender-specific characteristics have shown to negatively affect reading achievement in elementary schools. The limitations caused by the perpetuating of gender specific educational attributes have proven to be detrimental to the reading and literacy success for the male student population. By eliminating constricting expectations and roles specific to the male gender within the realm of reading, the gender gap may diminish. If elementary aged boys were free of their societal expectations, they could potentially engage in reading without concern for appearing to be outside of the gender norm.

Directions for Future Study

With the conclusion of this project being that incentives are in fact not beneficial to supporting male elementary school students' intrinsic motivation to read, it poses the question of what other method educators can incorporate into their teachings that would best accomplish this. By continuing to research practical methods that educators may realistically utilize in their daily instruction, the motivation to read may increase in this target population. When motivation to read has increased, reading success will follow.

Future research should also strive to provide insight into how educators, administrators and parents alike can disassociate reading as being a gender-congruent task. By establishing reading as a skill that is neither feminine nor masculine, it can open the door for elementary boys and girls alike to develop a deep and long lasting motivation to read.

Summary

Educators have turned to a classroom management system that utilizes incentives. Oftentimes this includes students completing a task with the intention of receiving a reward when that task is completed. However, when these incentives are not utilized with explicit intention and purpose, they have the potential to be detrimental to a student's intrinsic motivation. While both extrinsic and intrinsic motivation may have a place in education, intrinsic motivation has been connected to lasting academic success. In order to close the gender gap for reading achievement, educators most consider methods that inspire intrinsic motivation to read in their male students. With studies supporting the connection that incentive use does not assist in the closing of this gender gap, reform is needed. Teachers should pay particular attention to the way in which incentives are being given to students and the type of tasks they are being rewarded for. Incentives should only be used for classroom management or procedural tasks such as lining up for lunch. While incentive use may have its benefits when utilized intentionally, educators must consider what inspires intrinsic motivation in elementary-aged boys in order to close the gap. School and classroom libraries should consider types of books that motivate boys to read while school-wide reading incentive programs should focus primarily on exposing young readers to various genres and book topics. By shifting the focus from tracking the number of books and/or pages a student reads to instead promoting more meaningful engagement with reading, schools can inspire both boys and girls to enjoy reading. Societally, efforts must be made to diminish the idea that reading pairs with specific gender characteristics. When elementary-aged boys view reading as a feminine specific task, they are far less likely to engage in voluntary reading. Less time spent reading results in weaker

development of reading skills. Educators, administrators, policymakers and parents must combat this belief so that boys and girls alike can share in the intrinsic motivation to read that will open the door to academic achievement.

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Impact of Physical Activity Integrated into Vocabulary Acquisition in Students 6-12 Nathan Fruin

Abstract

Language is the primary means by which we think about ourselves and the world, express ideas and feelings, and communicate with others. Learning vocabulary and proper language use are crucial challenges for elementary school children because, during the years six to twelve, brain plasticity, cognition, and powers of association, imitation, and adaptation are growing rapidly. This study examines how elementary school students can best learn new vocabulary and language use by surveying embodied learning strategies that combine cognitive and physical activities in classrooms. Many studies report that Total Physical Response and Total Physical Response-like pedagogy are highly effective language teaching practices. Students learn new vocabulary faster, retain it longer, and recall it more easily when taught by Total Physical Response than when taught using conventional methods. Evidence in support of these claims is summarized and the effectiveness of Total Physical Response pedagogy on tokenization, executive function, the self-performed task effect, and deep encoding are discussed. Elementary school pedagogy, especially early second language learning, might be reconsidered, as embodied learning strategies appear cost effective. Generally, there are no new costs for equipment and facilities though there may be new costs for teaching training and materials, but these costs are likely offset by gains in student language acquisition and use.

Chapter 1: Introduction to the Project

Background

Learning new vocabulary and language are critical for elementary school students aged six to twelve. They enable students to think precisely and abstractly and lay a foundation for higher order cognition and reasoned behavior during their entire lives. As a result, learning new vocabulary and language are core issues in elementary education, and how to best teach new vocabulary and language assumes a pivotal importance for students aged six to twelve.

Many answers have been offered as to how this is best done. Among these, one approach, Total Physical Response (TPR), has delivered promising, but not well documented results. TPR includes five elements: standing, miming/pantomiming per word, semantically meaningful gestures, in playful classroom environments, all without reference to or use of native languages. The goal of this literature review is to examine and better understand the possibilities of TPR and TPR-like embodied learning methodologies for vocabulary acquisition and use among elementary students aged six to twelve.

This review will examine language learning outcomes when TPRlike pedagogy is combined with vocabulary learning for younger students as compared with language learning outcomes using conventional methods. The teaching methods should be evaluated by training, costs, and method effectiveness alone. Effectiveness should be an overriding factor, as the approach requires little or no changes to teacher training and the physical arrangement of classrooms.

Limited research has suggested that mild physical movements, including standing, hand movements, and stepping in patterns, do facilitate the encoding of new vocabulary for long-term recall and use. Total Physical Response (TPR) language learning involves more than mild physical movements, as it includes standing and miming/pantomiming to make unique semantically-meaningful gestures for each word being taught. Students repeat an instructor's movements immediately following their demonstration and proceed to use the vocabulary in playful classroom environments without reference to or use of their native languages.

In this work, the term TPR will include all five of the above-mentioned elements: standing, miming/pantomiming per word, unique semantically-meaningful gestures, in playful classroom environments, without reference to or use of native languages. The term TPR-like is used when one or more of these elements are relaxed. The distinction between TPR and TPRlike is notable because many studies of embodied language learning do not employ all five elements, making it difficult to compare studies of TPR and TPR-like pedagogical effectiveness. It should be noted that none of the TPR and TPR-like teaching regimes require high levels of student coordination and fitness.

Elementary and middle school students are taught new vocabulary words in every subject in most weeks of a school term, and the combination of new ideas and new words is important. It allows students to organize new ideas and experiences and express them with new vocabulary. The Pirahã of Brazil, the Xilixana of Brazil, and the Kewa of Papua New Guinea, along with other isolated tribes are famous examples of linguistic groups lacking most number words and, therefore, number ideas. It has been proposed that groups that do not have exposure to capitalist trading have not developed language for nested sets (e.g. 5 cartons of 12 eggs), large numbers, and even exact dates (Dos Santos, 2021; Frank et al., 2012; Johnson-Laird et al., 2022). An absence of abstract language, or an interference with internal language use, appears to lead to difficulties in thinking about these ideas accurately.

The effects of vocabulary on expression have been called linguistic relativity when they have been used to compare different vocabularies in different languages (Johnson-Laird et al., 2022; Lucy, 1997), and linguistic determin-

ism when they have been used to discuss languages in isolation (Everett, 2007; O'Shaughnessy et al., 2022). Precise language is a prerequisite for accurate abstract thought. Advances in machine learning (ML) artificial intelligence (AI) in recent years have been accomplished in part by leveraging this idea in the form of human-made example datasets about the relationship of descriptive language to pictures, text, and clinical outcomes (Aonghusa & Michie, 2020; Bachiri & Mouncif, 2023; Humm et al., 2023; Matero et al., 2023; Son et al., 2023). The processes growing children undergo when learning new vocabulary to express new thoughts are similar to the challenging processes their linguistic and cultural groups have undergone (Johnson-Laird et al., 2022; Vygotsky et al., 1978). AI is not "growing" but it is undergoing a vocabulary-learning process when it builds a statistical model of associations between vocabulary and another part of its example dataset.

TPR teaching ties new vocabulary learning with physical movements. These movements include activities to spark joy, creating playful atmospheres. Playfulness is a quality of being light-hearted and visibly enjoying the moment. It is hard to reproduce specific amounts and durations of playfulness and, for this reason, it is easier to have activities that attempt to spark joy in most participants while leaving the joy unquantified.

While miming (also called pantomiming) has received a bad reputation from street mimes performing in hopes of receiving donations, it has a history that stretches back to ancient Greece and Rome. It was considered a playful form of theatre, but most theatrical performances include little physical exertion. Physical exertion (PE) is often used interchangeably with physical activity to mean any movement that increases energy expenditure above basal levels. Exercise is a subcategory of PE that is planned, structured, and repetitive. Exercise is often considered purposive in the maintenance of physical fitness or the collection of attributes (balance, flexibility, power, strength, and speed) that enables students to carry out tasks with vigor and alertness and without undue fatigue (with ample energy for leisure and emergencies) (Mavilidi, Ruiter, et al., 2018). TPR gesturing does not lead to more exercise than acting or other casual movement.

In this research, the terms movement and gestures will be used to describe activities that have marginal effects on PE and can be performed without students needing to be physically fit. Embodied learning (EL) combines or coordinates physical and cognitive activities and is considered an example of this kind, PE, of movement (Mavilidi, Lubans, et al., 2018). It should be noted that the foundational studies of TPR and TPR-like language instruction were not careful in specifying or measuring what levels of PE were best suited to EL activities.

TPR (and similar methods) can be viewed from two disciplines, from a language learning approach or an approach based on fitness and movement in learning. While we are primarily interested in long-term vocabulary recall, PE is also known to help students with executive functions (Spanou et al., 2022). Executive function encompasses effortful and goal-oriented functions: perception, problem solving, planning, and attention. Beyond possible effects on EF, embodied learning activities fall into the trace theory of memory where multiple experiences reinforce both acquisition and recall. Before a word can be learned it must be separated from the incoming stream of connected sounds and recognized as a new sound group that has meaning, a process called tokenization that must take place before a meaning can be hypothesized.

The idea of tokenization is used in many fields outside education where it is used for adding logical discrete pieces to a stream as well as taking logical discrete pieces from a stream. The use of tokenization in language and behavior learning differs from the process of tokenization in cryptocurrency or Non-Fungible Tokens (NFT), for example. In these cases, the digital property (art, address, mining result, etc.), a checksum, and/or other metadata is added to the list or chain of valid property (Hoppe et al., 2023; Menon & Mady, 2022). This chain is often publicly published on distributed systems like InterPlanetary FileSystem (IPFS). There is concern that these systems may be revealing transaction details to governments, corporations, family members, and ex-spouses.

The blockchain metadata can include token use rules, transfer rules, expiration rules, and current ownership information. There are a variety of vaccine passport products already in production including IBM's Digital Health Pass, AOK pass, and GuardTime Pass that include block chain technology to make them publicly-publishable, contain updatable rules, and be difficult to counterfeit (Blaney et al., 2022; Corbishley, 2022; Guidi & Michienzi, 2023; Menon & Mady, 2022). These techniques overcome the limitations of more traditional control mechanisms that have been used to stymie the free movement and association of the people.

In block chain tokenization technology, the process of adding the digital part – the token – to the chain of the whole makes it real. In a process that moves the other way, the whole can also be broken down and sold off for profit. In the field of in real life (IRL) financial services, securitization and tokenization mean splitting ownership in an expected flow of payments (or a single payment) from property into pieces (Taherdoost, 2023). This can be done to spread or conceal risk and other costs. Tokenization is not talked about in written language learning because the white spaces create the tokens – perhaps because it removes the sometimes-challenging step – many schools choose to start students on written works.

Of the many organized attempts to teach a second language, the grammar-translation method may be the oldest. The students' native language is maintained as the reference system in the acquisition of the second language. In this teacher-centered model, students read and translate as their main problem-solving activities while little or no attention is paid to speaking (Liu & Shi, 2007). This older method remains popular, perhaps because it has been in use for a long time, and it demands little of schools and teachers.

The value of a school language laboratory – with its rows of students with headphones listening and repeating from recordings – and the audio-lingual method of instruction may now be considered a poor investment. This is because the audio-lingual method often failed to give students the ability to produce original speech and text, while it required a significant investment in space and technology. Direct, or immersion, language instruction eschews the first language as a point of reference and changes the focus of early instruction from literary language to everyday spoken language. Direct instruction methods require skilled and well-prepared teachers (Liu & Shi, 2007; Lyster & Tedick, 2014), but do not require the technology and space of dedicated language labs.

TPR language learning is a direct teaching method, in that the first language is not used as a reference or in the classroom. Students are actively engaged in the class to increase language relevance and meaning (Asher & Price, 1967). Unlike other methods, a teacher directs the class and starts with a lesson plan. After the initial lesson in TPR, students are asked to repeat what they have been taught before they are invited to produce original speech and add new language to their body of knowledge.

When viewing TPR-like vocabulary learning pedagogy from the fitness/physiology discipline, we find its roots in aging research. Standing embodied learning strategies do not have significantly more PE than standing desks, but studies from this background and using this approach are divisible into four main categories. There are studies of student fitness (not interspersed, not relevant to the content), loosely-related mid-lesson break activities (interspersed, low/no relevance), loosely-related simultaneous activities (simultaneous, low/no relevance), and carefully-designed simultaneous activities (simultaneous, high relevance) (Mavilidi, Ruiter, et al., 2018). These simultaneous and highly-relevant activities must be carefully designed and may not be possible for every school subject.

TPR – and similar methods discussed – would all claim to be activities that are simultaneous with learning and highly relevant to the vocabulary/ content being learned. Physically active academic lessons have been studied the least, perhaps because of the difficulties involved in developing such curriculum (particularly at higher levels of instruction). As noted above, greater specificity in how different levels and kinds of physical activities are aligned with cognition in vocabulary learning are needed for TPR-like studies to advance and become more generally useful.

Statement of the Problem

Students often do not retain the vocabulary they have attempted to learn. This is true in all subjects, but it is particularly true in second-language classes and other circumstances where students encounter a high density of new spoken words. Over the course of time, the sound patterns and definitions of these vocabulary words are lost from memory. This can happen during the span of the class, but it is particularly pronounced over long periods that lack language practice, like summer backslide that has been studied in many other subjects.

Students need more stimulating lessons that can lead to better fixation of their working memory into long-term memory. Physical activities have been shown to increase executive function in students (Mavilidi, Lubans, et al., 2018). With the addition of standing desks and no other changes in the environment, the executive function of inhibition improved (Tanaka & Noi, 2022). Executive function encompasses effortful and goal-oriented functions: perception, problem solving, planning, and attention. These are considered assembled activities that improve learning because of the increased strengthening of the pure elements of executive function: inhibition, shifting, and updating. Inhibition is the ability to control the mind's attention away from our first impulses and strive toward right answers under a set of rules. Shifting is the flexibility to move quickly from one set of rules to another set. Updating is related to keeping conscious track of a set of items in our working memory.

Standing desks are seen as unrelated or loosely-related and simultaneous activities from the perspective of types of embodied learning. They do not increase the metabolic rate beyond the basal state and are not changed when the curriculum changes. Standing desks do not significantly decrease the problems of modern students' sedentary lifestyles and do add noise to the classroom (Usman et al., 2018). Beyond the increase in inhibition, they appear to have few benefits.

Increases in inhibition may help people learn a second language. In tests of standing students, increases in test scores of working memory were observed, but they did not reach significance (Tanaka & Noi, 2022). In tests with unrelated and repetitive light exertion, like skipping rope or performing pushups, similar small improvements in working memory were measured, but they did not reach significance (Mavilidi et al., 2020). It should be noted that other work by the same authors did show significant improvements in spelling that required working memory to be encoded into long term memory (Mavilidi, Lubans, et al., 2018). The benefits of standing desks are small and appear to be around the encoding of memory.

The process of learning a vocabulary word in an unfamiliar language may be similar to the process of learning to spell a new word in a native language. The addition of oral vocabulary can be seen as making a connection between specific tokens (connected sound patterns that give voice to words) and hypothetical referents (meanings or uses). The first step is identifying tokens as words and trying to assemble them with meanings.

This moment, when a token is being connected to a referent, is called referential ambiguity, and it is escaped by understanding the referential intent of the teacher (Samuelson & McMurray, 2017). The familiar (previously-learned items) must be rejected and new fast mapping of the tokens and referents must be applied. Fast mapping will be refined by attempts to use the Two factors, working memory and attention, appear to be helped by embodied learning activities, and they are important parts of the word learning process (Pruitt & Morini, 2021). Attempts to use a word can be seen as a process where the hypothesized fast-mapped word referent is tested and, then, either refined/confirmed or rejected (Samuelson & McMurray, 2017).

Fast-mapped tokens can be stored together with multiple referents – still in a state of referential ambiguity – and refined with subsequent encounters/uses of words. While the effect on vocabulary building has not been specifically studied, it has been found elsewhere in education that feedback is most useful when it is supplied as quickly as possible. The feedback for hypothesized referents is testing them in original speech.

The social context when learning may make students more or less willing to practice using vocabulary they have not yet mastered. Students need to have a vocabulary-acquisition pedagogy that facilitates the acquisition and testing of fast-mapped vocabulary. The standing position, unique meaningful gestures, repetition, and playful atmosphere of TPR appear to aid early/sparse language learners in the production of original speech. Only when students produce language for others will they test their fast mapping of sounds to make meaningful communication, confirm or deny their referents, and be able to improve or reject their referents.

Purpose of the Project

The process of TPR-like instruction may change students' levels of executive function and create sociocultural classroom environments that encourage quick use of new fast-mapped referents. This should result in firm and accurate sound token matching with referents, and these connections are then encoded/fixed into long term memory. Vygotsky (1978) would say that interacting with others in social environments is the way to add learning to a student's independent developmental achievement.

The goal of learning a second language is to communicate ideas important to students in languages other than their first language, and TPR-like instructional methods should produce better long-term vocabulary retention for doing so. This review of the literature aims to confirm or deny that embodied learning strategies enable better vocabulary acquisition when measured at the longest term each study provides.

Theoretical Framework of the Project

An essential feature of learning is that it creates the zone of proximal development; that is, learning awakens a variety of internal developmental processes that are able to operate only when the child is interacting with people in his environment...once these processes are internalized, they become part of the child's independent developmental achievement. (Vygotsky et al., 1978, p. 90) In Vygotsky's idea of the zone of proximal development (ZPD), classroom interactions move activites from areas where students need help to areas where students can interact independently, called the zone of achieved development (ZAD). The idea of ZPD only appeared toward the end of Vygotsky's life, and he did not fully explain how it connects with his main ideas of scaffolding and sociocultural learning before his death from tuberculousis.

TPR-like classrooms give more scaffolding to students trying to learn new vocabulary words than classic language-learning methods. Specifically, miming movments and exaggerated facial expressions give the students information about the vocabulary word they are trying to move into fast-mapped pairings. Facial expressions and miming contain ideas that can be added to possible referents, and the starting and stopping of these movments will help separate the sound token of words from the stream of sounds being made.

The sociocultural environments created by TPR-like methods of teaching a second language encourage interactions that create learning. The more classic language learning methods make students wait longer to test their referents in original speech. The standing and moving of TPR-like methods boost executive function that should lead to better formation of fast-mapped vocabulary. The playful environment of the TPR-like classrooms will lead to students being more willing to practice information with which they are uncertin.

Definition of Key Terms

Coordinated learning: A term coined by the progenitor of TPR that is used to refer to learning where the physical and the cognitive processes are aligned.

Embodied Learning: A term that refers to all the activities that have grown since TPR attempted to add meaning to simultaneous movements to assist vocabulary learning.

Executive Functions: Executive function encompasses effortful and goal-oriented functions: inhibition (resisting default behavior), working memory (updating a list of items), and cognitive flexibility (cognitive shifting, or simply shifting). The components of executive function allow the student to carry out tasks commonly called perception, problem solving, planning, and attention.

Self-Performed Task Effect: Performing tasks creates greater recall of the ideas than learning the ideas for the same amount of time without performing tasks. This is the idea behind Edgar Dale's cone of learning experience, and the many similar ideas that point to students learning more when they are more actively engaged.

Trace Theory of Memory: New learning is more deeply fixed in longterm memory if sensorimotor experiences and conceptual information are combined. These higher-quality cognitive schemas lead to faster and better memory performance. *Tokenization*: The process of separating meaningful pieces to be learned from a stream of continuous sounds or social activities. In the field of traditional financial services, tokenization is the step after securitization of an asset that allows ownership in any future stream of payments to be distributed to holders as tokens. Tokenization is also used in the field of cryptocurrencies, vaccine passports, and NFTs where it denotes the reverse of what it means in the learning process, that is, adding unique tokens to a publicly-publishable stream.

Summary

Vocabulary is needed to express ideas and organize thinking. In most subjects, new vocabulary will help students express ideas in a compact manner and, in early second language learning, vocabulary is the main focus of learning. While many approches to vocabulary learning have been tried in the past, research around this important component of learning continues.

The steps for learning a word are the same for children and adults. Children must build up a collection of tokens (commonly called sound patterns) and referents (commonly called meanings or uses) before they are able to participate verbally. Adults are able to more quickly test their hypotheses about what tokens constitute a word and what words mean because they are able to participate in conversations.

Vygotsky's theories of scaffolding and the ZPD can be used to explain language learning environments. The coming sections examine the literature and explore the value of TPR-like language learning, particularly in the classrooms of six to twelve year-old students. As students of any age attempt to learn words, they collect sounds that they belive might be new words. These tokens are stored in the mind along with one or more ideas of what the word means. These hypothesized definitions are called referents and are confirmed or denied when students are able to use referents in their original speech. Vocabulary learning is a combination of the executive functions that are important to all learning with an additional step: sound pattern separation into tokens.

Referent hypothesizing and referent testing are distinct ideas used in vocabulary acquisition, but they are analogous to steps that exist in all learning. Tokenization does not appear to be a notable task in most formal learning streams, but in the informal building of social perceptions and social cognition, we first tokenize then classify behaviors and people (Hackel & Mende-Siedlecki, 2023; Lee & Harris, 2013). For example, when first perceiving the activities of a home in the evening it may be hard for the unenculturated learner to understand if the prayer is attached to sitting down at a table or should be attached to the meal.

Understanding what is happening is a process of four steps: observation, attribution, integration, and confirmation. This is analogous to the steps of early language learning in the home or under a direct method of formal pedagogy: listening/tokenization, forming a referent, using the token in original communication, and confirming/denying the token and referent connection. Similarly to the other uses of blockchain, education makes use of the idea of grouping data to make it easier to remember (Harris et al., 2021; Suppawittaya & Yasri, 2021), also called chunking, but such chunks are made up of elements that make sense individually before they are assembled.

To examine the effects of TPR-like embodied learning on vocabulary acquisition, we must examine their relationship to exercise and movement. TPR involves more exercise than basal rates, but only by tiny margins that are often ignored. The effects of lower and higher levels of exertion will be reviewed. The small metabolic effects of standing desks, for example, are between those of standard sitting classrooms and more active classrooms.

There are many studies of the effects of exercise, and they can be classified in several ways other than physical exertion intensity (Mavilidi, Ruiter, et al., 2018). The body of literature that looks at student physical activity throughout the school year can be seen as one quadrant of a classification: non-connected and non-simultaneous. Activities can be simultaneous and have obvious connected relationships to the vocabulary/concept being learned, like pointing to the terms of a complex mathematical equation in the same order and with the same hands/fingers. Or exertions can be non-simultaneous and have non-obvious relationships to the vocabulary/concepts being learned, as when children are learning to graph curves and swinging their arms while walking and running. The exercise of arm swinging creates significant exertion, but it is not possible to perform these movements simultaneously while practicing graphing.

TPR exertion is minor and simultaneous with learning and with obvious relationships to what is being learned, similar to standing at a whiteboard and pointing to terms in an equation. There is a small collection of well-controlled studies that use TPR-like practices for vocabulary acquisition. It is small because TPR-like learning is not a standard teaching format for most schools and most subjects. Standing, moving, direct repetition, and social interactions are all modifications of classroom environments that make them more physical and playful, and such movements are not typically seen in other classrooms.

Some of the positive effects of TPR-like methods may be due to novelty. In the study of novelty, almost any change has been shown to have shortterm positive effects on the memory and attention of students, workers and customers (Huang & Soebbing, 2022; Iannone & Vondrová, 2023; Schomaker, 2019). Novelty effects fade over time and in only one of the well-controlled studies of TPR-like vocabulary acquisition were the expected fade-out durations for novelty exceeded, but the results were still positive. Ideas about the periods of time during which novelty fades were based on studies when students and workers were stationed in the same environments all day, not in environments where they were moving from one type of activity and one classroom space to another. Since the amounts of time students spend doing single activities in a school year are low and breaks are frequent, the fading of novelty effects for six to twelve-year-old students needs further study.

TPR-like learning attempts to make miming movements have some connections with the meanings and uses of words. It is not clear to what extent the increased encodings of new vocabulary are helped by meaningful movements, but it is hypothesized that movements paired with words are encoded more deeply into memory because they are encoded into a larger network of neurons. These networks are not isolated to the language parts of the brain, but span to kinetic areas as well. MRI scans of the brain do show differences when kinetic activities are connected to vocabulary words.

Kinetically-connected vocabulary learning in the brain may not require that movements (real or imagined) embody the meanings of the words being taught, as non-meaning gestures appear to help as well. Gestures appear to aid in encoding for recall when using words separated from the social settings in which they would normally occur. TPR-like practices have shown the least value with older students that are the most sensitive to embarrassment (teens). With young groups, their fear of embarrassment may be lowered by group and classroom play. Nonetheless, even without playful atmospheres, the positive effects of gestures remain.

Syllable-based, prosody-based, tone-based, and virtual grabbing gestures all appear to increase the encoding of language into long-term memory. These gestures embody different aspects of the language, but all of the gestures either denote or connote word boundaries. The tokenization of the sound stream into words is the additional step that separates vocabulary acquisition from other sorts of learning, and that step is challenging for children and computers alike.

While we cannot examine the internal processes of children or older students, we may be able to inform our understanding of language learning by examining automatic speech recognition (ASR) for unknown languages (no training data) and lip reading (little training data). More carefully-controlled studies of TPR-like vocabulary learning could help us understand how and if meaningful gestures (which are hard to generate for advanced vocabulary) are an important part of TPR-like demonstrated benefits or if the effects are due to other aspects of pedagogical practice.

Chapter 2: Review of Related Literature

Introduction

As stated above, TPR includes five elements: standing, miming/moving per word, unique semantically-meaningful gestures, in playful classroom environments, without reference to or use of native languages. The following sections attempt to understand most of these elements. The one element that is not examined is the effectiveness of direct language learning methods, that being methods that teach without referring to the native language. The chapter begins with an examination of the effects of standing and physical exertion on vocabulary acquisition and the elements that assist in encoding vocabulary for long-term recall.

TPR and Exertion for Memory: Comparing TPR to Exertion Alternatives

The practice of TPR pedagogy includes standing and moving arms and legs while learning (Asher & Price, 1967). Many exercises differ from TPR because they are non-simultaneous with learning and are unconnected to the learning, and they have higher level of exertion or lower levels of complexity (Mavilidi, Ruiter, et al., 2018). TPR and TPR-like pedagogy are not the same as sitting and writing, but they also differ from most of the well-controlled studies of the relationship between exercise and education practices.

Standing Desks and Memory

To examine the effect of TPR-like embodied learning on vocabulary acquisition, we must examine their relationship to exercise and movement. The first step for the students in adding exercise would be to stand from their seats. The use of standing desks could be seen as the lowest level of change to learning environments in favor of increased exertion and embodied learning. Standing desks have received a lot of support in the workplace and classroom (Rosenbaum et al., 2017; Tanaka & Noi, 2022; Usman et al., 2018). However, implementation lags what would be expected given the positive literature.

This small change still appears to have significant results in students' executive function (Tanaka & Noi, 2022). A survey of educators showed that two-thirds would support the use of standing desks in the classroom and approval rates rose to 72% when students were added to the survey (Usman et al., 2018). Sitting has become the normal state for humans of all ages and stages due to it being the default position for meals, group viewing of videos, transportation, or enjoying solo internet & gaming experiences. Standing does not increase metabolic rate by any large degree and even if all classes were changed to standing this would reduce the weekly average student's sitting from 85% to 71% of waking hours (Usman et al., 2018). Executive function is improved, even when the desks are used for short periods of time.

Specifically, the use of standing desks for periods as short as 45 minutes leads to an increase in the inhibition of default or compulsory behaviors. This was observed in scores of the interference tasks of a Stroop test where conflicting information is presented to the students (Tanaka & Noi, 2022). In this type of test, students are presented with conflicting basic information, and they must inhibit their first impulse so that they can follow the directions presented.

Conflicting information is often given as a text and visual presentation, like seeing the word yellow written in blue or seeing the word triangle written in an oval. In such tests, higher scores can be achieved by having a higher percentage of correct answers or by completing the test in shorter amounts of time (Rosenbaum et al., 2017; Tanaka & Noi, 2022). Inhibition effects appear during the use of standing desks and when subjects are standing in unspecified circumstances.

While standing engages complex physiological and attentional mechanisms, it does not appear to have the same attention-dividing effects that would be seen in increased stress and in decreased performance on a cognitively demanding task (Rosenbaum et al., 2017; Tanaka & Noi, 2022). This is of note because cognitive stress and load have been show to share the same physiological attentional mechanism and can inhibit performance on tasks of divided attention but, in small amounts, they improve the selectivity of attention (Rosenbaum et al., 2017). This effect was found in students aged six to twelve on a word learning task measured during the same hour. It appears that the positive effects of standing desks are not coupled with the increased stress and cognitive load that can be associated with other physical stresses.

Ideal Exertion for Memory Fixation

When similar levels of full-body exercise are applied to students, the types and amounts of exertion change students' abilities to learn word lists. Students who performed a type of anerobic exercise, such as high-intensity interval training, received lower levels of benefit than students that performed aerobic exercise, such as swimming, but both groups realized positive effects on novel object vocabulary encoding as measured by recall a few minutes later (Pruitt & Morini, 2021). Longer and more complex exercise effects, particularly when measured at 24 hours and 7 days after encoding as opposed to immediately afterwards.

Researchers may be uncomfortable pushing young students to their limits, but the same is not true of adult government workers. It can be shown that there are situations where the intensity and complexity of exertion lead to reduced encoding of memory as measured by future recall. Test of witness accuracy show that assault-simulating workouts reduce the recall of details that would identify suspects and describe their actions (Hope et al., 2012). Participants in the assault group had an average heart rate of 158 beats per minute, way beyond what would be achieved in an orderly classroom with participants of any age. The control group had an average heart rate of 105 bpm. When standing and learning tasks are complex, connected, and done simultaneously, TPR-like pedagogy produces metabolic rates much closer to the control group. This level and complexity of TPR-like movement appears to be ideal for memory formation (Calavalle et al., 2014; Husanović, 2022; Johnson-Glenberg et al., 2014; Pruitt & Morini, 2021; Schmidt et al., 2019; Wang et al., 2019; Zhou & Li, 2017). It appears that TPR hits this ideal of complexity and low exertion.

When movement intensity and complexity were varied and a

non-movement control was used, results that favored complex exertion were found (Tomporowski & Pendleton, 2018). Simple and complex movements used the same muscle groups, as they were both stepping sequences. The simple group only stepped forward and backwards or up and down. The complex group had movements that added side-to-side steps and rhythm as presented by the game Dance Dance Revolution. The complex miming, stepping, and playful social situations of TPR-like vocabulary learning do not have the same exertion levels of DDR, but they can have the randomness and novelty of the game.

Consistent Statistically-Significant Benefits of TPR for Vocabulary

Several studies describe significant improvements in language acquisition when using TPR-like practices, but confounding variables made it difficult to cleanly evaluate the recent literature. The practice of TPR is normally and in-person pedagogy and in-person education was curtailed during the combined 2020-2023 flu season. Additionally, some of these studies are lacking in research design and method. There are a number of reasons for this, but a couple stand out. First, TPR-like instructional practices are not always well specified. Second, the number and manner of repetitions that combine gestures and vocabulary are not always well defined. As a result, the number of repetitions, gesture details, and vocabulary combinations may vary by instructor and course level.

Efforts to measure the efficacy of TPR-like practices suffer from a lack of well-developed TPR pedagogical regimes, making it difficult to measure and analyze the efficacy of TPR-like instructional methodologies. For example, while almost all TPR-like language acquisition classes are introductory second language classes conducted in person, one controlled study conducted on line showed a 0.53 improvement in achieved GPA scores for fifth year students that received online TPR-like instruction (Husanović, 2022). A group received TPR-like vocabulary acquisition online while the other received in-person form meaning and use (FMU) instruction.

The study compared two groups of 30 participants who received 30 minutes of daily instruction during a two-week period (Husanović, 2022). The on-line group performed better. This may not be a well-controlled study because there were differences between the on-line and in-person instruction and differences between TPR-like instruction and non-TPR-like pedagogy.

In another study of TPR-like instruction that included music, an experimental group of 36 students recalled 6.94 words while a control group of 30 students recalled 4.80 words when receiving instruction using what was described as traditional methodology. The experiment tested for recall of word meanings and pronunciations, but significant differences were only found in the recall of word meanings between the two groups (Calavalle et al., 2014). The recall of pronunciations was not significantly changed.

While traditional methodology is an almost completely open-end-

ed concept, a couple of studies used the vague but evocative description of "language drills" to characterize the experience of the control group. When comparing language drills to unrelated exercise, the unrelated exercise group was able to achieve M=0.74 with a SD=0.24, while the language drill group achieved M=0.61 with a SD=0.34, for an average difference of M=0.13 (Pruitt & Morini, 2021). Both the experimental and control groups had 24 students. The drill label has also been used to characterize the experience of the control group in a study of TPR-like learning done with full-body tracking via visual and depth-sensing imaging devices (Microsoft Kinect).

In another study, 19 students were in the control group that experienced the drills to achieve a score of 9.9 words. The 30 students of the experimental group were able to enjoy TPR with computer feedback and achieved a score of 61.7, for an improvement over the control group of 51.8 words. Both groups had 3 hours of exposure and were tested 14 days after the first exposure (Wang et al., 2019). This result is impressive and may be from a combination of differences between the experimental group and the control: collaboration, computer interaction, and the novelty effect of both.

In a study of science vocabulary acquisition, a virtual reality laboratory with embodied learning movements outperformed control students that used a real-world wet laboratory. The control group consisted of 34 students and the experimental group was 16 students. Both received 2.1 hours of instruction and were tested 3 days after first exposure to the lesson. The control group received a score of 38.89 on a test of new vocabulary while the experimental group scored 60.62 on the same test for a significant difference of 21.73 points (Johnson-Glenberg et al., 2014). The large effect seen in this study could also be attributed to the more pronounced differences between the experimental group and control group.

Flash cards have been used as a control instruction method for 33 students in one study of TPR-like practices, while 34 students were in an embodied learning experimental group. The experimental embodied learning students experienced 40 minutes of the learning environment and were tested two weeks after their first exposure. They were used as the scoring baseline. The flash-card control group recalled 4.775 fewer words. This experiment also contained a third group of 37 students that learned with unrelated physical activity and received a score between the control condition and the embodied learning group on tests of memory and attention. The physical activity group performed similarly to the control for attention testing (Schmidt et al., 2019). Reviewing flash cards may not have been among the most productive uses of students' time with a skilled teacher, and therefore this may not have been a good pedagogy for the control group.

A control group of 53 students had the mundane task of reading aloud while the experimental group, also 53 students, was tasked with group storytelling in the form of singing. The control group recalled an average of 4.89 words while the experimental group recalled an average of 6.04 words for a significant improvement of 1.15 more words. The total instructional time was 2.5 hours and the final test was 16 days after first exposure. Highly-similar results were obtained immediately after instruction as after a period of 16 days (Zhou & Li, 2017). All but the first study noted above were conducted in person, but several of the studies used computers to teach and provide an environment for repetition of embodied learning practices.

Summary: Having Fun to Form Memories

High levels of exertion and stress reduce the ability to encode memories, while standing desks and less-intense exertion can be beneficial. A review of well-controlled recent experiments revealed only a few studies where complex large physical motions in small and moderate amounts were used in instruction. This pedagogy appears to significantly increase vocabulary encoding. Such well-controlled studies of TPR-like classroom practices may be few in number due to the unprecedented reductions in economic activity and cessation of in-person education that were attributed to the combined 2020-2023 flu season.

During the 2020-2023 period, in-progress studies were cancelled or radically changed, and an inability to complete testing of a control group lead to at least one study being converted from mixed methods to completely qualitative surveys and interviews (Çimen & Çeşme, 2022). These surveys and interviews did show positive results by lowering the students' English as a Foreign Language (EFL) speaking anxiety and by increasing their self-assessed speaking skill levels. More well-controlled studies are needed to understand the impact of TPR-like practices. The older literature suggests that TPR-like practices create small positive effects on executive function without any large increases in muscle use or exertion. This is similar to what was seen with standing desks and standing group activities.

Playfulness and Novelty

Having seen that TPR-like vocabulary learning works reliably better than traditional pedagogy in recent well-controlled studies, while not adding significantly to metabolic rates, we should attempt to understand the non-exertion aspects of the pedagogy. Of the five elements of TPR, we have examined the effects of standing while learning. Next, the novelty of the techniques and playfulness of group situations in TPR-like environments should be examined.

Play Leads to Talking

TPR-like vocabulary acquisition requires a playful atmosphere. Moving with gestures, pauses, stresses, and tempo help to create playful environments for students. The selection of music and other elements to accompany TPR-like activities should be aligned with the social and cultural values of students (Calavalle et al., 2014). Playfulness is difficult to create and quantify. When attempting to study pre-verbal language development, an atmosphere of play creates verbal babble. These sounds are predictive of children's future development (Fasolo et al., 2008), with more imitative babble indicating a child will be on a path of normal language development. Even as early as nine months, a child's ability to detect novelty measured by gaze duration will be indicative of their future vocabulary size (Marino & Gervain, 2019). Novelty detection is an important element in tokenizing a sound pattern as a new word.

Children start to learn language by hearing their parents and siblings, finding tokens, and storing referents for words they may not use for many months (Samuelson & McMurray, 2017). Children often begin to speak while participating in group activities, like during meals and play times. Like children, students learning a new computer language make more attempts to use the language when the language tools have been turned into playful games (Rodrigues et al., 2022). Connections between play and oration/language use have been established, but these sorts of miming and play are unusual in classroom environments.

Playfulness can make children and adults more willing to use language. Play often reduces fear of embarrassment when using new vocabulary (Çimen & Çeşme, 2022), but no single practice can overcome the embarrassment that is common to teenagers. Even in the earliest studies of TPR, teens benefitted the least among all groups studied (Asher & Price, 1967). The embarrassment of teens appears to be impervious to pedagogy.

The Novelty of Play

Novelty, like play, is hard to quantify. When an environment or a stimulus changes, it leads to heightened stress and increased attentiveness (Ding et al., 2023; Miguel-Alonso et al., 2023; Schomaker, 2019). Novelty can lead to paying attention to verbal stimuli for longer periods of time, even when there is no understanding of the words being said (Mallikarjun et al., 2023). In one study, the novelty effects of gamification led to more attempts to make original use of a new language, with an initial effect size of 0.448 that faded to near baseline during a six week period ending with an effect size of 0.033 – or close to null (Rodrigues et al., 2022). In studies of 14 weeks and longer, TPR-like practices continue to show significantly positive results (Calavalle et al., 2014). Novelty effects also heightened stress levels, but students in studies of TPR report reduced levels of anxiety (Çimen & Çeşme, 2022). Novelty does not appear to be an important part of the effects of these techniques.

Animals, unable to produce any language, spend more time looking towards speakers who are using novel languages not spoken at home (Mallikarjun et al., 2023). Students find novel learning environments and practices stressful, but they give them more attention (Miguel-Alonso et al., 2023; Rodrigues et al., 2022). Customers spend more time and money on a product if the vendor makes novel changes (Huang & Soebbing, 2022). These effects fade as the subject gains familiarity.

Summary: Some games never get old

Even though TPR-like vocabulary learning practices are uncommon, they do not appear to increase stress and attention from novelty effects as seen in the absence of predictable drop-offs in the effect, and there is no evidence of increased stress in the students. Playfulness does appear to elicit a desire to communicate new ideas. This original language use from children of all ages may explain some of the effectiveness of TPR-like practices. While playful atmospheres are created, the practices do not include creativity as part of the play. Teachers of TPR-like vocabulary lessons will create specific movements that are done with each vocabulary word and students must repeat the words and movements many times before they are invited to "babble" and produce original arrangements using new words.

Iterating Semantically Meaningful Movement

Three features have proven to be essential in order to get the memory results. First, gesture must be semantically related to the words. Second, learners must perform the gestures themselves. ... Third, when learning with the body, the training must be [grouped and rehearsed]. (Macedonia, 2019, p. 4)

The Medium is the Massage

Most TPR-like vocabulary instruction starts with the teacher, or a video of the teacher, showing students a series of new words with distinct movements that are semantically related to the words. TPR-like vocabulary pedagogy makes every attempt to make gestures somehow related to the words being taught, or at least make gestures unique to words being taught. Certain gestures may be obviously and semantically related to specific verbs, but the same cannot be said of gestures for nouns and adjectives (Hughes-Berheim et al., 2020). As vocabulary increases and becomes more abstract, the need for semantically-meaningful unique gestures that can be easily performed and recognized becomes a limiting factor in the use of TPR-like practices (Macedonia, 2019; Macedonia et al., 2019). Students of all levels of physical fitness and without specific dance training can only reliably make a limited number of recognizable gestures.

The Medium and the Mind

Practitioners of TPR-like pedagogy postulate that difficulties in creating unique gestures for nouns, adjectives, and abstract concepts – like the word mortgage – are key reasons why TPR-like language learning methods are not used beyond introductory classes for second language acquisition, even when students learn more vocabulary faster while being taught with TPR-like pedagogy. Embodied learning has been shown to activate more areas of the brain and lead to what is called deep encoding of new vocabulary (Macedonia & Klimesch, 2014). Students are said to feel the meanings of words when asked to recall them (Kosmas & Zaphiris, 2020). The brains of students performing or imagining gestures shows a wider activation of neural networks.

The Medium and the MRI

TPR-like gestures, that are distinct for each word, must be easy to reproduce despite a wide distribution of physical characteristics and movement skills among students. Mere observations of gestures appear to activate more areas of the brain in fMRI imaging (Macedonia et al., 2019), and such observations do not include the full benefits of deep encoding that performing gestures would create. Gestures integrated with vocabulary acquisition appear to activate neuron pathways that are not activated when students are taught more conventionally.

However, due to technological limitations, it may be difficult to separate the effects of semantically-connected gestures from other fMRI-detected improvements in key regions associated with cognitive processes, given that many types of physical exertion can create improvements (Valkenborghs et al., 2019). It is not currently possible to observe the formation of these deep encodings in the brain as fMRI technology requires that students are immobile during imaging.

Summary: Schrödinger's Pedagogy

TPR-like vocabulary instruction likely incorporates many pedagogical elements that help to deeply encode memories, but we can only examine its effects on the brain under limited circumstances. TPR-like practices are not grouped and rehearsed in fMRI studies, as it is impossible to do so. The deep encoding of vocabulary observed in fMRI studies cannot be explained as self-performed task effects for the same technical reasons. These are core practices of TPR, and we see heightened brain activity across a larger number of regions than traditional pedagogy, even when these elements are not present. Therefore, perhaps the most basic assumption of TPR-like vocabulary instruction, specifically the need for semantically-related unique gestures, should also be questioned.

A Movement for Every Idea Learned

The difficulties of producing semantically-related unique gestures limit the reach of TPR-like vocabulary acquisition to introductory classes of second languages and some English, math, and laboratory science classes (Johnson-Glenberg et al., 2014; Mavilidi, Lubans, et al., 2018; Riley et al., 2021). As we have stated, this requirement may only be of limited value, as students are unable to move in most classes. The practices of learning new vocabulary and encoding them for long-term recall are aided by the neural pathways and kinetic areas of our brain, but it is not clear what characteristics of the pedagogical stimuli are responsible for activating the deep encoding across multiple functional areas of the brain.

A Movement for Every Word Spoken

Some benefits of gestures are seen across studies, and they appear regardless of the types of gestures performed (Baills, 2022; Baills et al., 2019; Li et al., 2020). Hand gestures can be used in conjunction with many parts of speech, even with word fragments. Gestures designed and used to indicate syllabic boundaries may appear more than once for multi-syllabic words (Baills et al., 2019), and they reduce the possible locations for dividing sound streams into word-like tokens. A reduction in locations would also reduce possible mistakes in tokenization. It should be remembered that tokenization is a process that could be described as attempting to find word boundaries, in order to store tokens/words from a continuous streams of sounds that might possibly be human speech.

Gestures that encode prosodic features of French words, mostly by hand clapping, help students encode word accenting and final word lengthening over students trained without hand clapping. Gestures that encode the tonal features of Mandarin Chinese lead to favorable recall and recognition of words taught using such pedagogy over words taught under similar conditions without such gestures (Baills, 2022). Mandarin has four tones and French words have multiple accenting/lengthening features, therefore the gestures are used over and over again in the same lesson associated with different words. It appears that the varieties of gestures may not be important to their benefits.

Virtual reality (VR) environments could be considered more controlled than any real-world environments and, in VR environments, words were trained with and without movements. Neither appeared to assist recall of words paired in the native language with words in the contrived language, but gestures and grasping of virtual objects assisted in word recall tasks related to virtual objects. It was postulated that grasping-only word trials had lower cognitive loads than trials with more complex gestures. Grasping was hypothesized to include sensory motor pathways while not increasing the recall load as much as more complex gestures (Macedonia et al., 2020). Reaching out and grasping may be the simplest motion that leads to deep encoding of new vocabulary.

Nonetheless, if gestures are devoid of information about word meanings, TPR-like practices could be developed for classes beyond introductory levels. Some researchers have suggested that non-meaningful gestures do not have equal memory effects (Macedonia, 2019). Gestures must be working at a more basic level, as gestures that indicate syllabary, prosody, and tone have similar value to gestures that indicate whole words (like grasping). In the chain of perceptions and cognitions between hearing sound streams, finding tokens/patterns, ascribing referents/meanings to tokens, and using tokens and referents in communications, gestures appear to have value outside of connections to referent meanings (Baills, 2022; Baills et al., 2019; Li et al., 2020). This is consistent with the logic used by developers of TPR-like pedagogy. What they all have in common are gestures assist in the initial steps of new-subject vocabulary acquisition: finding word boundaries (aka tokenization).

Vocabulary Acquisition Requires, Then Creates Word Boundaries

Finding word boundaries in a stream of speech in an unknown language is a difficult task. When trying to recognize a new language without a starting lexicon, specialized tools are required. While scientists are unable to observe the pipeline-like mental functions that pre-verbal children apply to their observations, we are able to look at the functional pipelines of computers attempting to grow similar abilities. Computer systems that receive a stream of sounds only and turn sounds into words differ from other computer systems that perform ASR. They must find edges in the sound patterns to make pieces that appear to be discrete and cohesive – also called tokens and tokenization (Faruqui & Hakkani-Tür, 2022; Friedman, 2023). The processes of students may be similar to the processes that computer learning programs undergo.

To process a string of sounds into words, ASR systems that do not have access to source texts of any kind begin by listening when human voices are speaking (by detecting inputs from the frequency ranges and patterns humans commonly produce) and applying a collection of common word boundary sound tokens, like silence, to divide the ongoing string into word boundaries (Kaur et al., 2023). These boundary-sound tokens are marked in the string of sounds, and long sections of sounds that are devoid of silence tokens are split with a Dirichlet process.

The Dirichlet process attempts to segment long strings of sounds into word-length tokens by splitting continuous sounds that are unlikely to be single words into a series of sound tokens of similar lengths as the tokens used in most human languages. Among these word-length tokens, frequently occurring tokens are more likely to be words than rarely occurring tokens. While sneezes may be detected as coming from humans and may be proceeded with silence and turned into tokens, even before contexts are understood, sneeze tokens should appear with such rarity to be rejected as words. Sneezes, yawns and other interruptions in a word string should only rarely be misinterpreted as words (Algayres et al., 2022; Faruqui & Hakkani-Tür, 2022). This is important as the interjections of biological processes could destroy attempts to find meaning by examining the local context of word usage.

The durations of frequently-occurring word-length tokens can be used to update the accuracy of the Dirichlet process via a process of posterior probability (Alexandru-Lucian Georgescu et al., 2021; Algayres et al., 2022). In ambiguous systems like lip reading, homophones produce the same lip shape and/or sequence (e.g. P and B), and recognition systems require a starting library that deaf children cannot download (Afouras et al., 2022). Once enough common tokens have been found by a computer, or enough tokenized vocabulary words have been learned by a child, tokens can be matched against long sections of input mouth shapes and sounds that are devoid of boundary-sound/shape tokens that would otherwise denote the boundaries of new words (by subtraction).

Once many common tokens are known, new vocabulary tokens are likely to appear next to known tokens. While new vocabulary tokens may appear sequentially, posterior updating may advance student/computer Dirichlet expectations to levels of accuracy where the value of constantly conveying word boundaries via gestures are lower than the conveyance efforts required in teacher/student cognitive loads (Alexandru-Lucian Georgescu et al., 2021; Algayres et al., 2022). While computers can perform many millions of abstract calculations per second, the decision-making processes of children remain shrouded in mystery.

Isolating the Value of Tokenization

Further research could establish the value of word-boundary knowledge as known vocabulary tokenization increases. Because of the small number of hours of vocabulary instruction common in studies of TPR-like language learning, as in attempts to build ASR systems, each token is highly valuable (Friedman, 2023; Toraman et al., 2023; Wei Di et al., 2018). The value of each gesture-assisted or starting-vocabulary token in finding word boundaries or turning speech into meaning remains high in TPR-like vocabulary acquisition and ASR experiments.

Research could also use single gestures to isolate word boundaries and add consistent word-synchronized movements with more vocabulary during longer periods of time. The benefits of gestures are initially derived by making students more enthusiastic about testing referents because of their playful atmosphere, gaining a larger vocabulary more quickly due to deep encoding for recall, increasing executive functions because of standing, and the role of gestures in conveying word boundaries in sound streams. The downsides of gestures may be found in heightened cognitive loads and pedagogical inconveniences. Ultimately, gestures may distract from communication as grammar, number, and tenses become important.

Summary

As stated above, TPR includes five practices: standing, miming/moving per word, unique semantically-meaningful gestures, in playful classroom environments, all without reference to or use of native languages (direct language learning). An examination of direct language learning pedagogy is beyond the scope of this review. TPR and TPR-like teaching methods appear to have significant benefits when teaching early/sparse vocabulary. We have seen the value of physical exertion and classified TPR as similar to standing desks.

Standing desks increase the executive functions of inhibition and updating. Inhibition of the default behavior may be important to classifying sound patterns into unknown tokens. Without inhibition, the students might

Chapter 3: Implications

Introduction

Learning vocabulary is a prerequisite for abstract thought and reasoning, and students aged six through twelve spend major parts of every week of the school year acquiring and using vocabulary. It is essential that vocabulary be deeply encoded for long-term recall, as thinking about new subjects and using new language are highly dependent on the availability of suitable vocabulary and knowledge of the rules for using vocabulary. This study has researched the effectiveness of embodied learning strategies for facilitating vocabulary learning in students aged six to twelve, and it has generally found that embodied learning approaches, particularly Total Physical Response (TPR), do heighten and enhance vocabulary learning. They appear to facilitate the tokenization of an unknown sound stream into words that can be fast mapped to hypothetical referent definitions.

Without making utterances and original speech, students cannot move tokens and referent pairs from Vygotsky's ZPD to the ZAD. When teaching vocabulary – in a knowledge area where students do not have reference to familiar words – acquisition appears to be facilitated by TPR and TPR-like pedagogy. TPR is a direct/immersion language learning pedagogy. In addition, TPR includes four other practices: miming/moving per word, semantically meaningful gestures, standing, and playful classroom environments. The literature around each of these elements as well as adjacent literatures have been reviewed to delineate topics that could lead to confusion in understanding how TPR works. Some changes to practice and policy appear to be supported by the literature review, and avenues for future research that highlight the root mechanisms of TPR pedagogy have been exposed.

Conclusions

A small number of recent well-controlled quantitative studies suggest that Total Physical Response (TPR) and TPR-like pedagogical practices demonstrably improve early/sparse vocabulary and language learning. Despite the positive evidence, it is unclear why TPR and TPR-like practices are as effective as they are. To answer the question, the literature around each element of TPR and TPR-like teaching practices was examined.

Four principal areas were examined as explanations of why TPR and TPR-like practices appear to improve vocabulary and language learning. The first highlights that TPR and TPR-like practices combine physical movements with cognitive processes when learning new vocabulary and languages. The combination, known as embodied learning, appears to enhance encoding and intensify how data – in this case vocabulary – is tokenized, stored with a referent, then deeply connected across areas of the brain when stored in memory as a confirmed pair. The augmented encoding of TPR and TPR-like practices increases vocabulary learning effectiveness.

classify incoming sound patterns as known words in their known/native language. In some studies, students were able to maintain a longer list in memory – also called updating – as shown with spelling retention and other tests. While some studies have shown improved on-task behavior, grammar, and punctuation with PA (Mavilidi et al., 2020), other studies have shown no differences in spelling or executive function (Mavilidi, Lubans, et al., 2018). It is difficult to derive if the effect of standing is minor, elusive, or if the designs are limited in their ability to delineate the specific benefits of the practice.

We have examined the value of playfulness and novelty that TPR provides. The value of playfulness to generate utterances and novelty to attract attention for longer periods of time may be key effects of TPR-like pedagogy. Children learn languages faster than older subjects and this is attributed, in part, to the atmosphere of play that encourages original utterances. Playful environments elicit babble from small children, and pre-verbal children who detect novelty have been shown to have a higher vocabulary a year later.

The practice of TPR demands semantically meaningful per-word gestures. These gestures are unique to the word and, therefore, the difficulties of making unique gestures grow as the numbers of words grow. It is also increasingly difficult to make new gestures as the vocabulary being taught becomes more advanced and abstract. These difficulties are likely reasons why TPR is not used in later language learning. fMRI imaging of the brain shows that the imagining of per-word gestures leads to activation of more areas of the brain than learning vocabulary without imagining/performing such gestures. The self-performed task effect may be part of the deep learning process that leads to effective encoding for long-term recall (Wu & Liu, 2023). Further research might be possible with advances in fMRI, but current fMRI equipment removes the subjects' ability to perform gestures during the scan.

Few well-controlled recent studies are available, but it appears that all per-word gestures help in vocabulary acquisition. Syllable-based, prosody-based, tonality-based, and grabbing-based gestures all appear to help with vocabulary encoding and recall. TPR increases self-reported speaking skill and reduces self-reported speaking anxiety. Teens, the group that often has the highest anxiety with their peers, appear to benefit the least from TPR and TPR-like pedagogy – perhaps because they resist teacher-imposed playfulness. The effects of the pedagogy need further investigation to provide details about the magnitude and mechanism of these practices on early vocabulary acquisition.

Tokenization is aided by any per-word gestures, and the use of unique semantically-meaningful gestures may be more than what is needed for significant effects. Inaccurate tokenization may lead to a requirement of more exposures before token and referent pairs can be hypothesized and confirmed. Accurate tokenization when a word is first heard, by contrast, would be the equivalent of a longer duration of practice. Standing, even without movement, leads to heightened executive functions. Particularly, the executive function of inhibition most often exceeds the improvement needed to become statistically significant. Students that are more attuned to new stimuli learn more new vocabulary, rather than engaging in default behaviors. Heightened executive functioning appears to be a useful first step in TPR-like language learning, as students need to be ready and able to recognize a sound as an unfamiliar token while learning a moderately-complex physical movement as part of their cognitive load. The combination, as we saw, leads to deep encoding and improvements in long-term recall.

A second area would be playful classrooms and the novelty effects of joining in TPR and TPR-like physical movements in fun-filled classrooms. Pantomiming interactions heighten feelings of playfulness and result in more effective vocabulary learning. They likely help to move new vocabulary and language learnings into Vygotsky's ZPD and, in doing so, trigger greater babble in the new language. This leads to students confirming token and referent pairs with limited sparse/early vocabulary and moving words into the ZAD.

The aid of the movements in tokenization could be seen as creating scaffolding effects for students. Students learn, retain, and recall more of what is being taught in fun-filled classrooms. Novelty of the playful environment may trigger the heightened attention and stress of the novelty effect, but TPR and TPR-like studies did not observe the tell-tale drop-off of the effect and students reported reduced stress in qualitative studies.

A third area may help to untangle the conundrum of TPR and TPRlike teaching effectiveness. This is the study of the effects of the semantically-meaningful gestures and heightened activation of more areas of students' neural networks. This is a difficult area to study as we cannot see inside young brains while they learn, but there is evidence that physical movements stimulate multiple brain areas, including ones associated with language as well as others not associated with language.

Students in TPR-like teaching environments and computers trying to build ASR libraries face similar challenges: how to make intelligible chunks – or tokens – from a continuous stream of data. Computer algorithm pipelines have been designed and built to organize, analyze, and translate the truly massive amounts of data that are needed to extract words from a sound stream of an unknown language and build an ASR library. For these systems trying to build an ASR dataset without any knowledge of the language, the first step of tokenizing the sound stream is difficult and iterative.

A fourth area of study would be aids to tokenization. TPR-like teaching practices employ gestures, exaggerated physical movements and signs. These appear to help in recognizing and interpreting word spacings, meanings, and boundary mappings in speech streams. The additional information allows students to correctly tokenize the sound stream the first time it is heard. This results in making the process non-iterative and frees up the learner's cognitive processes. This allows cognitive capacity to be used to build referents and hypothesizing original utterances. These original utterances confirm or deny the token and referent pair. When the pair is confirmed, the new vocabulary word can be moved into Vygotsky's ZAD.

While many sources indicate the positive benefits of TPR and TPRlike teaching practices, existing research does not clearly distinguish between effects, and it may be impossible to do so at this time. Different disciplines employ very different research designs and methods and, for such reasons, it is impossible to triangulate the results of the studies. For example, it is impossible to plumb how TPR-like practices stimulate neural pathways while students physically exercise. The current measurement technology, fMRI, requires that subjects of the scan be immobile. The grouping and rehearsing of gestures are also not consistently documented.

Practice Implications

Direct/immersion language instruction requires skilled instructors and many classrooms have sufficient space for standing activities. This could be a separate area of the classroom or the rows and aisles between desks, the existing pathways from the door(s) and to access classroom equipment. Having an area where the students can stand together without intervening furniture and equipment in the way may increase the playful atmosphere that the teacher is attempting to develop.

If both of these conditions – skilled instructors and sufficient space - are satisfied, the costs of switching to TPR or TPR-like language learning could be minimal. Given minimal costs and increases in long-term vocabulary recall, the benefits of introducing embodied learning methods would hope-fully lead to widespread adoption of the practices. TPR teaching practices for learning language, and other areas of study that introduce multiple vocabulary words at once, should be widely adopted and applied.

At present, TPR and TPR-like practices are rarely used in later language learning. While a recent study did show benefits over the control, it stands alone. The majority of programs do not use TPR in later/denser vocabulary/language learning. There could be many reasons for this, including the difficulties of making semantically-meaningful gestures for more complex vocabulary (like the words mortgage, aesthetic, and sophisticated), but reduced needs for aids to tokenization and the production of playful babble could also lead to reduced use of TPR. It may be better to reduce the production of playful babble as later language learning begins to put more value on grammar and details of proper usage. For these reasons, the current practice is affirmed.

Policy Implications

This literature review compared direct teaching methods to TPR and TPR-like teaching methods. Both require a skilled teacher and a well-developed curriculum. As addressed above, the only additional need is classroom space to safely perform the per-word semantically-meaningful gestures. As students are not engaged in significant additional physical exertion, schools should not need additional ventilation and air conditioning. The only long-term policy implication would be to ensure that early language learning be done in classrooms with plenty of space for the needed gestures.

In the short term, the curriculum would have to be updated and this would lead to additional costs to implement TPR or TPR-like practices. Typically, it is not possible to recover any significant amount of what was spent on a previous curriculum, if schools discontinue use of it before the planned replacement date. If embodied learning leads to broader and more precise thoughts for students, the additional expense of changing curriculums would be justified by additional learning. Students should be able to make more connections and move more activities from the ZPD to the ZAD.

Directions for Future Study

As we noted above, there are four effects of TPR-like embodied learning: standing, miming/pantomiming per word, semantically meaningful gestures, in playful classroom environments. Studies could be designed where different learning groups had wildly different amounts of variation in the perword gestures. Both Dance Dance Revolution and Mandarin-language instruction have four distinct directions/tones, but these are re-used for the whole lexicon of learning – they are not unique to the word and have no meanings paired to the word. Studies could be designed to examine if four variations are the ideal number of variations to make gestures varied/interesting or are unique gestures the ideal. If a single virtual grabbing gesture or an imagined single gesture also has value, as seen under fMRI scans, then perhaps TPR could be used with advanced vocabulary.

The difficulties of making unique semantically-meaningful gestures for a large and abstract vocabulary are one of the main reasons why TPR is not used beyond the first and possibly second initial classes at most institutions. If simple and often-repeated gestures are able to cause deep fixation, then TPR should be tested with students learning later/denser vocabulary. If a single imagined or virtual grasping gesture is sufficient, it would be possible to include TPR in curriculums designed for students with limited mobility. It may be difficult to isolate the effects of unique semantically-meaningful gestures from the effects of standing desks/learning on executive function, if students with limited mobility are unable to stand for long periods of time. Once the same movement is used over and over again, and students are no longer standing, it may be difficult to produce the same sorts of playful experiences. It may be impossible to separate the effects of some of these elements.

While testing the importance of unique semantically-meaningful gestures would require original experiments, some of the ideas around the effectiveness of TPR could be examined by scoring videos of TPR-like classroom experiences vs direct language instruction in a control classroom. Some classes are less successful than others and it would be interesting to score days where the class appears to be more or less enthusiastic/playful. If playful environments are spurring more original language use, this effect would be documented in videos. The attempted utterances could be scored by number, duration, or by combinations of new words.

Video could also be scored for incidences where the unique semantically-meaningful gestures being pantomimed helped peers guess the word a student is attempting to use, even when the student is unable to remember the sounds. Successful guessing would also be an indication that TPR is spurring/ allowing more original utterances that include the ZPD-resident vocabulary and, thereby, more new vocabulary token/referent pairs are moved into the ZAD.

Summary

A variety of factors help explain the effectiveness of TPR and TPRlike pedagogical practices, including concepts of executive function, along with neural, physical, and social cultural effects. The effects change the tokenization, referent formation, referent testing in the ZPD, and deep memory encoding and retrieval of the word/activity in the zone of achieved development. Combinations of these factors would likely explain a great deal of the effectiveness of TPR and TPR-like practices in language learning, but understanding which combinations can be formed without the others and their relative order of importance will require a great deal of additional research.

Students in early/sparse language-learning programs are challenged every week to make sense of what first appears to be incomprehensible sound streams. There are many steps in doing so – sounds are broken apart, connections are made between sounds and objects or actions, and relationships between sounds and meanings are tested. The challenges are great, but the rewards are greater since learning vocabulary and mastering language are foundational to abstract thought and reasoned behavior. The challenges of learning vocabulary and using language are overcome sooner, lessons are retained longer, and they are applied to original communication more effectively when students are taught using TPR and TPR-like practices.

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Learning Readiness Physical Education as an Alternative to the Design of Traditional Physical Education Classes James Hansen

Abstract

Learning Readiness Physical Education (LRPE) as a viable framework for implementing physical education classes. This paper examines the qualities and shortcomings of traditional physical education classes. These classes include sport model design classes, health and wellness model design classes, and weight training model design classes. The problem with these traditional physical education class designs is that they often rely on non-educational, focused motivations which negatively impact positive outcomes physical education can provide. There are economic, societal, and legislative incentives affecting how physical education classes can be designed. A positive outlook for these classes is that each one is not separate from LRPE concepts. There is often overlap in what physical activity accomplishes in terms of student health. LRPE concepts can be applied to traditional physical education classes to improve the academic performance of the students. Research from the past two decades supports the efficacy of LRPE. This project explains applications and results from previous instructors who have implemented LRPE in their schools. The implications of this study may influence future investigations into the efficacy of LRPE classes as a benefit to the cognitive intensity of students.

Chapter 1: Introduction to the Project

Background

Learning Readiness Physical Education (LRPE) is a zero hour physical education class before school in which students perform moderate to intense cardiovascular activity for a minimum of twenty minutes (Ratey & Hagerman, 2008). This is an attempt to promote Brain Derived Neurotrophic Factor (BDNF) as well as other proteins and chemicals responsible for brain health (Miyamoto et al., 2018). During this time, students can do multiple types of activity like rock climbing, swimming, kayaking (in the pool), and high intensity interval training (Ratey & Hagerman, 2008). BDNF is the foundation of LRPE that physical educators are taking advantage of during physical education classes. LRPE utilizes BDNF principles to utilize chemical, hormonal, and psychological responses of the body to benefit brain health in students (Ratey & Hagerman, 2008). This can be accomplished in multiple types of physical education classes as the principles are reasonable within the confines of a standard fifty-minute class as LRPE only requires twenty-minutes to complete

(Monroe, 2020). Implementing LRPE can improve the shortcomings of traditional physical education classes by increasing benefits such as brain health, cardiovascular health, and academic performance in other classes. The benefits are felt by administration, teachers, students, and parents ensures that LRPE provides a relevant service not typically provided by more traditional physical education classes.

Three of the most common types of physical education classes are designed using a sport model, a health and wellness model, or a weightlifting model. The most influential methodology in physical education as of now is the sport model design (Rocliffe et al., 2023). It is not as though the sport model does not have success, because empirical evidence supports the notion that sport education has a positive impact on motivational outcomes based on self-determination theory (SDT; Chu & Zhang, 2018). There are very few who play sports professionally as an adult however, which is why the methodology of the sport model is inherently flawed (Ratey & Hagerman, 2008). Classes spend an average of three weeks at a station focusing on one sport which prevents the students from ever becoming proficient in the sport in the first place. The methodology of health and wellness models center around developing basic movement patterns and more importantly developing the temperament in the students that motivates them to maintain health and wellness for a lifetime (Huqi & Peza, 2020). The idea is that by instilling students with the proper nutritional knowledge, they can maintain health and wellness throughout adulthood (Li & Whitacre, 2022). The fundamental flaw with this type of class is that it attempts to socially influence students to abstain from modern fast-food, which can be difficult because fast food is prepared quickly and tastes good. Regardless, the sentiment to change to a dietary focused physical education class is understandable as the rising health problems in developed countries has caused a shift away from the sport model (Ratey & Hagerman, 2008). Unfortunately, it is difficult to reliably imprint lasting behaviors onto students that will promote health for a lifetime because when they are adults their behaviors will be influenced by things like money, family, and work (Huqi & Peza, 2020).

The last common type of class found in high schools and colleges are weight training classes. The problem with finding value in weight training is that weightlifting is far more complex that most people know, as it has been determined in recent years that programs need to include odd forms of periodization as opposed to a simple linear progression when increasing weight (Smith, 2022). There are multiple facets to being proficient in weightlifting to the degree that it requires a college major in its own right (Weldon et al., 2021). The education of weightlifting students is often performed by physical education teachers who have only a moderate understanding of the intricacies of weight training form and progression (Weldon et al., 2021). Concerns such as these make it difficult to achieve the educational goals set for the students in the sport, health and wellness, and weightlifting model classes. In spite of this, people still prioritize these classes as opposed to developing an LRPE class (Zientarski, 2013).

LRPE is superior to traditional models of physical education because it meets the individual needs of learners by promoting brain health and efficiency as opposed to sporting skill acquisition which becomes obsolete upon completion of the course (Ratey & Hagerman, 2008). There can be some overlap between traditional physical education classes and LRPE. The main difference is that the goal of physical education changes to be centered around heart rate training zones and how they positively affect the brain (Ratey & Hagerman, 2008). Modern LRPE has two known founders: Zientarski; who developed an LRPE class at Naperville Central High School and Ratey, Professor of Psychiatry at Harvard Medical School. Dr. Ratey studied Brain Derived Neurotrophic Factor (BDNF) which is a major factor of LRPE's enhancing effects on brain power (Zientarski, 2013). As it stands now, there have been other LRPE programs practiced across other school systems with promising results (Ratey & Hagerman, 2008). However, advocacy and usage remain low in public education.

Statement of the Problem

Many physical education classes prioritize economic interests, legislation, and societal influences which negatively impact student motivation and performance (Wilson et al., 2019). Physical Education content designers have been reactive to creating as least restrictive of an environment as possible rather than pro-active to the necessities of students (Wilson et al., 2019). LRPE offers and alternative to the economic, legislative, and societal motivations affecting physical education class design that will benefit the students academically (Ratey & Hagerman, 2008). A consequence of continuing to prioritize economic, legislative and societal motivations is physical educations' diminished importance in the education system due to the inconsistent curriculum design, non-physical education related methodology, and ability to generate enough student body who can successfully adhere to standards (Ratey & Hagerman, 2008). There are very few physical education programs in high school and college that use LRPE as a framework to advocate for the inclusion of physical education classes (Zientarski, 2013). The motivation students feel towards physical education is on a continuum that ranges from non-regulation, to external regulation, to introjected regulation, to identified regulation, to integrated regulation, and finally intrinsic regulation (Ackerman, 2018). Encouraging intrinsic regulation in the classroom can be difficult because physical activities and the benefits they provide do not present themselves in everyday life like reading or doing some form of mathematics. Physical education must evolve to include additional benefits not provided in traditional class design or it risks becoming obsolete (Zientarski, 2013).

Purpose of the Project

The purpose of this project is to promote the scientific reasoning and real-world benefits of implementing a LRPE program, which contains more opportunities for motivation compared to traditional physical education programs (Nogg et al., 2020). A core component of LRPE is that empirical evidence has determined it benefits learners by enhancing cognitive intensity (Ratey & Hagerman, 2008). The scientific literature has concluded for years that cardiovascular exercise promotes positive cognitive benefits, but the focus of physical education class design remains primarily on sport (Ballester-Ferrer et al., 2022). Regardless, the benefits of sport classes where students learn sport specific skills are important. The empirical evidence supports the idea that sport education has a positive impact on motivational outcomes (Chu & Zhang, 2018). It is clear that LRPE is not the only method with positive implications. However, LRPE is unique in that it has carry over benefits for the students by increasing cognitive intensity during their following subjects that day.

If the intention is to play a sport or lift weights more effectively, then traditional physical education classes may be capable of fulfilling that role if taught properly. LRPE is not without considerations as the exercise selection does matter when attempting to manipulate heart rate (Zhou et al., 2022). Understanding the advantages of LRPE classes stems from their unique ability to provide immediate marked results in cognitive efficiency, the ability to provide benefits to a greater number of non-athletes, and the ability to merge with most educational system designs (Ratey & Hagerman, 2008). The capability of LRPE to provide positive effects to cognitive efficiency help the administration, the other teachers and the parents witness the value of physical education in academics. LRPE has been supported by empirical data to increase the mental preparation and have a positive influence on reading and math scores with students (Zientarski, 2013).

The second benefit provided by the LRPE classes is that it benefits non-athletes. A negative aspect of traditional physical education classes is that they tend to punish non-athletes by requiring a certain baseline of physicality to be proficient in the class (Løvoll, 2020). Part of the public perception regarding the efficacy of physical education in general is that many students are not able to successfully compete with their peers or demonstrate an acceptable performance on fitness tests (Løvoll, 2020). Grading has suffered as a result with the bulk of classes being scored on participation rather than success (Killian & Woods, 2021). LRPE circumvents this dilemma by offering a measurable and achievable goal with benefits to fitness that go beyond simply participating in the activity (Ratey & Hagerman, 2008).

The last prominent benefit of LRPE is that it can be added to most common educational system designs. While more sophisticated devices such as bikes, treadmills and row machines are beneficial, the only items truly needed to implement an LRPE program at a school are a white board to draw the instructions on and heart rate monitors which are not expensive. Another quality that makes LRPE simple to add to almost any educational system design is the time commitment. Research has indicated that to become more academically alert the students need to get their heart rates in a range of sixty to ninety percent of their maximum heart rate (MHR) for a length of twenty minutes minimum (Monroe, 2020). During a standard fifty-minute class, this should be a simple achievement by doing high intensity interval training, running on a treadmill, or riding an exercise bike. An important fact to take into consideration is that cardiovascular exercises do induce a remarkable response from BDNF and cortisol which boost working memory, but they only stay elevated for up to thirty minutes after the exercise has ended (Martínez-Díaz et al., 2020). Even though the commitment is small, the LRPE class should be scheduled before the students' most difficult class of the day.

Research Questions

• Why is it that LRPE is not emphasized during the training of physical education instructors?

- What are barriers or obstacles that can impede the practical implementation of LRPE classes in high school and college physical education classes?
- What resources, educational technology, and policies are most critical for the inclusion of LRPE in modern physical education classes?

Theoretical Framework of the Project

The theoretical framework for this project is Self-Determination Theory (SDT), which was created by Deci and Ryan (2012) and is centered around the interaction between motivation and human behavior. The problem with typical physical education class designs is that they prioritize physical education class design based on societal influences, economic influences, and legislative influences over student success in education (Wilson et al., 2019). There are two types of motivation associated with SDT. They are intrinsic motivation which is motivation that aligns with our core values and personal sense of morality, and extrinsic motivation which is motivation caused by external rewards and punishment (Ackerman, 2018). It is important class design inherently try to meet both motivations to increase the chance of success because if a physical education class only considers motivational needs that apply to a small minority of athletic students, then they will alienate the rest from seeking out fitness in the future. Physical educators must be effective in providing a need-supportive climate to the students that will urge their continued participation in physical activity (Adams & Khojasteh, 2018). For physical education students to find sufficient motivation, teachers must extend opportunities for autonomy, competence, and relatedness (Chen et al., 2020).

To satisfy the need for autonomy, LRPE provides multiple activities the students can use to achieve the daily heart rate training goals (Ratey & Hagerman, 2008). Autonomy is extending liberties to the students to make

choices and act to maintain student interest in activities (Chen et al., 2020). To provide the students with a sensation of competence, it is important that they have regular opportunities to experience success (Adams & Khojasteh, 2018). In LRPE class, the students' only requirement is to maintain their heart rate in the appropriate training zones during a twenty-minute period which is more achievable to a greater number of students than demonstrating their athletic capability in the sport model. This is where a shortcoming of traditional physical education classes come into play because they are often competitive in nature when they should be cooperative (Ratey & Hagerman, 2008). Students who are not athletically capable will rarely have positive impactful experiences when succumbing to their physically superior classmates. The last need that will help the students feel motivated is connection and acceptance by others (Chen et al., 2020). Thanks to the multiple activities approach LRPE classes use like rock climbing, kayaking, swimming, and working out on exercise machines; there is a higher level of sympathy towards the personal interests of the students (Ratey & Hagerman, 2008). LRPE classes have activities like rock climbing, swimming, kayaking, and exercise machines (Zientarski, 2013). Typically, students have no difficulty finding an activity they can perform to meet the heart rate training zone requirements.

The Following Terms are Essential for This Project

Amotivation: completely non-autonomous and lacking the drive to engage in any activity (Nogg et al., 2020).

Autonomous Motivation: behaviors believed to be consistent with intrinsic goals. It includes intrinsic motivation from individuals who identify with the value of the activity (Ackerman, 2018).

Brain Derived Neurotrophic Factor (BDNF): a protein in the brain that plays in important role in maintaining and improving brain functions. These functions include survival, axonal and dendritic growth, neuronal protection, and synaptic plasticity (Martínez-Díaz et al., 2020)

Controlled Motivation: motivation that is entirely externally regulated. The person acts and reacts for the sake of rewards or punishment (Ackerman, 2018).

Cortisol: a hormone produced by the adrenal cortex in response to stress. High intensity and long duration exercise induces the greatest cortisol release. Studies have shown this hormone to have a positive impact on executive function (Martínez-Díaz et al., 2020).

Dopamine: chemical released in the brain that makes a person feel good. It is important because it helps nerve cells send signals to each other. It allows us to feel satisfaction and motivation (Health Direct, 2021).

External Regulation: involves behaviors driven exclusively by external factors; relying on rewards and punishment (Nogg et al., 2020).

Extrinsic Motivation: motivation from external sources such as prizes, awards or accolades (Ackerman, 2018).

Health and Wellness Model (HWM): a physical education class design centered around basic motor skills and the development of attitudes enabling students to pursue physical activity for a lifetime (Huqi & Peza, 2020)

High Intensity Interval Training (HIIT): a workout encompassing several rounds of training that alternate between vigorous physical activity (80% MHR minimum) and moderate physical activity (60% MHR minimum) (Martínez-Díaz et al., 2020).

Identified Regulation: motivation is somewhat internal and based on values important to the individual (Nogg et al., 2020).

Integrated Regulation: self-motivated and self-determined and driven by interest or enjoyment in the activity the person is engaged in (Nogg et al., 2020).

Intrinsic Motivation: when motivation comes from within and tries to align with a persons' core values, interests, and sense of morality (Ackerman, 2018).

Introjected Regulation: motive is somewhat external and driven by ego protection, self-control, and internal rewards or punishment (Nogg et al., 2020).

Learning Readiness Physical Education (LRPE): A research-based physical education program that takes place in the gym before school. It is designed with student fitness and academic objectives in mind (Ratey & Hagerman, 2008).

Maximum Heart Rate (MHR): the maximum number of beats per-minute a person's heart can beat during intense exercise (Ratey & Hagerman, 2008).

Moderate-to-Vigorous Physical Activity (MVPA): cardiovascular activity that typically operates in a heart rate training zone. Moderate (60% MHR) – Vigorous (90% MHR)

Norepinephrine: amplifies signals influencing motivation, arousal, perception, and motivation (Ratey & Hagerman, 2008).

Physical Education (PE): instruction on games and exercise (Ratey & Hagerman, 2008).

Self-Determination Theory (SDT): a theory studying the individual differences in motivation in an attempt to explain behavior. This theory suggests motivation lies on a continuum (Nogg et al., 2020).

Serotonin: a chemical that carries messages between nerve cells. It plays a role in sleep and mood (Ratey & Hagerman, 2008).

Sport Model (SM): a physical education class designed to emphasize sport specialization and sport knowledge.

Weight Training Model (WTM): a physical education class in which students lift weights.

Summary

This chapter describes common physical education class structures and addresses the shortcomings involved with these designs. The description of these structures discusses what the classes' primary objective is as well as what the motivations are for the creation and maintenance of that class. After briefly summarizing import qualities of the class, chapter 1 then begins talking about LRPE and the creators involved. It also includes some data about their program that they believe justify the actions they take to run the LRPE program. The conceptual base that this topic originated from is the self-determination theory which theorizes the stages of motivation both intrinsic and extrinsic (Ackerman, 2018).

In chapter 2, the qualities of traditional physical education classes (sport model, health and wellness and weight training) as well as their benefits and shortcomings are discussed. The scientific origins and research supporting the efficacy of LRPE are reviewed. After discussing the scientific reasoning, studies explaining the implementation of an LRPE program into schools are also included. The implications chapter will emphasize the importance of further investigation and advocacy of learning readiness physical education programs in schools.

Chapter 2: Review of Related Literature

Introduction

Learning Readiness Physical Education (LRPE) is a physical education class prioritizing moderate to intense cardiovascular exercise (Zientarski, 2013). This class is traditionally held during zero hour before school and utilizes cardiovascular effects on chemical and hormonal aspects of the body to increase the student's cognitive intensity for their following classes (Ratey & Hagerman, 2008). The objective is to give the students heart rate monitors and have them perform moderate to intense exercise in a heart rate training zone of sixty percent minimum heart rate to ninety percent maximum heart rate for a minimum of twenty minutes (Ratey & Hagerman, 2008). The literature indicates that exercising in this manor (particularly higher intensity exercise) improves cognitive function and overall brain health (Zhao et al., 2022). The problem is that even though this type of class has shown great promise with improving student success, physical education curriculums are still influenced by poorly informed legislation, economic interests, and societal influences instead of using an LRPE approach that will more effectively benefit the students (Wilson et al., 2019).

The purpose of this project is to examine the scientific reasoning of LRPE, and discuss the benefits of implementing an LRPE class in schools. LRPE comes with additional benefits compared to more traditional curriculum designs which causes an increase in student motivation to participate in physical activity (Nogg et al., 2020). Regardless of the literature providing

evidence that classes that prioritize cardiovascular exercise have a greater inclination towards academic performance, sport model curriculum remains as the dominant framework when designing physical education classes (Ballester-Ferrer et al., 2022). This is understandable as the research demonstrates that sport education has a positive impact on motivational outcomes in students (Chu & Zhang, 2018). As the research will indicate, many types of traditional physical education class designs are accompanied by benefits to the students be it health, strength, or confidence. The purpose of this project is to examine the unique ability of cardiovascular exercise to promote cognitive intensity, and how that process can be used to create a more engaging and relevant physical education program (Ratey & Hagerman, 2008).

The scope of the research has examined LRPE and traditional physical education's ability to increase student motivation using the theoretical framework of Self-Determination Theory (Deci & Ryan, 2012). Self-Determination Theory is the study of human motivation and focuses on intrinsic and extrinsic motivators as a spectrum ranging from being externally motivated with rewards or punishment to internally motivated by personal values and the ideal self (Ackerman, 2018). Self-Determination Theory states that humans have three psychological needs they need met to feel motivated which are autonomy, competence, and relatedness (Chen et al., 2020). Getting students to a decent level of internal motivation for physical activity is important for sustained physical fitness.

Autonomy is the feeling that one has a choice in their behavior, competence is the experience of mastery or success, and relatedness is the need to feel connected to others (Deci & Ryan, 2012). A large portion of this research centers around the ability of traditional physical education classes to provide the necessary experiences to meet these three criteria, and why they may fall short. The research also examines how effectively LRPE meets the three criteria to motivate students to participate in physical activity. Aside from motivators the research covers the basic metabolic processes occurring, important chemicals and hormones affected, and a general explanation of the procedures and qualities of LRPE.

The sequence of this project encompasses three main ideas regarding motivation of students to be physically active and LRPE in schools. The first is the motivations influencing curriculum design, and the effect that traditional curriculum design has on student motivation in physical education. The study centers around traditional physical education classes using a sport model design, a weightlifting model design, and a health and wellness model design. As a reminder, the literature examines the ability of the traditional physical education classes to successfully motivate students using the theoretical framework of Self-Determination Theory (Deci & Ryan, 2012). It is important to note that LRPE is a health and wellness model design, but it has some key differences when compared to the type of health and wellness classes usually taught. The second main idea examines the scientific and psychological literature supporting the parameters of LRPE and the correct heart rate training zones. The third and final main idea is a description of how well LRPE motivates students to participate in physical activity using the theoretical framework as a guide, as well as important considerations when transitioning from a traditional physical education program to an LRPE program. The literature will also include criticisms and considerations of LRPE in schools. To understand the importance of having the right motivators when considering curriculum design, the current motivators of curriculum design must be understood.

Motivations Influencing Curriculum Design and Their Ability to Motivate Students

Legislative influences are often a powerful motivator in physical education as they carry the weight of the administration. Legislative influences are not always negative as research indicates that schools in states with specific requirements have significantly more minutes allocated to physical education each week (Perna et al., 2012). The research further indicates that institutions largely free of legislative motivations such as private schools may fall short of providing quality physical education classes (Kahan & McKenzie, 2017). The caveat that limits legislation from effectively influencing curriculum design is that developing efficient policy is a time-consuming process with no single best approach to accountability (Tsuda et al., 2022). With no unified objective of what physical education classes should be required to educate students on, a strong legislative influence is not ideal when designing curriculum.

Societal influences also play a significant role in how physical education curriculum is designed primarily due to the idealized role that sport plays in captivating people. Societal influences on physical education class design change based on region, but enjoyment of sport is experienced by many and is often pursued even outside of physical education classes (Johnson & Twietmeyer, 2021). Team sports are particularly relevant both culturally and socially in the lives of students as they act as opportunities to play and socialize (Johnson, 2018). Contrary to the fact that participation in sports increases health, behavior, and wellbeing in students, sport specialization negatively affects physical literacy due to the children's limited opportunities to explore different movement patterns (Bell et al., 2019). Despite the difficulties with developing the physical literacy of students, societal influence constantly pressures physical education curriculum to serve a minority of sport specific individuals over serving the greater needs of the community. One big consequence of a sport specialization approach to designing physical education curriculum is the public heath consequences which get progressively worse as the students never develop the physical literacy needed to maintain a healthy lifestyle (Bell et al., 2019). Economic influences also play a major limiting role in physical education curriculum design as physical education is often the last consideration when distributing the budget.

Economic influence has two main impacts on curriculum design for

physical education. The first is that when designing the curriculum, it must stay within a reasonable budget and the second is that the funding is spent on things that will produce an even greater profit when possible. Because of the impact sport model classes have on education, there is little economic incentive to transition to physical fitness centered physical education classes (Waller et al., 2022). The literature indicates that a class designed to contain at least fifty percent of activity time of moderate to intense physical activity is imperative to maintaining the stability of the public health system (Bell et al., 2019). A shift away from budgetary mindset is needed to view physical education as the valuable resource it is for combatting health epidemics (Waller et al., 2022). In spite of this, physical education is the most marginalized class with regards to facilities, adaptive equipment and class size which is why they are progressively asked to accomplish more with less resources (Wilson et al., 2019). LRPE offers reasonable solutions to many budget constraints that arise from more traditional physical education classes.

Curriculum design in physical education is important as with other classes. Unfortunately, curriculum can often be influenced by these non-education related factors. Motivations for curriculum design come from legislative influences, social influences, and economic influences. Understanding why these are imperfect motivations to create a curriculum is important to positively influence the physical activity behavior of the students (Rocliffe et al., 2023). For the sake of motivating the students to participate in physical activity, it is important that classes consider the necessary provisions needed to positively impact physical education. Classes must provide opportunities for moderate to vigorous physical activity, minimize opportunity for sedentary behavior, and extend more minutes dedicated to physical education (Rocliffe et al., 2023). Occupational socialization will take a lead role in curriculum design for physical educators to develop the beliefs needed to enforce these provisions (Prior & Curtner-Smith, 2019). Without experienced on the ground physical educators, curriculum design will be left in the hands of legislative influences.

Legislative influences remain imperfect for curriculum design because too strong of a legislative influence would weaken necessary autonomy for separate institutions and states. Legislative influence also relies on the existence and coordination of both local and state level systems of accountability to be successful (Tsuda et al., 2022). A glaring weakness of societal influences impacting curriculum design comes in the form of regional preferences. Physical education policies vary by area and school level which contain extensive differences that need to be addressed before even considering how to meet individual student needs (Michael et al., 2019). Economic influences are also a poor choice of motivation when designing physical education curriculum because physical education is often the main subject targeted by budgetary shortfalls (Waller et al., 2022). The most important provision affected by funding is the inclusion of technology which is negatively impacted by administrators who do not see the possibilities the inclusion of technology provides to physical education (Waller et al., 2022). Relying on economic influences for curriculum design is a mistake that constrains motivational opportunities for physical activity by selecting specific sports by consensus. Correct physical education curriculum design must account for having a multifaceted approach to match the multifaceted physical activity behaviors of the students (Rocliffe et al., 2023). Future curriculum must be more student centered with the goal of promoting sustained physical fitness as opposed to sport skills.

Impressions Different Groups Have of Physical EducationCurriculum

Transitioning to LRPE is helpful in changing the impressions that different stakeholders have with physical education. The stakeholders consist of groups like students, parents, teachers, and society. For students, any meaning making experiences in physical education are reliant on the wider context of family, physical activity related values, and norms in their local community (Mikalsen & Lagestad, 2020). Given that students find relevancy in a wide range of variables, it is easy to understand how the specialized and limited activities of traditional physical education classes struggle to deliver the same level of positive emotions to everyone (Løvoll et al., 2020). Traditional physical education is also competitive with multiple opportunities for students to compare their physicality to each other. A consequence of this curriculum design is that even if class is delivered efficiently, physical education does not offer concepts that prevent some students from feeling inferior (Mikalsen & Lagestad, 2020). The parents and legal guardians of the students are an important support system that have their own views of what physical education should address.

Impressions Parents Have of Physical Education

The motivation for parents to support their children being physically active can fluctuate from legal guardian to legal guardian with the level of parental involvement playing a big role. The students should experience parental involvement in their physical education experience so they feel a sense of familial attachment to their pursuit of physical activity (Kreider, 2018). A strong influencer of physical educations impression on parents is frequent communications between the teacher and the parent (Paulson et al., 2022). Many parents acknowledge the importance of regular physical activity, but there are others who maintain that their child not have to take physical education because they do not see the value. They permit their children from participating in physical education with waivers, exemptions, and substitutions because they are not informed of the academic value of physical education class (Prior & Curtner-Smith, 2020). That is an advantage that LRPE has over traditional physical education classes because LRPE includes multiple benefits that extend beyond sport knowledge acquisition, weight lifting expertise, or dietary knowledge. That is why it is imperative that parent communication and advocacy for LRPE have a big involvement on the teaching habits of physical educators.

Physical Education Teacher's Impressions of Physical Education

The impression physical education teachers have of physical education is affected by more than simply their enjoyment of the subject. During the time students spend studying physical education at university, they learn clear goals, the quality of teaching they are expected to deliver, and the importance of autonomy which are important skills when developing a professional physical educator's identity (Poteliūnienė et al., 2022). Unfortunately, a considerable number of physical educators did not receive quality education at university as thirty percent of public high school physical education teachers do not have an undergraduate degree in physical education, and almost twenty percent of physical educator teachers are not certified (Cardina & James, 2021). This is due to the fact that schools do not typically understand the importance of hiring adequately trained physical educators and would rather have other teachers step in and essentially monitor the students during physical education class rather than put in the effort to achieve best practice for the subject.

Physical educators can be demoralized by the lack of concern from peers and administration which is why during the time they spend learning to teach physical education at college or university, they must learn to advocate for a practice like LRPE which uses exercise themes that stand on more than just the principle of having the students perform any physical activity. Three of the common themes from well-designed programs are; many available physical activity opportunities, an established school based physical education leader, and support from the school community (McMullen et al., 2022). The themes are imperative for any physical education curriculum attempting to establish greater credibility compared to more traditional curriculum designs. They are policies worth pursuing due to the impact physical education has on society.

Societal Impressions of Physical Education

Physical education's impact on society is potentially the most crucial consideration when designing physical education curriculum. This is primarily due to the fact that obesity has been linked as a major risk factor for chronic diseases like hypertension and diabetes (Dettoni et al., 2023). The process of living a healthy and active lifestyle requires a certain degree of knowledge and understanding in the value of that lifestyle similar to how a person literate in sports or exercise would be knowledgeable about that sport (Cale & Harris, 2018). Dietary health depends more on actual nutrient knowledge than it does on the food environment increases (Li & Whitacre, 2022). Unfortunately, due to health and wellness classes failing to alter student behavior to seek out opportunities for physical activity in the future, the value of physical education classes es do have certain redeemable qualities, but they have certain limitations with regards to fulfilling the basic psychological needs the students need to participate in physical activity.

Aspects of Traditional Physical Education that Effect Student Motivation

Traditional physical education classes do have some capabilities to inspire motivation in students. Whether it originates from the fun of playing games, the feeling of accumulating periodic success in weightlifting, or the knowledge of health concepts, students do receive a certain satisfaction from a motivation centered curriculum design (Chen et al., 2020). A sense of satisfaction in physical activity is important as the research indicates that motivation can exert different influences on the quality of physical activity depending on different settings like in school, out of school, and on weekends (Nogg et al., 2021). To understanding the capability of traditional physical education curriculum in motivating students to maintain a physically active lifestyle, it is important to understand how capable they are of providing a level of autonomy, competence, and relatedness (Deci & Ryan, 2012). Traditional physical education classes can also implement modified LRPE principles if designed to do so.

Sport Model Providing Autonomy

For a sport model curriculum design, providing autonomy is difficult due to the competitive atmosphere of the activities. Students must compete against each other to do the activity which is why their level of autonomy is not very high with the exception of deciding what position to play in the sport, or a separate role like coach or referee (Chu & Zhang, 2018). In the event students are allowed to pursue roles outside of the selected sport, they threaten to minimize the health benefits of participating in physical activity with their peers. Regardless of what type of freedom the teacher extends to the students during the activity, students have different sporting preferences and no matter what, they will have to settle and play the sport selected by the teacher (Ivashova et al., 2022). The greatest level of autonomy sport participation can provide typically comes from the participation in non-physical education related "pickup games" at school or other institutions (Johnson & Twietmeyer, 2021). The non-competitive setting allows students the autonomy to decide what sport related physical activity they wish to participate in. They also do not have to worry about demonstrating the adequate levels of physical literacy needed to pass the class.

Sport Model Providing Competence

Trying to create situations where students feel the experience of mastery is likely the most difficult need to meet in order for students feel motivated. As educators, physical education teachers are taught to emphasize best practice policies such as creating a least restrictive environment, which is a policy that is far more difficult to implement than it is to conceptualize (Wilson et al., 2020). It has been a constant component of physical education curriculum design that the students be provided with modified game states that allow them to successfully execute strategies in game (Chu & Zhang, 2018). The issue with this type of goal setting is that demonstrating mastery is the result of frequent practice and experimentation that extends far beyond the allotted time physical education teachers have in order to teach their student's the sport skills. The students also struggle to become proficient because they cannot practice skills outside of class without the necessary resources which are either expensive or that the students only have a certain amount of access to (Barney & Leavitt, 2021). While modified games and activities are a decent curriculum design choice, the modification would likely be better served increasing the time the students are being physically active rather than improving skill mastery.

Sport Model Providing Relatedness

The ability for sport model curriculum to provide the students with a sense of relatedness with their peers is difficult to evaluate as sports can provide both comradery between a student and their team or isolation from their team due to poor athleticism. Sport has always been a transcendent phenomenon as it crosses many boundaries despite differences in race, age, social class, and sex and delivers enjoyable experiences to most people (Johnson & Twietmeyer, 2021). The research indicates that the sport model curriculum design does indeed positively impact student motivation to participate in physical activity, but not without the risk of exposing their vulnerabilities (Chu & Zhang, 2018). The sport model will struggle to give the students a consistent sense of relatedness to their peers as it is often contingent on the student's ability to perform athletically. The psychological need of feeling related to peers and a group is received to a greater degree by spectators of sport which is why team sports are so socially and culturally relevant to high school students (Johnson, 2018). Fortunately, by applying certain principles of LRPE to a standard sport model physical education class, the curriculum can become more relevant than a simple social gathering.

LRPE Principles Applied to the Sport Model Curriculum

While it is not necessarily conducive to common core education classes, sport model design classes can be altered to include LRPE principles by adding heart rate monitors and using adaptive activities that promote student involvement. One of the keys to successfully implementing LRPE policies is to use small sided games with fewer students on each team such as four versus four soccer or three versus three basketball (Ratey & Hagerman, 2008). This will increase the amount of effort each student will have to exert during the activity, and raise their heart rate. Research has shown that sports can induce increases in cognitive function as a secondary consequence to playing the badminton, so it is not as though the sport model and LRPE concepts must remain separate (Santos et al., 2022). A major caveat to the regular inclusion of LRPE policies into sport model design classes however is that the type of activity can negatively impact the intensity of the exercise. If students were playing baseball there would be a tremendous amount of standing around both in the dugout and in the outfield which will reduce the amount of active time (Ratey & Hagerman, 2008). Due to the inconsistency of the cardiovascular intensity, it is difficult to apply LRPE policies to many sport activities regularly held in class. Weight training can also face difficulties in student motivation and the number of benefits it provides.

Weight Training Model Providing Autonomy

When students are educated well in the nuances of weight training such as hypertrophy, strength, power, and endurance, it opens many different goals that the students can pursue in a weight model design class. There are also many different practices used by different strength and conditioning educators which can lead to a variety of different avenues of teaching within weight training (Weldon et al., 2022). One negative of using weight training as a primary physical education curriculum is that when progressing to an advanced lifter status; the students must submit to the periodization rhythm of their body. These are complicated, and can often include undulating, non-linear programs designed to create muscle confusion (Smith, 2022). Regardless, there are many forms of autonomy that exist in weight training due to the different fields of weight lifting students can participate in like bodybuilding, strength training, and Olympic lifting.

Weight Training Model Providing Competence

Ensuring the students experience mastery of weightlifting is difficult for reasons such as different students have different body types as well as the fact that lifting heavy loads is a consequence of consistent commitment to diet and training over many years. Developing a sense of weight training competency is difficult for these reasons and in order to circumvent these limitations, teachers must use a student-centered approach that promotes adherence to a strength training plan as the way to demonstrate competence rather than successfully lifting specified amounts of weight (Lanter et al., 2020). Aside from planning, students can demonstrate success when performing the lift with proper form and repetition and be comfortable with the knowledge that they are making progress every day. However, demonstrating mastery of weightlifting will illude them because that exists beyond the scope of any high school weight training class. Relatedness on the other hand is achievable and often typical in weight training curriculum.

Weight Training Model Providing Relatedness

In weight training, relatedness is often emphasized early on as there is usually an intense focus on safety when teaching weight training in high school. Comradery is common as group members are united in spotting for whoever is lifting and offering tips for improvement. A major concern for students feeling a sense of relatedness in this situation is the developmental differences in the student's physicality (Lanter, 2020). Students may be left with a feeling of inferiority when they struggle to lift a near empty barbell and then watch their groupmates lift several times more than they did. The weight training class can be modified to use an LRPE approach to circumvent any clear strength differences that may discourage students from lifting weights.

LRPE Principles Applied to the Weight Training Model

Weight training is capable of adapting LRPE principles in spite of the fact that many would say weight training involves very little cardio. As far as objectives go, Learning Readiness Physical Education is a class that emphasizes the uses of moderate (60% MHR) to intense (90% MHR) cardiovascular activity for a period of twenty minutes with the intention of increasing cognitive intensity (Ratey & Hagerman, 2008). Weight training is usually thought of as a non-cardiovascular training class which is why some may be surprised to discover that an acute bout of high intensity resistance exercise is capable of causing certain domain specific changes in cognitive function (Anders et al., 2021). Tasks involving response inhibition and information processing exhibited improvements to cognition while there was a decline in recall and memory in participants (Anders et al., 2021). CrossFit is a weight training class which has been shown to have positive health benefits on students, but it should be noted that changes in aerobic capacity are not statistically significant (Han et al., 2021). While it is unwise to adapt a weight training class to use LRPE principles and expect the full range of benefits LRPE is capable of offering, including weight training as a component to the program can be a helpful addition for reasons of variety.

Health and Wellness Model Providing Autonomy

Although LRPE is a type of health and wellness model class, traditional health and wellness classes focuses more on dietary education than on increasing physical fitness. This is not an inherently flawed mindset as diet is important to obesity, which represents a risk factor for many chronic diseases (Dettoni et al., 2023). There has been a shift in physical education curriculum design in recent years from sport model designs to health and wellness model designs due to the more significant upside students can attain from a health and wellness type of curriculum. The influx of strategies that arose from this have produced many ideas with diet and behavior that students can use to develop and maintain health for a lifetime (Rocliffe et al., 2023). The level of autonomy health and wellness curriculum design provides students is excellent as the students can learn many different diets and strategies about proper nutrition. Demonstrating competence is typically not achievable as a healthy lifestyle is built over years of committed healthy behavior.

Health and Wellness Model Providing Competence

Demonstrating competence of heath in traditional health and wellness classes is achieved by demonstrating knowledge rather than performing physical activity. As a result of this, students miss out on the minimum amount of time spent being physically active during physical education class (Perna et al., 2012). Students enter a health and wellness model class with an idealized physique they want to achieve based on pre-determined standards of physical attraction. They were met with complex chemical and hormonal interactions such as serotonin, dopamine, and norepinephrine that highly complicate that idealized version of success they are attempting to achieve (Ratey & Hagerman, 2008). They learn that they must change their interpretation of what demonstrating mastery is when completing traditional physical education class. Relatedness is a more complex need to fill in traditional health and wellness classes as students learn to emulate behavior that will maintain health and wellness for a lifetime rather than perpetuating negative health behaviors of people they feel connected with. In this respect, relatedness is not always a strength in achieving the benefits of health and wellness classes.

Health and Wellness Model Providing Relatedness

Relatedness can work against the students in traditional health and wellness as they will often emulate the unhealthy behaviors of students they admire or their parents, and not to a nutritional commitment. It is important to note that relatedness can sometimes be a benefit as some students will be internally motivated to participate in activities that the community values thus increasing their amount of physical activity (Johnson & Twietmeyer, 2021). The student can learn about nutrition, but as the student's association with food is dictated by what their parents purchase, they will struggle to put what they learned into practice. Furthermore, the parent's dietary health is dependent on nutritional knowledge which individuals outside the heath and wellness class are not even aware of. Successfully maintaining health for a lifetime requires strong internal motivation which is why relying on the feeling of connectedness to others is not necessarily a strong motivator in maintaining proper diet.

LRPE Principles Applied in the Health and Wellness Model

Traditional health and wellness physical education classes are possibly one of the best classes that Learning Readiness Physical Education Policies can be added to. The reason it is a good match is that it remedies one of the chief concerns with traditional health and wellness classes by increasing the amount of time dedicated to physical activity (Rocliffe et al., 2023). A class like that would accomplish both tasks of getting the students to perform important daily physical activity and increase the physical literacy skills needed to maintain a physically active lifestyle (Cale & Harris, 2018). While the class must undergo some reorganizing due to the fact that the two types of curricula are unable be taught at the same time, the instructor can engage the students with LRPE at the beginning of class and then teach them nutrition during the end of class.

Scientific Research Supporting the Efficacy of Learning Readiness Physical Education

Having a comprehensive understanding of the scientific mechanisms that are affected by exercise is pivotal to understanding the efficacy of Learning Readiness Physical Education. This research examines multiple facets of exercise results such as mood conditions like stress, depression, and anxiety. The research also examines how exercise affects important physiological chemicals in the body such as neurotransmitters, proteins, and hormones. Understanding both the function and exercise activation principles of these physiological mechanisms is important to understanding what the exercise accomplishes. Different exercise intensities can have different results on cognitive intensity which is why the use of empirical data is helpful to distinguish what the exercise session is accomplishing and not accomplishing.

Effects of Exercise on Mood

Exercise is widely known to cause many positive effects such as weight control, strength building and unique experiences that keep people active. The research for supporting the efficacy of LRPE exclusively examines physical educations potential impact on learners by enhancing cognitive intensity post-workout. Exercise also has a positive impact on mood, which is an additional benefit to education that goes beyond cognitive intensity. The parameters of this research cover the effects of exercise on the common mood conditions of stress, depression, and anxiety.

The Effect of Exercise on Stress

High school and college students will often feel stressed due to the many transitions that occur over the maturation process. If the students experience stress for too long it will put the them into a state of chronic stress which can transform an emotional strain into a physical strain (Ratey & Hagerman, 2008). Frequent activation of the psychological stress system can in fact lead to clinical depression or anxiety which is why managing stress is important (Caplin et al., 2021). Contradictory to the fact that exercise itself is a form of stress, exercise can control the physical and emotional feelings of stress (Ratey & Hagerman, 2008). Even a single session of high intensity exercise can reduce the acute stress response of the body, but an important consideration of the research is the indication that higher intensity exercise (Caplin et al., 2021). Student participation in high intensity cardiovascular exercise helps them develop stress coping skills needed to avoid the onset of clinical depression and anxiety in some situations.
The Effect of Exercise on Depression

Depression is a saddened state that negatively effects how people think, feel, and behave. Much of the research collected on how exercise effects mood is based on research in depression as it has been determined that aerobic exercise has a positive impact on a range of depression symptoms (Ratey & Hagerman, 2008). While the research confirmed that exercise has a positive impact on depression with cardiovascular exercise being most effective, it struggles to identify an appropriate dose response relationship as it is based on a meta-analysis using multiple types of exercises, frequencies, and intensities (Bessera et al., 2018). The ability to determine a consensus is difficult for this reason. Regardless of the need for more well orientated studies on cardiovascular exercise prescription as a solution to depressive symptoms, cardiovascular exercise remains one of the most functional tools to combat it, and it is included in LRPE classes.

The Effect of Exercise on Anxiety

Helping with mental health concerns like anxiety or nervousness is a matter of reducing anxiety causing variables. Anxiety is more complicated than stress and depression because anxiety is when a person worries even to the point where there is no real threat (Ratey & Hagerman, 2008). One study indicated that aerobic exercise increases happiness variables and decreases stress in high school girls by having them participate in a twelve-week aerobic program and then take the Spielberger Anxiety and Oxford Happiness Questionnaire for the measurement (Babaei & Jamali Qarakhanlou, 2021). The result of the study demonstrated the significant effect that aerobic exercise has on managing anxiety (Babaei & Jamali Qarakhanlou, 2021). Similar to the previous mood disorder of stress, the research states that high intensity exercises work better than low intensity exercises when managing the negative symptoms of anxiety (Ratey & Hagerman, 2008). To understand how mood is affected by exercise, it is important to examine the mechanisms that affect the mood of exercisers which consist of neurotransmitters, proteins, and hormones.



Note. From *Neurotransmitter*, by Admin, 2021, Byjus (https://byjus.com/biology/neurotransmitter/)

To understand how cardiovascular exercise improves cognitive intensity, the research examines the relationship between the physiological components at play. Neurotransmitters are substances released at the ends of nerve fibers that allow the transfer of an impulse to another fiber or structure (Ratey & Hagerman, 2008). These chemical messengers allow messages to travel throughout the body by traveling from one nerve fiber, across the synaptic cleft, and to the receptors of the next chemical location as demonstrated with the neurotransmitter dopamine in Figure 1 above (Byjus, 2021). For the sake of narrowing the focus exclusively to the impact of cardiovascular exercise on neurotransmitters, research involving dopamine, serotonin, and norepinephrine were identified as standout neurotransmitters that were relevant to cognitive intensity.

The Effect of Exercise on Dopamine

Dopamine is a neurotransmitter that allows for the feeling of motivation and pleasure, which can have negative or positive influences on the individual student. The research suggests that exercise does have a positive impact on dopamine production in certain parts of the brain as well as other neurotransmitters (Gorrell et al., 2022). Specifically, exercise plays a role in managing addiction by affecting blood levels of dopamine and serotonin (Arazi et al., 2017). An important consideration when trying to achieve the benefits of the dopamine reward sensation of exercise is that some students have a dopamine variation which can cause dopamine deficiency syndrome (Ratey & Hagerman, 2008). This is one of the reasons some may feel deprived of the satisfaction of exercise, and why exercise may not deliver the same satisfaction to everyone.

Figure 1

The Effect of Exercise on Serotonin

Another neurotransmitter that effects mood is serotonin. Serotonin helps reduce a wide range of brain systems that are out of control and that impact mood, anxiousness, and impulsivity (Ratey & Hagerman, 2008). High intensity interval training showed similar effects in raising serotonin similar to how it did dopamine (Fiorelli et al., 2019). Production of serotonin is so important that drugs such as Prozac are taken to modify runaway brain activity leading to clinical disorders like anxiety and depression (Ratey & Hagerman, 2008). One source examined the difference between high intensity interval training (HIIT) and continuous moderate-intensity training and discovered differences in cognition. It claims that in the experiment performed, continuous moderate-intensity training presented better immediate and late memory benefits than the control group and HIIT group, while the HIIT group improved in attention, sustained attention, and immediate memory (Fiorelli et al., 2019). It can be concluded from the research that lower intensity exercises are better for serotonin production. Studies such as this also provide a strong base for exercise prescription to improve cognition without the use of medication.

The Effect of Exercise on Norepinephrine

The exercise intensity needed to produce the neurotransmitters is not always the same. One difference between serotonin and norepinephrine is that norepinephrine increases more with high intensity exercise than with low intensity exercise (Giles et al., 2018). Similar to the other neurotransmitters mentioned in this research, norepinephrine affects mood and attention (Ratey & Hagerman, 2008). The fact that norepinephrine responds better to higher intensity exercises indicates that running, or HIIT is likely to produce the best results in LRPE classes. This claim is supported by additional literature showing positive improvements in norepinephrine with HIIT, however the supporting study did have few participants which can minimize the importance of the results (Fiorelli et al., 2019). Proteins also play an important role in brain health and cognitive intensity.

Important Proteins Affected by Exercise

The research describes three proteins involved with cognitive intensity. The first is brain-derived neurotrophic factor (BDNF) which has many roles including protecting and growing brain cells (Martínez-Díaz et al., 2020). The second is Vascular Endothelial Growth Factor (VEGF) which signals other cells to divide to make more blood vessels similar to Fibroblast Growth Factor (FGF-2) which is the final protein (Ratey & Hagerman, 2008). These three proteins benefit cognitive intensity and respond to cardiovascular exercise.

The Effect of Exercise on Brain Derived Neurotrophic Factor

Ensuring that LRPE programs are using correct exercise prescription is imperative to stimulating protein development. BDNF has multiple func-

tions in the brain including causing synapses to sprout new branches which improves neural connectivity (Ratey & Hagerman, 2008). Of the many benefits that LRPE causes within the body, BDNF is likely the most crucial as it serves as an important link between thought and behavior (Ratey & Hagerman, 2008). A single bout of HIIT triggers a tremendous response of BDNF which in turn boosts working memory and other cognitive functions (Martínez-Díaz et al., 2020). BDNF not only supports cognitive systems but the production of other proteins to support cognition (Ratey & Hagerman, 2008). Although it is likely the most important protein affected by exercise, BDNF is not the only protein that is capable of supporting learning.

The Effect of Exercise on Vascular Endothelial Growth Factor

VEGF also has an important use for learners. VEGF is a signaling protein that signals other cells to divide and make more blood vessels and activates when tissues are exhausted and low on blood flow (Ratey & Hagerman, 2008). A study was performed on rats that supports the claim that exercise improves protein levels of VEGF and other proteins compared to non-exercising demographics (Yeo & Lim, 2022). The study compared non-exercise, aerobic exercise, resistance exercise and combined exercise and concluded that regular exercise training regardless of exercise type can improve cardiovascular function, but aerobic exercise is likely the most effective (Yeo & Lim, 2022). VEGF plays in important role in cognitive expansion that has a similar responsibility to Fibroblast Growth Factor.

The Effect of Exercise on Fibroblast Growth Factor

The final protein included in the research is FGF-2. FGF-2 makes more blood vessels when the body is stressed like VEGF and initiates stemcell division into new and functioning brain cells (Ratey & Hagerman, 2008). This protein is in the cellular lining of veins, arteries and capillaries of organs and muscles and increases during exercise (Mezil et al., 2020). Research has indicated that both VEFG and FGF-2 make more blood vessels within only two hours of exposure to exercise (Ratey & Hagerman, 2008). The effects of exercise on important proteins such as these illustrates the strong need for a more enhanced focus on heart rate zones and heart rate monitors in physical education. The benefits of LRPE do not end there as exercise also has the ability to positively influence hormone stability in the body.

Important Hormones Affected by Exercise

Hormones play an important role in the body by stimulating action in cells, which is why the regulation of hormones is important to consider when designing a Learning Readiness Physical Education curriculum. Three important hormones examined in the research are Insulin Like Growth Factor (IGF-1), Atrial Natriuretic Peptide (ANP), and Human Growth Hormone (HGH) (Ratey & Hagerman, 2008). These hormones are critical to cognitive function and the transition of adolescents to adulthood, which is why understanding the impact that exercise has on them is as important as the proteins and neurotransmitters.

The Effect of Exercise on Insulin Like Growth Factor

One hormone that exercise affects is IGF-1. This hormone promotes cell growth and helps prevent cell deterioration (Ratey & Hagerman, 2008). Fortunately, this hormone seems to increase in serum levels regardless of the exercise. The research contains a study comparing the serum IGF-1 levels of veteran athletes in both table tennis and long-distance running and discovered that the difference in serum levels is not statistically relevant (Birinci et al., 2022). This is promising for exercise prescription as it allows LRPE curriculum to focus on meeting the needs of neurotransmitter and protein activation. Unfortunately, the knowledge of the effect of exercise on IGF-1 are not well researched and requires more conclusive data similar to some other aspects of LRPE.

The Effect of Exercise on Atrial Natriuretic Peptide

Fortunately, the literature on how cardiovascular exercise effects physiology is always increasing. ANP is a hormone that is responsible for blunting the stress response by counteracting certain elements of the stress response system (Ratey & Hagerman, 2008). According to recent physiological research performed on rats which tried to compare physiological responses to cardiovascular and resistance exercise; both types of exercises resulted in an increase in ANP with resistance exercise releasing the most (Pianca, 2019). The results support earlier research endorsing the involvement of some resistance training in an LRPE class even if the class focuses more on cardiovascular activities.

The Effect of Exercise on Human Growth Hormone

The last exercise afflicted hormone that is addressed by the research is HGH. HGH is incredibly important, and not only to brain development as it is also vital to the development and growth of all cells in the body and brain during maturation (Ratey & Hagerman, 2008). High Intensity Interval Training (HIIT) is an excellent way to raise HGH, but it is important to know that duration of near-maximum or maximum exercise must be about twenty to thirty seconds and nothing shorter like six seconds (Vakili et al., 2021). Duration and frequency of times a week is important to finding the optimum results in the students' academic performance.

Surmising the Parameters of Intensity, Duration, and Frequency of Activities

Although cardiovascular exercise has been shown to greatly improve cognitive ability, understanding intensity, duration, and frequency is crucial to implementing an LRPE curriculum because the students and parents will be discouraged if they do not see the results they were anticipating. It is important to know what physiological changes will occur when determining what the optimal heart rate training zone is, as an LRPE program will not trigger many of the previously stated benefits from the body if the students do not perform at the specified intensity described by the literature (Ratey & Hagerman, 2008). The time after the workout is also important as the heightened cognitive intensity does not last the duration of the day which is a mistake implementors of LRPE should avoid (Zientarski, 2013). The workload that teachers are asking students of lower physical fitness levels to take on should also be managed appropriately for their current fitness level.

Student Centered Level of Approach to Learning Readiness Physical Education

Considering the fitness level of the student is important in motivating further participation in physical activity. One of the most important considerations when implementing LRPE activities is that students of a low physical activity fitness level should begin by spending at least a few months doing lower intensity exercises before progressing to higher intensity exercises (Shi et al., 2022). The appropriate heart rate training zone for students beginning physically active lifestyles is fifty-five to sixty five percent of their maximum heart rate, and they should not perform any overly complex movement beyond their mobility (Ratey & Hagerman, 2008). These activities can include things like walking, light cycling, yoga, or stretching for at least a month, in order to prepare the body to progress to the next level of moderate to intense physical activity. Although the students will not be achieving the benefits of LRPE during this time, they will be more capable of transitioning to more intense workouts.

Proper Intensity and Duration of the Exercise

After the appropriate adjustment period, the students will begin increasing the intensity level of the activities. When transitioning to actual LRPE intensities of moderate to intense physical activity, the target heart rate training zones then becomes seventy five percent to ninety percent (Ratey & Hagerman, 2008). Multiple components of the literature are clear about how the intensity of the exercise must be high to elicit the physiological responses needed to increase cognitive intensity (Avazpour et al., 2020). The research also indicated that when doing HIIT which is bouts of high intensity followed by bouts of low intensity, the high intensity should reach a time frame of twenty to thirty seconds (Vakili et al., 2021). If an instructor did not want to use HIIT to benefit the students because they view it as too complicated to coordinate with their class, they could simply assign a daily heart rate training zone on a whiteboard, and have the students remain in that training zone for a minimum of twenty minutes (Zientarski, 2013). Staying in the specified heart rate zones for the allotted amount of time is the only requirement for students

in an LRPE class to successfully complete the activity.

Frequency of Learning Readiness Physical Education Sessions Per Week

Determining the number of times per week can be tricky due to the fact that there are many variables involved with the impact the exercise had on the body. One big consideration is whether or not the students performed the activity on exercise machines and spared themselves some of the impact on their joints that running causes (Ratey & Hagerman, 2008). Depending on the incurred costs of some activities, the students may be able to increase the number of LRPE sessions per week because high intensity sessions take multiple days to fully recover from. According to the research, the likely maximum number of sessions per week that students should do the activity should not exceed three (Avazpour et al., 2020). Taking the data into consideration, holding twenty-minute sessions on Mondays, Wednesdays, and Fridays where the students will maintain their heart rate at seventy five percent or more of their maximum heart rate for twenty minutes is likely be the most effective LRPE curriculum design strategy.

Methodology of Learning Readiness Physical Education

Understanding the conditions of real-world implementation is important for Learning Readiness Physical Education so physical educators can use the experiences of peers as a resource when designing curriculum. Advocating for the superiority of LRPE over traditional curriculum design has been more complicated than the data would indicate. There are inherently the tasks of convincing physical education professionals to change their teaching styles, examining case studies involving institutions that have implemented LRPE, and determining appropriate funding for the technological requirements of LRPE. The research discusses these considerations as understanding how to navigate the application process is as important as the conceptualization process.

Learning Readiness Physical Education Affecting Student Motivation

To maintain the same level of assessment as the traditional physical education curriculum design, the ability of LRPE to motivate students is assessed across a self-determination theory lens. Similar to the traditional physical education curriculum design discussed earlier, the ability to motivate students is dependent on LRPE providing a sense of autonomy, competence, and relatedness that is superior to traditional physical education (Deci & Ryan, 2012). LRPE has the ability to make up for the shortcomings of traditional physical education classes with regards to satisfying these three needs and developing a higher number of opportunities for students to become internally motivated.

Learning Readiness Physical Education Model Providing Autonomy

LRPE provides autonomy by including a wide range of physical activities to peak the students interest in physical activities. While sports can also be included in an LRPE class, the primary activities include things like rock climbing, biking, kayaking, and using a Cybex Trazer which is a device that allows students to chase a light for exercise (Ratey & Hagerman, 2008). Some programs need to start off with less autonomy because it will take time to obtain equipment on the same level as the school being used as a case study in the research. While some programs will not be able to provide an equal amount of autonomy, as long as the students are being physically active and are able to achieve the desired heart rate training zones, they will receive credit.

Learning Readiness Physical Education Model Providing Competence

Students participating in LPRE activities have a much higher ability to experience mastery in the activities. This is primarily due to the fact that cooperation and not competition is a major quality of LRPE classes that differs from traditional classes (Ratey & Hagerman, 2008). The activities are far more achievable than the sport model class because students do not have to physically outperform their peers to be successful and do not have to see immediate and sustained changes in their body weight like traditional health and wellness model classes. They can also take their own fitness levels into account and not compare themselves to the other students (Shi et al., 2022). The non-competitive and physically appropriate activities ensure that the students have an easy time finding a physical activity that they will enjoy doing recreationally.

Learning Readiness Physical Education Model Providing Relatedness

The students feeling a sense of relatedness to their peers increases in LRPE because of the type of activities. At one of the schools that is used as a case study in the research, cooperation is emphasized heavily over competition as ensuring the graduates from a program are able to be physically active for life is the main goal of modern physical education (Ratey & Hagerman, 2008). The wide range of activities provided give the students more opportunities to bond over shared interests. The goal of satisfying the three needs of self-determination theory stems from the idea that people need to experience all three to develop true internal motivation which is necessary due to students incurring many more responsibilities when graduating from school (Ackerman, 2018). Engaging in LRPE activities with peers increases motivation to a more superior level than traditional curriculum design as the students have many more positive interactions with their peers. The academic rewards of prioritizing cognitive intensity as the focal point of physical education is supported by the case study of Naperville Central High School which is where LRPE was developed by a physical educator named P. Zientarski.

The Case Study of Naperville Central High School

This research contains one case study outlining the procedures and methods used by one educational institution to achieve academic success in their students through the proper implementation of LRPE. Naperville Central High School (NCHS) is the facility that LRPE was essentially created and implemented at in the year 2003, and there is a background of performance results stemming from NCHS with promising empirical data (Zientarski, 2013). Students exhibited a seventeen percent increase in their reading and comprehension by the end of the semester when participating in the LRPE class during zero hour before school, while other literacy students who took LRPE later in the day scored a 10.7 percent increase in their reading (Ratey & Hagerman, 2008). In the research, comparative data tables collected by Zientarski and the staff of NCHS shows the differences between students participating in LRPE classes and students participating in traditional physical education classes during a roughly six-year period.

Data Tables Demonstrating Cognitive Benefits of Learning Readiness Physical Education

First observe the effects of LRPE on academic proficiency. Below is a visual representation (Table 1) of the academic proficiency recorded by Zientarski and provided by the Illinois Public Health Institute (2013). The methods commonly practiced by Zientarski were to take any student who was struggling in math or reading class at Naperville Central High School, and place them in to an LRPE class during zero period before school in the (AM) or later in the afternoon (PM) (Zientarski, 2013). During this time, the students perform high intensity exercises on exercise equipment like air bikes, ellipticals, and row machines, for 20 minutes, and then immediately go off to the class they struggle with the most in a heightened state of academic alertness (Ratey & Hagerman, 2008). Notice in Table 1 that during every year the program was enacted, the LRPE classes experienced a higher performance result than all traditional physical education classes, and that LRPE (AM) had the greatest effect on literacy improvement (Zientarski, 2013).

Table 1 Literacy Improvement 3.5 Regular PE 3 Change in Grade Level LRPE (AM) 2.5 LRPE (PM) 2 1.5 1 0.5 0 2011** 2005 2006 2007 2009 Reading leve evaluated using the Nelson-Denny Reading Test *No students permitted to opt-out of LRPE in 2007 ** 2011 data includes students from Naperville North High School

Note. From *Enhancing P.E. in Illinois*, by P. Zientarski, 2013, Illinois Public Health Institute (https://iphionline.org/wp-content/uploads/2020/01/P.E._Case_Study_Naperville. pdf). In the Public Domain.

Table 2 demonstrates the percentage improvement to the student's Algebra Readiness Test during the years NCHS implemented LRPE. Notice once again that the LRPE classes performed markedly better on the tests than the regular PE classes (Zientarski, 2013). These are not the only notable academic achievements made by NCHS. The students of NCHS took the TIMSS test which is the International Mathematics and Science Study and scored number one in the world in science and number six in the world in math (Ratey & Hagerman, 2008). Even if some find it difficult to connect the complex physiological processes that cause this phenomenon to the results, the high achieving test scores of NCHS lend credence to the notion that cardiovascular centered exercise has a positive influence on cognitive intensity.



Note. From *Enhancing P.E. in Illinois*, by P. Zientarski, 2013, Illinois Public Health Institute (https://iphionline.org/wp-content/uploads/2020/01/P.E._Case_Study_Naperville. pdf). In the Public Domain.

Importance of This Case Study

Table 2

Algebra Improvement

The findings provided by this case study combine previously disconnected literature regarding cardiovascular exercise's effect on cognitive ability to the implementation of an academically focused program that uses the literature in the curriculum design. As determined by the research on cognitive intensity, students in the NCHS program are required to keep their heart rate between eighty and ninety percent of their maximum heart rate during a twenty-minute exercise on a treadmill, bike, or row machine (Ratey & Hagerman, 2008). The data in this case study affirms that academic improvements in students are achieved by adhering to these parameters of cardiovascular exercise and that LRPE is a worthy inclusion in standard physical education class design (Zientarski, 2013). A focus on cardiovascular exercise is not the only culture change experienced when transitioning to an LRPE class as the importance of technology and the way it is used also changes.

The Role of Technology and Resources in Learning Readiness Physical Education

The relationship between LRPE and technology is important as technology and other resources are what determine curriculum design. One of the common barriers of implementing technology is that physical educators can lack the knowledge of how to integrate technology in physical education class (Hill & Valdez-Garcia, 2020). Finding the optimum use for technology in the traditional physical education curriculum is often difficult because the activities are capable of being taught without the use of specific devices or structures unlike in LRPE (Ratey & Hagerman, 2008). LRPE encourages the use of a wide range of devices to give students many opportunities to find a physical activity they can be consistent with after they graduate.

Heart Rate Monitor Implementation

The most important devices used in LRPE classes are heart rate monitors. Heart rate monitors are nearly the only mandatory device in LRPE class as they allow the students to do self-checks and maintain the proper heart rate training zones (Ratey & Hagerman, 2008). According to the literature, type of exercise and activity matters when trying to engage cognitive intensity, so the students will be able to self-adjust the level of intensity they are producing to fit within the heart rate training zones by using the monitors (Costa et al., 2018). Students also experience positive motivational outcomes from the implementation of heart rate monitors in such a manner (Partridge et al., 2011). Using heart rate monitors in conjunction with a variety of activities gives students an achievable and non-competitive method to demonstrate their physical proficiency in physical education.

Impressions of Heart Rate Monitors in Physical Education

When addressing the changing technological requirement of the heart rate monitors, it is important to analyze the impressions students, teachers, and parents have when using them. The students enjoy using heart rate monitors and doing so provides additional motivation to participate in physical activity (Partridge, 2011). One strong reason for this is that the benefit of real time feedback psychologically motivates students on the individual level (Stöckel, 2021). Parents and teachers also understand the important role heart rate monitors play in physical education due to parent teacher communication involving the academic benefits of high intensity cardiovascular exercise (Ratey & Hagerman, 2008). Heart rate monitors are not the only resources that are used in a well-equipped LRPE class as they can involve the use of exercise machines and rock walls. These are not mandatory to exercise in heart rate training zones, but their inclusion offers more variety to students of different fitness levels.

Additional Resources of a Well-Equipped Learning Readiness Physical Education Class

While heart rate monitors are not difficult to provide, other resources will influence how physical educators design LRPE programs at their institutions. NCHS's resources are different than resources other programs are capable or willing to provide (Ratey & Hagerman, 2008). When programs invest in exercise machines, the cost is high, but some students need them because their joints may not be able to perform the activities repetitively without the



machines. Some may balk at the idea of promoting a program with a seemingly large investment like LRPE, but there are cheaper methods of implementing it like creating a follow along video where the students will follow the instructions of a HIIT exercise session. According to the literature, teacher led HIIT programs are viable with both teachers and students finding the activity acceptable (Harris et al., 2021). In spite of the educational benefits of LRPE and the ability to circumvent tight budgets, there are still certain criticisms regarding the efficacy of LRPE.

Notable Shortcomings of Learning Readiness Physical Education

Learning Readiness Physical Education is an effective curriculum design for motivating high school students to be physically active for a lifetime because it exposes them to regular experiences with physical activity, increases parent's interest in their child's physical education, and inherently offers benefits that extend beyond traditional physical education curriculum design. In spite of these benefits, LRPE has some notable shortcomings and considerations that are difficult to circumvent. Physical education is the last consideration people have when allocating funding, which is why budgeting a transition to an LRPE curriculum design is often met with resistance by administration (Ratey & Hagerman, 2008). There is also the caveat that even though intensive cardiovascular exercise can positively curve behavior, not all behavioral problems can be successfully addressed by LRPE. It is also important to note that LRPE is a whole-of-school type of physical education curriculum that requires the communication of teachers outside of physical education and the coordination of class schedules to achieve the academic benefits (Mulhearn, 2020). It is important for physical educators and administration to consider these obstacles and enforce constant communication when implementing LRPE.

The Variety Needed for Activities can Inflate the Curriculum Budget

Budget has always been a major concern for physical educators as physical education is an afterthought when deciding what orientation the collection of school subjects will take. According to Zientarski (2013), LRPE carries two major expenditures which are the equipment needed to provide a wide range of activities like rock-climbing walls, light-up devices students chase around, cycling trainers that the students can ride on or even race each other on if they want, and software to track the student's fitness. Zientarski (2013) goes on to say that they needed grants in order to afford much of the equipment like bikes, treadmills, and row machines. Fortunately, the only mandatory device to begin is a heart rate monitor which is so cheap that LRPE programs can request parents provide their children with them. While some schools may be able to obtain similar education grants in order to afford the devices, many schools could not, and if they could, it would be difficult for the physical education teachers to advocate to their administrators and their colleagues about the expenditure of funds on non-core subjects.

Learning Readiness Physical Education is Dependent on Peer Cooperation

Another caveat that may prevent the effective implementation of LRPE curriculum on a wide margin is the fact that implementing it also requires the cooperation of other teachers and faculty. This is an inescapable requirement due to the time-frame that cognitive intensity lasts post-exercise (Zientarski, 2013). As mentioned earlier, the heightened cognitive benefits that high intensity exercise provides do not last the duration of the day, but rather a couple of hours (Ratey & Hagerman, 2008). In fact, the research indicated that the increase in BDNF which was the protein in the brain that helps brain cells grow and function, remain elevated for only thirty minutes after a workout ends (Martínez-Díaz, 2020). This forces class schedules to be organized so that students can attend their most difficult subject immediately after physical education. Communication for this is achievable with staff meetings which is the method used by the LRPE program at Naperville Central High School, but other schools and districts will not have the same level of comradery among teachers and some will not want to participate in the organization process (Zientarski, 2013). There is also the inescapable reality that there are several barriers to learning that LRPE will not solve.

Learning Readiness Physical Education is not the Solution to all Academic Intervention

There are simply some conditions and disorders that make cardiovascular exercise a non-effective form of intervention. Some students have attention deficit disorders or some other condition that requires medication and prevents them from operating on the same academic level as their peers (Ratey & Hagerman, 2008). Some students will also have firm objections to physical activity completely, and when circumstances like this occur, schools would likely rather pass the student somehow regardless of poor behavior (Prior & Curtner-Smith, 2020). Situations involving disability or refusal to participate can be difficult to consider when thinking about how a program can implement best-practice. It is important to note that this program does not claim to fill the role of an end all solution to educational excellence, but rather a more efficient curriculum design for physical education, that will revitalize the motivation students have for participating on physical activity.

Summary

The research in this chapter consisted of three key components of Learning Readiness Physical Education. The first is the qualities and shortcomings of traditional physical education curriculum design that effect the motivation students feel to participate in physical activity. As stated previously, these classes are not without their benefits as they can sometimes motivate certain students during the activity. The concern raised by the research is simply that LRPE has the capability to achieve many more positive results for students, parents, teachers, and the community at large than traditional physical education does. The second key component the research covers is the important proteins, neurotransmitters, and hormones that are affected by higher intensity cardiovascular exercise (Ratey & Hagerman, 2008). It is important to remember that the parameters of a correctly performed LRPE class is getting the heart rate into a training zone of eighty to ninety percent of the student's maximum heart rate for a minimum of twenty minutes (Zientarski, 2013). If the training threshold is not met, then the students are not successfully meeting the intention of LRPE. The third key component of chapter two is research regarding real world expectations educators can expect when implementing LRPE as well as a case study of the school that developed LRPE. Chapter three contains a summary of the information in the project, the concluding theories the thesis proposes, practice and policy implications of LRPE, directions for future study, and a closing summary describing the orientation of the research.

Chapter 3: Implications

Introduction

The research collected aims to evaluate the efficacy of implementing Learning Readiness Physical Education (LRPE) programs to increase student motivation to participate in lifelong physical activity. The problem with tradition physical education is that they possess inherent flaws when motivating students to be physically active. The purpose of the research is to support the furthering of LRPE as a viable framework for physical education curriculum design. As a measurement of achievement, traditional physical education classes and LRPE are evaluated through a self-determination theory lens which requires the meeting of three categories which include autonomy, competence, and relatedness (Deci & Ryan, 2012). Chapter three will contain a conclusion connecting the research, implications of practicing LRPE, policy implications, and directions of future study regarding LRPE.

Conclusions

There are multiple ways to assess the optimum physical education curriculum design. High intensity cardiovascular exercise performed for twenty minutes can increase cognitive intensity for roughly two hours after the end of the exercise session (Ratey & Hagerman, 2008). The research has encompassed how traditional physical education classes fall short of motivating students to pursue physical activity for a lifetime, how scientific literature supports the claim that LRPE motivates students by providing additional benefits beyond physical activity, and a case study that demonstrates what teachers of LRPE can expect when implementing it at their institutions.

Traditional Physical Education has Gaps That Negatively Affect Student Motivation

In the research, the three different types of traditional physical education classes that are discussed are sport model curriculum design, weight training model curriculum design, and health and wellness model curriculum design. While the traditional classes are able to satisfy certain aspects of autonomy, competence and relatedness, they all have shortcomings that inhibit them from reaching larger proportions of students and motivating them to be physically active for a lifetime (Johnson, 2018). These can include limitations like not allowing enough activities to give the students autonomy, only including activities that students cannot demonstrate mastery in, and not supporting group cohesion.

Science Supports the Claim That Cardiovascular Exercise Increases Cognitive Intensity

Learning Readiness Physical Education would not have the potential behind it without the corroborating literature supporting the claim that LRPE does indeed increase cognitive intensity. LRPE comes with multiple scientifically proven benefits to important cognitive functions such as hormone regulation, neurotransmitter function, and protein health (Ratey & Hagerman, 2008). It is important to note that while lower intensity exercises are sometimes necessary and acceptable, exercise intensity should be high (80%-90% MHR) during most sessions (Shi et al., 2022). Examination of the literature on how exercise improves cognitive function is important, but an equally important component of the research is real world application of LRPE.

How Learning Readiness Physical Education Can Realistically be Implemented

A successful understanding of how LRPE is implemented and maintained is an important part of the literature when ensuring nothing is lost in the application process. To fill this role, the literature includes a case study discussing what methods were used by the creators of LRPE (Ratey & Hagerman, 2008). The research also demonstrates a comparison in student grades between the students at Naperville Central High School (NCHS) who participated in LRPE and the ones that participated in traditional physical education classes. The findings clearly indicated that LRPE had increased benefits on student GPA during the years it was implemented at NCHS (Zientarski, 2013). This case study is important as it is one of the leading examples of the successful implementation of LRPE in a public-school setting.

Practice Implications

There are multiple concerns with putting LRPE into practice on a large scale. One of the most important changes that must happen is that physical educators must receive both the know-how and professional identity of an

LRPE educator in college or university (Prior & Curtner-Smith, 2020). Physical educators are their own best advocates and being able to explain to colleagues and staff about the additional cognitive benefits of LRPE increases the popularity. When physical educators are armed with the knowledge and communication skills to operate a LRPE program, they receive additional benefits and achieve a higher status that traditional physical education is typically not able to achieve.

Learning Readiness Physical Education Improves Colleague Communication

Teacher communication is an important component of a productive school environment. It is crucial to success that LRPE teachers meet with educators from other classes and discuss what type of schedule the students will have based on their performance in previous classes (Ratey & Hagerman, 2008). A positive side effect of this mandatory meeting to establish the optimum student schedule is an increase in teacher communication and interaction which improves the ability of educators to coordinate teaching practices to better help the students. This enhanced communication is a benefit traditional physical education classes lack as they have no intention of acting as a whole of school physical education program in their initial design (Mulhern et al., 2020). LRPE has the increased potential to positively influence the environment of the school by extending beyond just the typical fifty-minute class.

Learning Readiness Physical Education is a Whole of School Program

Another practice implication that is involved in LRPE is that physical education becomes a whole of school class transcending the limitations of traditional physical education. According to the research, the ability for school based physical activity intervention to positively impact self-determination elements is high (Jung et al., 2021). That being the case, it is easy to see the value in programs can extend beyond sport specialization, diet, and weight training. The implications of LRPE also extend to the resources and technology that schools use to educate students.

Technology Becomes More Inclusive in Physical Education

In traditional physical education classes, use of technology fluctuates greatly depending on the activity. In LRPE, technology takes on a mandatory and unique role in the form of heart rate monitors. It is important to note that at Naperville Central High School where LRPE was created, the classes have access to many resources beyond just heart rate monitors such as rock-climbing walls, exercise machines, and fitness tracking software (Ratey & Hagerman, 2008). Despite this, when implementing programs at other institutions, the only devices that are truly necessary are heart rate monitors that the students can use to stay in the designated heart rate training zones. Aside from that, the instructor can play a video that the students can follow along with or even lead them in the daily activity while they maintain their heart rate.

Policy Implications

The implications for policy suggest that future research should focus on advocating for LRPE to policy makers. An important policy that should be enforced is maximizing any opportunities for the students to perform moderate to intense physical activity (Rocliffe et al., 2022). Ensuring that policy makers are monitoring schools to make sure they are using essential physical education policies is important as the research indicates schools rarely enforce these rules themselves (Michael et al., 2019). In order for LRPE to develop as a superior physical education program design, the policies will need to be laid out, simplified and enforced by a legislative body that understands the significance of LRPE.

Actions That Can be Taken When Implementing Learning Readiness Physical Education

To implement LRPE, certain actions can and should be taken into consideration. Two of the most important are allocating funds and opening clear lines of communication that everyone is expected to participate in (Ratey & Hagerman, 2008). For the most part, the only truly mandatory pieces of equipment that is mandatory for LRPE classes are heart rate monitors. While it is important that the students do have the opportunity to experience new and unique activities such as kayaking, rock climbing, and swimming, the only device that is mandatory is the heart rate monitors and a space to perform the daily activities. The second action that can be taken when implementing LRPE is having meetings between teaching staff to aid in student placement (Zientarski, 2013). Regular communication is key to ensure that everyone understands their responsibilities.

Adding Substance to the Existing Knowledge of Exercise's Effect on Cognition

This study adds substance to existing knowledge by combining and surmising conclusions from the existing literature, and comparing it to the original source of LRPE developed at Naperville Central High School (Zientarski, 2013). The original data lacked cross referencing due to the fact that not enough institutions apply LRPE principles to their physical education programs. Separate research discussing components like neurotransmitters, proteins, and hormones demonstrated results synonymous with the findings of NCHS albeit through non-school related laboratory studies with a small number of test subjects or even rats (Ratey & Hagerman, 2008). Although there are some limitations to what research can determine due to the fact that some measurements require dissection, the research provides a connection from which future study can build upon. The most efficient future research will likely revolve around comparing separate institutions implementing LRPE programs, and what effect it has on the academic culture.

Directions for Future Study

Determining what the best course of action is regarding future study is difficult due to the level of cooperation between institutions. Regardless, an examination of how LRPE impacts physical education would best be served by examining the difference when comparing schools. There is a strict limitation with measuring some of the biological components affected in exercise because the process can sometimes involve dissection, which will never be able to be performed on human subjects. Findings schools with similar GPAs and comparing them to their past work as well as each other will help determine the extent that cardiovascular exercise affects cognitive intensity. Schools with similar GPAs can initiate different types of LRPE programs and compare their findings to discover the optimum form LRPE should take.

Examining Different Implementations of Learning Readiness Physical Education Programs

Not all LRPE programs are the same and some may completely miss the mark with regards to the heart rate monitor training parameters. At different institutions, some programs will center around weight training, high intensity interval training, or low intensity interval training. Collecting data from these institutions is imperative in establishing protocols for LRPE that future educators can use to increase their predictive capabilities. Confirming that cardiovascular exercise positively influences cognitive intensity will ensure that students are motivated, that parents care more about their children's participation in physical education, and that teachers have a multi-dimensional and effective program.

Training Future Physical Educators in Learning Readiness Physical Education

One of the most important steps to ensuring that future study of LRPE is conducted is that it is included in the future education process of physical educators. How a teacher teaches is important to their professional identity and for that reason, they must have a comprehensive understanding of LRPE. Colleges and universities are where physical educators develop the strategies and characteristics to teach physical education and motivate students to become lifelong movers. For LRPE to become a truly mainstream physical education curriculum design, the goal of teaching these teachers should be centered around fitness and not sports, weight training or diet.

Summary

The research in this paper encompasses four major parts of LRPE. The first is the qualities and potential shortcomings of traditional physical education, the second is scientific literature supporting the reasoning behind LRPE, the third is a case study of NCHS which implemented LRPE, and the fourth is the expectations when implementing LRPE. These aspects of LRPE are some of the most important when assessing the efficacy of the program.

Qualities and Shortcomings of Traditional Physical Education Curriculum Design

Traditional physical education classes have major shortcomings when motivating students to be physically active. The assessment of those traditional physical education classes was done through a self-determination theory lens which measures motivation by providing autonomy, relatedness, and competence, which are needs that must be met if students are to develop true internal motivation for physical activity (Deci & Ryan, 2012). While there are positive aspects of the sport model, the weight training model, and the health and wellness model classes, there are even greater opportunities for students to find a physical activity they enjoy in LRPE modeled classes. Students can perform their daily activities in the designated heart rate training zone while rock climbing, kayaking, swimming, or other activities (Ratey & Hagerman, 2008). The research also supports the claim that certain types of exercises improve cognitive intensity when performed at certain increments.

Studies Supporting Learning Readiness Physical Education

An important component of this study is alternate research promoting the claims of the creators of LRPE. Although the creators of LRPE collected data regarding the benefits of LRPE, the cross-referencing between their results on neurotransmitter, hormones and proteins being affected by exercise was not mentioned in their work (Ratey & Hagerman, 2008). As a consequence of the low levels of studies examining the physiological impact of the exercise, a major portion of the research examined separate instances of what happened to the physiology of the body post-workout (Gorrell, 2022). Studies such as these enforced the notion that cardiovascular exercise (particularly at high intensity) has an enhancing effect on the mechanisms responsible for cognitive intensity (Ratey & Hagerman, 2008). The benefits are also supported by the case study conducted at Naperville Central High School (NCHS).

The Case Study Supporting the Efficacy of Learning Readiness Physical Education

The case study of NCHS serves as an example of LRPE being implemented on a public high school level. During zero hour physical education, the students participate in a twenty-minute high-intensity workout and then go to reading or math classes in a state of heightened cognitive intensity (Ratey & Hagerman, 2008). The case study confirms that students who participated in the LRPE class had a notable increase in academic performance compared to students who participated in traditional physical education classes (Zientarski, 2013). This case study fills an important role in establishing what physical educators can expect and what the demands are when implementing LRPE programs at their academic institutions.

Expectations When Implementing Learning Readiness Physical Education

Knowing what to expect with regards to academic performance is also an important component of implementing LRPE. There are obstacles that can prevent LRPE from being correctly introduced to an academic institution. There are budgetary constraints to contend with as the amount of equipment is expected to increase and become more specialized to focus on heart rate training zones and diverse activities (Ratey & Hagerman, 2008). There is also the fact that LRPE is so heavily dependent on peer cooperation because the students must attend their most difficult class right after physical education (Zientarski, 2013). Lastly, LRPE should not be expected to solve nearly all needs for intervention as some students will need medication, therapy, as well as extra academic support (Prior & Curtner-Smith, 2020). In spite of concerns such as these, LRPE remains a promising curriculum design model with the potential to reshape how society values physical education.

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Early Career Teacher Retention: An Exploration of the Impact of Support Strategies on Early Career Teacher Self-Efficacy Stephanie May

Abstract

Scholars have continued to discuss the ongoing teacher shortage with a focus on early career teachers, as this demographic of educators leaves the profession at a significantly high rate. However, little research exists on the nature of induction support and its impact on early career teacher retention. This study investigated early career teachers' experiences, self-efficacy, and the impact of induction support on early career teachers' development. A review of the literature revealed that working conditions, leadership, marginalization, and inexperience often have a negative impact on the early career experience. These conditions also play a role in the developing identities and self-efficacy beliefs of teachers, which can impact teachers' career decisions. Though existing literature revealed predominantly lower self-efficacy amongst early career teachers, some studies identified ways in which efficacy can be developed. Existing research highlighted key supports and characteristics of induction that are effective in fostering growth and self-efficacy in early career teachers. Supportive relationships through mentorship and peer collaboration were most impactful, as well as other in-service learning opportunities. Frequent, accessible, and comprehensive support was shown to be integral in onboarding new educators and building confidence. Thus, comprehensive induction support, including quality mentorship, peer collaboration, and positive school climates, may increase early career teacher retention.

Chapter 1: Introduction to the Project

Background

California is experiencing a massive teacher shortage which is due, in part, to high turnover rates among new teachers and a wave of teacher retirements. The California Department of Education (2015) estimated that for the 2016-17 school year there was a hiring need of over 22,000 teachers across the various subjects. Eight years later, that number has grown to approximately 24,794 teachers for the 2023-24 school year (California Department of Education, 2022). It has also been reported that California would need to hire 135,000 teachers just to meet the national pupil-teacher ratio (Darling-Hammond et al., 2016). As of 2018, California still led the nation in largest class size with a 23.3:1 pupil-teacher ratio (U.S. Department of Education, 2018). This staggering number is due in part to the wave of retirements that have occurred 164

over the past few years. The California State Teachers' Retirement System (CalSTRS; 2021c) reported that it processed approximately 11,700 retirements for the 2019-20 fiscal year, which is not far off from the record setting 16,000 retirements during the Great Recession of 2008. Retirements increased by 26% for the second half of 2020, ending the 2020-21 fiscal year with a total of 12,785 retirements (CalSTRS, 2021a; CalSTRS 2021b). In response to this increase, CalSTRS (2021b) collected survey data from 500 retirees which indicated that 62% of those who retired did so earlier than planned, many citing reasons related to teaching during the Coronavirus Disease (COVID-19) Pandemic. When teachers retire, there is a great need for new teachers to fill their positions. This rapid turnover of new teachers costs the nation billions of dollars and costs students a quality education (Darling-Hammond et al., 2016; Haynes et al., 2014; Ronfeldt et al., 2013). As of 2014, it was estimated that teacher turnover costs the U.S. approximately \$2.2 billion annually (Haynes et al., 2014). This money that should be spent on students, is spent on additional training and recruitment programs (Boe et al., 2008; Luther & Richman, 2009).

However, the rate of teaching credentials being issued and enrollment in teacher education programs is not matching the demand that California has for new teachers (Darling-Hammond et al., 2016; Partelow, 2019). Recent analysis of nationwide data indicates that enrollment in or completion of teacher preparation programs (TPPs) has significantly declined (California Commission on Teacher Credentialing, 2015; Darling-Hammond et al., 2016; Partelow, 2019). More specifically, one report suggests that between 2010 and 2018, enrollment in TPPs decreased by more than 30% and the number of students completing TPPs decreased by 28% (Partelow, 2019). For those individuals that do make it through the TPPs, research indicates a further decline in the number of teachers that stay in the profession beyond five years. It is estimated that one in five teachers state they will likely or definitely leave the profession in the next three years and approximately 44% of teachers within their first 5 years of teaching leave the profession altogether (California Teachers Association, 2022; Ingersoll et al., 2018). The statistics are continuously moving in the wrong direction as far as preparing and retaining teachers.

The effect this turnover has on school communities and students, however, is arguably even more costly to the nation. This revolving door of teachers has been shown to greatly disrupt school climate and students' learning and development (Fulton et al., 2005; Keesler et al., 2010; Luther & Richman, 2009; Ronfeldt et al., 2013; Tillery et al., 2013). Students often develop bonds with teachers and may even view them as role models (Fulton et al., 2005; Headden et al., 2014; Tillery et al., 2013). Studies have shown that students' sense of belonging at school and motivation is enhanced by these positive connections with adults at school, namely teachers (Tillery et al., 2013). When teachers leave, these bonds are severed, taking an emotional toll on the students (Fulton et al., 2005; Headden et al., 2014).

Teacher turnover has also been found to have a direct impact on stu-

dent achievement (Keesler et al., 2010; Luther & Richman, 2009; Ronfeldt et al., 2013). When teachers leave, they are often replaced with less experienced or new teachers (Darling-Hammond et al., 2016). New teachers often need more experience in terms of curriculum, instruction, classroom management, and district policies (Darling-Hammond et al., 2016; Luther & Richman, 2009; Wilson et al., 2001). Furthermore, experienced teachers have been shown to have a more significant impact on student learning and achievement than inexperienced teachers (Darling-Hammond et al., 2016; Luther & Richman, 2009; Wilson et al., 2001). More specifically, one study found that teacher turnover negatively impacts achievement in math and English Language Arts (ELA), especially in schools with low-performing students (Ronfeldt et al., 2013). Early career teacher attrition does not allow for growth or development of experienced teachers in the workforce. Thus, retaining these new teachers and developing their experience is crucial to student success (Keilwitz, 2014).

In an ongoing attempt to address early career teacher attrition, many school districts have adopted various induction programs to systematically train teachers and provide support during this pivotal time (LoCasale-Crouch et al., 2012; Smith & Ingersoll, 2004). Some of these programs include mentorships, administrator support, peer collaboration, beginning teacher seminars, external teaching networks, or aides (Fry, 2007; Smith & Ingersoll, 2004). Formal induction programs are also available at state or district levels. Programs such as this were originally intended to help early career teachers handle the realities of teaching, managing students, and acclimating to the school environment (Smith & Ingersoll, 2004). However, studies show that these programs are inadequate in providing their intended support (Fry, 2007; Fry, 2010; Smith & Ingersoll, 2004). In fact, as participation in existing induction programs increases, attrition rates of early career teachers have not decreased (Fry, 2010). In other words, these induction programs lack the support needed to effectively aid in the retention of early career teachers.

Statement of the Problem

The teacher shortage in California is a significant problem that is only exacerbated by the high rate of early career teacher attrition. With the worst pupil-teacher ratio in the nation and continued retirements, California cannot afford to keep losing new teachers (Darling-Hammond et al., 2016). Failing to retain new teachers and losing experienced teachers to retirement and other normal attrition has a significant impact on school climate and student achievement (Darling-Hammond et al., 2016; Fulton et al., 2005; Keesler et al., 2010; Luther & Richman, 2009; Ronfeldt et al., 2013; Tillery et al., 2013; Wilson et al., 2001).

State Boards and school districts have attempted to address this issue by implementing induction programs to aid new teachers in their beginning teaching experience (Carver & Feiman-Nemser, 2009; Fry, 2007; LoCasale-Crouch et al., 2012; Smith & Ingersoll, 2004). However, these programs have yet to produce their intended result of lowering the attrition rate of their target demographic (Fry, 2007; Fry, 2010; Smith & Ingersoll, 2004).

Purpose of the Project

The goal of this study is to gain a better understanding of the impact of working conditions and induction supports on early career teachers' self-perception and career paths. As stated, it is estimated that 44% of early career teachers in California leave the profession within their first five years of teaching (California Teachers Association, 2022; Ingersoll et al., 2018). This is of great concern considering that California is amidst a significant teacher shortage (Darling-Hammond et al., 2016). Though intended to help, the current induction programs are falling short in terms of early career teacher retention (Fry, 2007; Fry, 2010; Smith & Ingersoll, 2004). In order to better support and retain new teachers, induction programs that include quality mentorships and peer collaboration should be implemented in a sustained manner. Ideally, this comprehensive approach will promote early career teacher self-efficacy, which will lead to better retention of teachers, school climate, and student achievement. This project will be guided by the following research questions:

1. What challenges do early career teachers (ECTs) commonly face?

2. What is the relationship between self-efficacy and ECTs' development?3. How do induction supports impact ECTs' development and self-efficacy?

Theoretical Framework of the Project

The idea of comprehensive induction programs involving mentorships and peer collaboration can best be supported by looking at self-efficacy within Bandura's social cognitive theory. The concept of self -efficacy sets out that an individual's belief in their own capabilities to carry out a function influences the way they think, feel, behave, and motivate themselves (Bandura, 1977; Bandura, 1993). In the present study, self-efficacy refers to a teacher's belief in their ability to successfully teach students. Early career teachers not only lack extensive experience, but they often lack confidence in their ability to teach effectively (Fontaine et al., 2012; Putman, 2012). By employing Bandura's (1977) theory of self-efficacy, this lack of confidence has a great impact on early career teachers' behaviors, feelings, and overall motivation. Many studies have confirmed the importance of self-efficacy on early career teachers' success and effectiveness (LoCasale-Crouch et al., 2012; Ross & Bruce, 2007; Saffold, 2005; Ward, 2005). Comprehensive induction programs, including mentorships and peer collaboration, should be used to help support early career teachers and boost their self-efficacy (LoCasale-Crouch et al., 2012).

Bandura (1977) sets out that there are four sources of motivation for self- efficacy: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal. Mentor teachers and peers can play a vital role in these categories of motivation. Performance accomplishments are the most influential sources of efficacy as they are derived from mastery experiences (Bandura, 1977). When a task is performed successfully, the individual feels more efficacious. On the opposing side, failure to perform a task serves to lower self-efficacy. In early career teacher induction programs, mentors typically observe the new teachers and provide feedback regarding their instruction. This feedback can have a direct impact on the teacher's level of efficacy because it speaks to the success or failure of their instruction.

Vicarious experience refers to the observation of others performing certain activities without adverse reactions (Bandura, 1977). These observations yield expectations in the observers that they, too, can perform those activities (Bandura, 1977). In terms of induction programs, these vicarious experiences would take place with a mentor or peer, allowing the early career teacher to believe they can teach successfully. A study of sixth grade mathematics teachers showed that teachers benefited vicariously from the success of their peers in terms of instruction and classroom practice (Ross & Bruce, 2007). In other words, when their peers were having success in their teaching, they felt that they could also be successful. Observing and analyzing instructional practices of other teachers is key to teachers learning and development (Darling-Hammond & Baratz-Snowden, 2007). Thus, mentorships and peer collaboration can enhance early career teachers' self-efficacy through vicarious experience.

Verbal persuasion, otherwise referred to as social persuasion, lends to the idea that human behavior can be led through the mere suggestion that one is capable of success (Bandura, 1977). In other words, a mentor or peer has the power to enhance the self-efficacy of a new teacher by simply suggesting that they can be successful. Mentors have a great power to encourage self-efficacy in new teachers by actively and verbally praising them or giving them feedback. Reciprocal relationships, such as with peers, help new teachers to foster confidence and competence in their work (LeCornu, 2013). Surrounding new teachers with supportive relationships, such as mentors, administrators, or colleagues, helps new teachers to develop a strong sense of self-efficacy and identity within their new environment (Brunetti & Martson, 2018; LeCornu, 2013; LoCasale-Crouch et al., 2012; Sikma, 2019). This strong sense of self-efficacy has been shown to promote the development of effective teaching practices, which plays a significant role in early career teachers' intentions to stay in or leave the profession (Ensign et al., 2020; Fontaine et al., 2012; LoCasale-Crouch et al., 2012). Retaining early career teachers by building up their self-efficacy through sustained mentorship and peer collaboration will ultimately lead to a larger workforce of experienced teachers and higher student achievement (Darling-Hammond et al., 2016; Luther & Richman, 2009; Wilson et al., 2001).

Definition of Key Terms

The following key terms and corresponding definitions will be used for the purpose of this paper.

Early Career Teacher (ECT): teachers that are within their first five years of classroom teaching (Ingersoll et al., 2018).

Induction Programs: programs that are intended to support, mentor, and evaluate teachers during their first few years of teaching and clear their credential through their given state. (California Commission on Teacher Credentialing, 2023; Fry, 2007; LoCasale-Crouch et al., 2012; Smith & Ingersoll, 2004).

School Climate: the school's atmosphere created by a combination of factors such as safety, collaboration, instructional quality, professional development opportunities, and access to resources (McLean et al.; 2017).

Teacher Preparation Program (TPP): a program that is intended to educate and prepare future teachers, which generally cover topics such as pedagogy, subject-specific coursework, and typically include field experience requirements. These programs come in various formats and are offered by different organizations but are most often embedded in post-secondary degree programs at colleges and universities (Mitani et al., 2022).

Summary

California needs more teachers. Specifically, California needs to sustain teachers beyond the early years of their career in order to address the ongoing teacher shortage. This can be accomplished through adequate, sustained, and job-embedded induction supports that encourage early career teacher self-efficacy. Comprehensive induction like this will help to retain and sustain teachers beyond their formative years, which will ultimately aid in reducing the teacher shortage, building strong school climates, and improving academic achievement.

The following sections of this study will explore existing literature on the challenges that early career teachers face, the development of teachers' identity and self-efficacy, and the impact of induction supports and programs on beginning educators. This review of literature will inform the subsequent discussion of implications and policy considerations for state and local education policymakers.

Chapter 2: Review of Related Literature

Introduction

The importance and immediacy of retaining early career teachers in California cannot be overstated, as their staggering rate of attrition severely impacts students, school communities, and society.

In order to address the ongoing teacher shortage and alarming rate of early career teacher attrition, the specific purpose of this study was to examine the impact of working conditions and induction supports on early career teachers' self-efficacy. The following literature review explored existing research on the many challenges faced in the early career context to better understand the experience of new educators. Research on the development of early career teachers' identity and self-efficacy was also reviewed to identify the potential impact of efficacy beliefs on career trajectories. Additionally, literature on induction supports and programs was studied to shed light on the ways in which such supports can develop or constrain early career teachers' self-efficacy and sustainability within the profession.

Early Career Context

Teachers face many challenges in their first few years in the profession, including burnout, classroom discipline issues, unreasonable workloads, and lack of support from administration (Fontaine et al., 2012). As such, early career teachers who do not feel prepared or supported in these areas are more likely to consider leaving the profession (Fontaine et al., 2012; Fry, 2009; Fry, 2010). Much of the existing research points to the contextual factors that impact early career teachers and their experience of being inducted into the profession (Chang et al., 2022; DeMatthews et al., 2022; Garcia et al., 2022; Geiger & Pivovarova, 2018). Often, the nature and quality of these factors can play a significant role in the retention or attrition of these novice teachers (DeMatthews et al., 2022; Garcia et al., 2022; Geiger & Pivovarova, 2018; Howard, 2016; Ingersoll et al., 2018).

Working Conditions

The conditions in which teachers work as they transition into the teaching profession have been extensively examined in past research. Specifically, Geiger and Pivovarova (2018) confirmed that perceived working conditions were a significant factor connected to teacher retention and identified key characteristics of schools in Arizona that had high retention rates. Some of these characteristics included schools with high academic performance, low Native American student enrollment, and high poverty. Geiger and Pivovarova noted that teachers at schools with high performance, lower minority enrollment, and low-income students indicated being more pleased with their working conditions, namely the quality of support and development opportunities. Similarly, Ingersoll et al. (2018) found that first-year teachers cited dissatisfaction with various school and working conditions as their reason for leaving. These working conditions included aspects such as salary, resources, behaviors, development opportunities, and leadership. Both studies indicated that specific working conditions played a role in the retention and attrition of educators.

Existing literature also asserts that working conditions impact early career teachers' emotions and mental health. McLean et al. (2017) sought to track early career teachers' depressive or anxious symptoms through their transition from pre-service to formal teaching with a specific focus on the role of school

climate in relation to these symptoms. For the purpose of this study, school climate included factors such as safety, collaboration, instructional quality, professional development opportunities, and access to resources. The authors confirmed that symptoms of depression and anxiety increased as participants transitioned from their preparation program to actual teaching. Additionally, they found that symptoms increased most when teachers transitioned to low-quality school climates rather than positive school climates.

In a more recent study, Chang et al. (2022) sought to understand how contextual factors impacted teachers' emotions and feelings of burnout, particularly during the COVID-19 pandemic. They found that teachers experienced high levels of negative emotions and burnout as a result of teaching through the pandemic as well as a link between those emotions and the number of COVID-19 cases. Chang et al. (2022) also indicated a connection between a lack of autonomy support and teachers' negative emotions. Though the focus of this study was on the exceptional nature of the conditions exacerbated by a global pandemic, Chang et al.'s (2022) research further contributed to the understanding of the impact of working conditions and levels of support on teachers, specifically on teachers' emotions and feelings of burnout.

In a narrative inquiry, Craig (2014) observed and interviewed one teacher over the course of six years in order to better understand how beginning teachers' experiences impact their career decisions. In this case, positive and constructive relationships helped to develop and sustain the teacher through their first several years of teaching. However, constant turnover of colleagues and administrators, as well as many other factors, led to an unstable and chaotic school environment which challenged the development of the teacher's identity in their job. After six years, the teacher left her position and began teaching in other countries. Though remaining in education, this teacher took their drive and passion for students elsewhere, due in large part to the instability of her job in the United States' public education system. DeMatthews et al. (2022) likewise found that the culture and dynamics of a school, including administrative influence and leadership turnover, played a role in the educators' decisions to leave. Karalis Noel and Finocchio (2022) found that attrition was further influenced by cost of living, insufficient resources, class or caseload, state exams, and ephemeral feelings of resilience, hope, or efficacy.

In order to identify working conditions that contribute to ECTs' stress and potential for attrition, Tompkins (2023) surveyed over 2,000 teachers from across California. Table 1 outlines the percentage of responses to each stress factor. 51.83% of teachers often experienced stress due to time demands and 43.45% due to student behaviors. In line with DeMatthews et al.'s (2022) findings, Tompkins found that school climate had the strongest correlation to teachers considering leaving the profession, with lack of adequate support staff closely behind.

Table 1

Number of Participants and Percentage of Total Responses Per Stress Factor.

Stress Factors	No		R	Rarely		Sometimes		Often	
	n	%	n	%	n	%	n	%	
Policies (including EdCode)	600	28.20	441	20.72	744	34.96	343	16.12	
Pay and/or benefits	561	25.96	366	16.94	604	27.95	630	29.15	
Job instability	684	31.81	380	17.67	555	25.81	531	24.70	
Administrative control/conflict	502	23.15	485	22.37	691	31.87	490	22.6	
School climate/culture	472	21.82	507	23.44	730	33.75	454	20.99	
Disorganization of the district/school site	426	19.71	488	22.58	666	30.82	581	26.89	
Professional development (including induction)	480	22.42	514	24	751	35.07	396	18.49	
Meetings	325	15.07	514	23.84	827	38.36	490	22.72	
Lack of or ineffective support staff	479	22.24	534	24.79	654	30.36	487	22.6	
Extra duties (supervision, events, etc.)	500	23.16	570	26.4	641	29.69	448	20.75	
Parent involvement	509	23.84	715	33.49	647	30.3	264	12.37	
Lack of parent involvement	349	16.18	448	20.78	741	34.39	617	28.63	
Class sizes	364	16.94	340	15.83	675	31.42	769	35.8	
Differentiation demands	302	14.09	390	18.19	736	34.33	716	33.40	
New/changing curriculum	404	18.97	449	21.07	710	33.33	567	26.61	
Testing (standardized state, district, site based, etc.)	346	16.53	396	18.92	664	31.72	687	32.82	
Technology problems	379	17.97	558	26.50	718	34.09	451	21.41	
Insufficient/inappropriate supplies	354	16.38	515	23.84	667	30.87	624	28.88	
Student behaviors	121	5.62	312	14.50	784	36.43	935	43.45	
Student hardships (lives and stories)	202	9.37	434	20.14	829	38.48	689	31.98	
Demands on time	166	7.82	241	11.35	615	28.98	1,100	51.83	

Note. From "Breaking the Cycle of Teacher Attrition: Suggested Policies and Practice for Retention," by A. Tompkins, 2023, *Journal of School Administration Research & Development*, 8(1), p. 29 (https://doi.org/10.32674/jsard.v8i1.3960). Copyright 2023 Journal of School Administration Research and Development.

Administration and Leadership

Recent research also focused on the specific impact of administration and leadership on early career teachers. Like Craig (2014), DeMatthews et al. (2022) found that leadership turnover had a negative impact on teacher turnover, specifically in the year a principal left and the few years that followed. Teacher turnover increased by 11% the year of the administrators' exit and 10% the subsequent year. The authors also found that the impact was greater in schools with higher poverty rates or a higher number of new teachers. This article outlines the impact of administrative leadership on teachers' career intentions and indicates that inconsistent leadership negatively impacts teacher retention.

Though Carver-Thomas and Darling-Hammond (2019) did not find working conditions such as student behavior, resources, or faculty duties to have a significant effect on teacher turnover, they did point to the impact of administrative support and compensation as significantly predictive. Specifically, when teachers reported strongly disagreeing that their administration was supportive, there was a 23.5% predicted turnover rate and when the maximum salary available in a district was less than \$60,000, there was a 31% predicted turnover rate.

Likewise, Nguyen et al. (2020) confirmed through meta-analysis of existing literature that teachers were less likely to leave when they feel supported by administrative leadership and adequately compensated. Thus, lack of support from administration and financial compensation proves to be a significant barrier to teacher retention. Conversely, Burkhauser (2017) found that there was a high correlation between estimated principal effects and positive perceptions of working conditions such as teacher time use, physical environment, teacher empowerment, school leadership, and professional development. The authors further indicated that principals play a significant role in teachers' perceived working conditions and subsequent teacher retention.

Furthermore, administrators are often responsible for observing and evaluating new teachers, which can impact early career educators' development. Kraft & Gilmour (2016) studied principals' perspectives on their ability to promote teacher development through the observation and evaluation process. Though principals noted some positive improvements in the evaluation system in the U.S. school district studied, many challenges and consequences emerged in this attempt at improved evaluation and teacher growth. Because each principal had unique experiences and areas of expertise, there was a discrepancy in how the evaluation process was used or implemented. The authors noted that principals at the secondary level could often only speak to pedagogy rather than content specific feedback. Furthermore, some principals had limited training or experience in evaluating teachers, which affected both the type of feedback and nature of those conversations. Ultimately, Kraft and Gilmour (2016) highlighted the potential for teacher evaluation systems to encourage teacher growth, but emphasized the role of the principal in the effectiveness of these systems.

Agency, Autonomy, and Voice

In order to identify major factors that influence teacher attrition, Garcia et al. (2022) examined the Schools and Staffing Survey (SASS) for 2011-2012, the Teacher Follow-up Survey (TFS) for 2012-2013, and the School Districts Finance Survey (SDFS). They found that teacher voice, school support, school problems, and teacher morale were the key factors that influenced teachers' decisions to leave or stay. Specifically, attrition decreased when teachers felt they had more of a voice or influence at their schools and in their classrooms. They also found that these factors had a larger impact on early career teachers, suggesting that these factors need to be addressed in order to retain newer teachers. Furthermore, Garcia et al. (2022) reported that a supportive workplace and administration had a significant impact on teachers' decision to stay in the profession, which lines up with existing literature on teacher attrition (DeMatthews et al., 2022).

On the other hand, Cardon et al. (2023) found that early career professionals across a variety of occupations experienced higher rates of anxiety and fear in situations that require oral communication such as meetings, groups and interpersonal interactions. More specifically, 55% of the early-career professionals surveyed in this study reported high apprehension in interpersonal communication. The authors suggested that this communication apprehension can pose significant challenges to each level of an organization, including the individuals and teams within it.

Ensign et al. (2020) conveyed that new teachers reported negative outcomes when taking the chance to speak up or advocate for themselves. The authors also reported cases where new teachers felt marginalized within their staff, which led to weakened feelings of efficacy. Though the authors noted that these negative experiences were the exception rather than the status quo amongst the participants, they still identified a thread of diminished efficacy when inductees encountered a lack of agency, voice, or support.

Preparation and Experience

Another aspect of the early career context for teachers is the level or quality of a practitioner's preparation for and experience in the profession. Existing literature reveals that teachers' pre-service preparation type is a predicting factor in teacher turnover (Carver-Thomas & Darling-Hammond, 2019; Mitani et al., 2022). In their study, Carver-Thomas and Darling-Hammond (2019) found that teachers were 25% more likely to leave their jobs when they were trained in an alternative certification program rather than a regular certification program. Similarly, Mitani et al. (2022) found that all teachers from non-traditional certification programs were more likely to leave teaching after their first year than those from traditional programs. However, Mitani et al. In one study, Mee and Haverback (2014) considered the influence of first year middle grade teachers' perceptions of their commitment to teaching middle school and their teacher preparation program on their decision to stay in the profession. Because of the coursework focused toward the middle grade context and their continued practice throughout their preparation program, teachers felt they were adequately prepared for their positions. Though expressing feelings of being prepared, the authors indicated that 100% of the teachers interviewed experienced frustrations in the areas of classroom management, implementation of curriculum, and the organizational demands of the job. This article is significant in understanding the experiences of early career teachers, as even when these teachers felt prepared, they experienced frustration and challenges in their new job demands.

Research also highlights the relationship between preservice preparation and teacher trajectories. DeAngelis et al. (2013) analyzed survey data and employment records to understand the effect of preservice preparation and early career supports on novice teachers' career intentions and decisions. They found that teachers within their first two years of their careers and with low satisfaction in the quality of their preservice preparation program were more likely to change school sites or leave the profession altogether. Fitchett et al. (2018) also found that first-year teachers that are more at risk for stress are characterized by a lack of adequate preparation. Specifically, the authors found that 23.8 % of the teachers at-risk for stress reported no teaching experience prior to the start of their employment. In contrast, 67.6% of the teachers classified as being the least at risk for occupational stress reported twelve weeks or more of teaching practice before employment.

To further explain the relationship between professional preparation and teacher attrition, Karalis Noel and Finocchio (2022) interviewed five former educators who worked in U.S. public schools for five years or less, with a spotlight on human, social, structural and psychological capital. Their findings echo previous literature that identified lack of adequate preparation and support as major deciding factors in teacher attrition. (DeAngelis, 2013; Howard, 2016; Newberry & Allsop, 2017). Participants reported inadequate preparation in classroom management and the discrepancy between the theories or expectations of teaching and the realities of the classroom as impacting their decisions to leave (Karalis Noel & Finocchio, 2022). This study further confirms the relationship established between Bandura's theory of self-efficacy and the early career teacher's experience, as Karalis Noel and Finocchio (2022) highlighted that teacher efficacy dropped off quickly within the first few years in the profession.

Teacher Development and Self-Efficacy

While navigating the challenges posed by the early career context, new teachers are also working to establish their identities as educators and cultivate confidence in their teaching aptitudes. Existing literature points to the complexity of each individual teacher's experience and asserts that career paths cannot be simplified to singular factors or aspects of teaching; rather it is the amalgamation of many aspects (Barnatt et al., 2017).

Teacher Identity

As teachers transition into their new roles and context, they are simultaneously working to develop their identities within the classroom. A longitudinal cross-case analysis conducted by Barnatt et al. (2017) suggested that teacher's career intentions are dictated by the composite interactions between a teacher and their figured worlds. The authors outlined that the way in which teachers construct and reconstruct their identities in the dynamic teaching context and the interactions and responses of their figured worlds ultimately impact their career path. Furthermore, they proposed that effective teaching is characterized by an individual's ability to simultaneously acknowledge and adjust to their given teaching context while addressing the principles and expectations of teaching.

Similarly, Brunetti and Martson (2018) sought to understand the nature of teacher development throughout the various stages of a teacher's career, with a specific focus on early and middle-career practitioners. While conducting qualitative interviews with teachers across the United States, they found common themes that represented teachers' areas of growth through professional development. These themes included balance, collaboration, leadership, relationship with students, and validation. The author's findings indicated that individuals within their first three years of the profession were in search of their identity as teachers through these areas of development, while those with more classroom experience and an established identity were working more toward refinement in these areas. For example, Brunetti and Martson (2018) identified that early career teachers needed more validation and support from their administrators, colleagues, and others in order to affirm their classroom competency. However, once teachers had a more established sense of their teacher selves, they seemed to require less external validation or acknowledgment from their coworkers. As shown in Figure 1, Brunetti and Martson highlighted the connection between areas of professional growth and teacher identity. Like previous literature, the authors also acknowledged the influence of contextual factors on a teacher's growing identity.

Figure 1

Themes and trajectories of teacher development.



The six themes (branches) depicted above identify areas of professional development in which teachers showed growth (defined as increased knowledge and skills, and movement towards greater professional self-understanding and autonomy) as they gained classroom experience. Each theme is characteristically present in each phase, though manifested differently therein, and is related to the broader themes of teacher identity and agency. The pattern suggests a trajectory of continuing teacher development.

Note. This figure depicts the six areas of professional growth, which are shown as branches, that teachers developed in as they extended their experience in the classroom. As teachers gained experience, their manifestation of each area differed, thus contributing to their growing teacher identity and agency, shown as the tree trunk. From "A trajectory of teacher development in early and mid-career," by G.J. Brunetti and S.H. Marston, 2018, Teachers & Teaching, 24(8), 874–892. (https://doi.org/10.1080/13540602.2018.149 0260). Copyright 2018 by Informa UK Limited, trading as Taylor & Francis Group.

Early Career Self-Efficacy

As new educators transition from pre-service preparation to teaching, they continue to develop their identities as teachers and build on their beliefs in their ability to carry out their new responsibilities successfully. Existing research indicates that many beginning teachers experience lower levels of self-efficacy or confidence in their teaching (Gamborg et al., 2018; Karalis Noel & Finocchio, 2022; Olson et al., 2021; Putman, 2012). Gamborg et al. (2018) studied first-year teachers' self-efficacy beliefs in their transition between the preparation and induction phases of their careers. Survey results showed that during their first three months of teaching, participants held high beliefs in their ability to do their job, but lower outcome expectancy. In other words, the early career teachers were not as confident that their teaching would impact student achievement. Additionally, Hoy and Spero (2005) discovered that efficacy mostly rose during participants' preparation program and student teaching, but fell in the first year of actual teaching. In two measures of their study, the authors found a correlation between efficacy and level of support. In other words, as supports were removed, efficacy lessened. Gamborg et al. (2018) suggested that this may cause teachers to overwork in order to make up for that lower outcome expectancy, which puts them at higher risk for burnout or attrition. Olson et al. (2021) also found that teachers in their first semester of teaching felt overwhelmed, stressed, incompetent, insecure, and isolated.

In a seminal study, Putman (2012) considered the efficacy belief differences between teachers with varying levels of experience. Using the Teachers' Sense of Efficacy Scale, they found that teachers with less experience had less teaching efficacy than experienced teachers, which resonates with other recent findings (Gamborg et al., 2018; Olson et al., 2021). Putman (2012) noted that pre-service teachers and novice teachers scored similarly in efficacy beliefs. In the areas of instructional strategies, student engagement, and classroom management, experienced teachers held a significantly higher sense of efficacy than pre-service or novice teachers. The author concluded that this finding supports the notion that teachers who stay in the profession have a greater possibility of exhibiting positive efficacy.

In order to investigate the relationship between teacher efficacy and emotional states, DeMauro and Jennings (2016) surveyed over 297 pre-service teachers enrolled in a teacher preparation program. The authors found that pre-service teachers that reported more depressive symptoms also reported lower levels of efficacy in their teaching. DeMauro and Jennings (2016) also found that anxiety and stress were not significant predictors of negative efficacy. Rather, stress had a somewhat significant positive prediction of efficacy, which the authors attributed to the motivation pre-service teachers may experience through the stress of impending challenges. This aligns with Bandura's (1997) assertion that individuals with higher self-efficacy beliefs "approach difficult tasks as challenges to be mastered rather than as threats to be avoided" (p. 39). Bandura argued that this posture toward difficulties fosters heightened commitment, reduced stress, and lowered risk of depression.

Efficacy Development

While research indicates that early career teachers experienced insecurities, the literature also conveys that some teachers developed feelings of pride and resilience when reflecting on their perseverance through difficult professional and personal challenges. More specifically, Olson et al. (2021) reported that 67% of the teachers indicated increased feelings of resilience and 83% indicated an increased ability to overcome obstacles after engaging in the Creating Authentic Resilient Educators (C.A.R.E.) program, intended to provide support for new teachers from out-of-state. As a result, 83% of the participants remained teaching in the same district. This further supports existing literature that points to the positive relationship between stress and self-efficacy (Bandura, 1997; DeMauro & Jennings, 2016).

Research has also shown that self-efficacy can develop as teachers gain experience in the classroom (Ensign et al. 2020; Putman, 2012). Ensign et al. (2020) investigated the factors that influence the development of efficacy, specifically in the induction period for physical educators, over the course of three years. Throughout the study, the authors found that classroom management was a consistent challenge, whereas perception of teaching skill and differentiating instruction improved. A common theme revealed through the participants of this study was the importance of support by way of colleagues and administrators. Most participants cited positive interactions with staff members, which influenced their perceptions of efficacy to make an impact on their students. Overall, Ensign et al. (2020) concluded that perceived efficacy increased over the course of three years, as the educators gained more knowledge and experiences.

McLean et al. (2023) looked to both internal and external characteristics of first year teachers and their relationship to self-efficacy. Specifically, they focused on how individual adaptability and school climate contributed to the new teachers' sense of self, classroom relationships, and career hopes. The authors found that teachers who went into their careers with higher reports of adaptability had higher self-efficacy for teaching and more positive perceptions of classroom relationships. Similarly, teachers with a more positive perception of their school climate felt more confident in their pedagogy as well as their careers. McLean et al.'s (2023) findings suggest that adaptability works in relationship with contextual factors to influence early career teachers' experience and self-efficacy.

Ensign et al. (2020) found that competing demands also played a role in perceived efficacy for new teachers. As teachers took on further duties such as coaching or supervising other activities, they felt stretched between the demands of teaching and their other responsibilities. These competing demands ultimately affected their perceived efficacy. Like McLean et al. (2023), Ensign et al. (2020) also identified organizational factors that influenced the development of efficacy such as the expectations of stakeholders and actual tasks involved in teaching.

Efficacy and Career Intentions

As reported by Bandura (1997), past research has identified teaching efficacy as a strong predicting factor in practitioners' commitment to or exit from the profession. (Coladarci, 1992; Glickman et al., 1982). Glickman et al. (1982) found that first and fifth year teachers had a significantly higher sense of efficacy than those that had exited the profession. Coladarci (1992) confirmed existing data which suggested that aspects of the school environment such as class size and administrative leadership influence teachers' commitment to teaching. In contrast to other research, the authors reported that collegiality, level of teaching experience, and salary were unrelated to teachers' commitment to the profession.

More recently, Carver (2021) used data from the Measuring Quality in Initial Teacher Education Project (MQuITE) in order to identify risk factors for attrition by focusing on teachers' career intentions. Like Coladarci (1992), they found that one of the biggest risk factors for attrition included teacher self-efficacy, specifically in the area of managing student behavior. However, this study also presented an idea that attrition may happen for positive reasons such as "vocational maturity" or new career opportunities. They highlighted that teachers who leave the profession are deemed "wasted," but that the term or perspective is severely biased to disregard those that leave for positive reasons. While acknowledging the impact of self-efficacy on teachers' career decisions, Carver (2021) offered an alternative view of attrition and suggested that care should be taken to question the terminology used or assumptions made about teachers who leave.

Induction Programs and Supports

Considering the many challenges faced in the first years of teaching, California and several other states have implemented induction programs meant to onboard educators from pre-service preparation to classroom teaching. Existing research has highlighted the importance of these efforts. Using the 2011-2012 SASS and 2012-2013 TFS data, the Learning Policy Institute (LPI) found that teachers are more likely to remain in their job when they are adequately prepared, supported, and compensated (Carver-Thomas & Darling-Hammond, 2019). Ronfeldt and McQueen (2017) found that induction supports were a negative predictor for leaving teaching. Furthermore, the authors found a relationship between the total number of combined induction supports and the likelihood of attrition. From their study, Ronfeldt and McQueen (2017) estimated that each additional type of support reduced the likelihood of attrition by 18%-22%. Much of the existing literature on teacher induction focuses on specific supports such as mentorships, peer collaboration, and other professional development opportunities (Burke et al., 2015; Carver & Feiman-Nemser, 2009; DeAngelis et al., 2013; Fox et al., 2015; Smith & Ingersoll, 2004).

Supportive Relationships

Supportive relationships are crucial to early career teachers' success (Algozzine et al., 2007; Johnson et al., 2014; LeCornu, 2013; Newberry & Allsop, 2017). Studies have shown that novice teachers need to be involved in supportive relationships in order to feel confident and competent in their new job (Brunetti & Marston, 2018; LeCornu, 2013; Sikma, 2019). Tompkins (2023) conveyed that teachers in their study frequently reported relationships as an important aspect of their induction experience. Through an analysis of pre-existing data, Ingersoll (2012) found that having a mentor and peer collaboration

time had the strongest effect on reducing turnover among beginning teachers.

Mentorships

Many teacher induction programs are created to include a mentorship between an experienced teacher and the teacher being inducted into a school site (Smith & Ingersoll, 2004). However, the frequency and quality of those mentorships varies across school sites and districts (Fischer et al., 2022; Spooner-Lane, 2017). In a cross-national review of existing literature, Spooner-Lane (2017) highlighted the inconsistencies across the studies regarding the role of mentors and the support provided. The definitions, purposes, and functions of mentors varied greatly from study to study. Spooner-Lane (2017) did not find one set model for mentoring in the existing literature, but concluded that the frequency and accessibility of mentor interactions seemed to be an integral consideration in effective programs. The author indicated that a common finding across the literature was novice teachers' preference toward readily available on-site mentors that could provide frequent support.

Furthermore, the mentorship programs that do exist are often insufficient in supporting and fostering professional learning (Carver & Feiman-Nemser, 2009; Gardiner, 2012; Kane & Francis, 2013). Examining qualities of effective mentorship and collaboration is crucial in promoting resilience among early career teachers (Carver & Feiman-Nemser, 2009). In a study of varied mentorships, early career teachers that were mentored on a full-time basis reported more effective instructional practice than those being mentored on a part-time basis (LoCasale-Crouch et al., 2012). The authors concluded, like Spooner-Lane (2017), that frequency of mentorship does play a crucial role in the development and retention of early career teachers (LoCasale-Crouch et al., 2012). Frequent meetings with a mentor gave early career teachers consistent and structured time to reflect on and analyze their teaching practices (Gardiner, 2012).

Along with frequency and accessibility, studies have also pointed to the quality of mentorships. Achinstein and Davis (2014) highlighted the importance of mentors' complex knowledge and practice base in order to aid in the development of early career teachers' content teaching, specifically in the areas of assessment and fostering students' disciplinary reasoning. The authors found that 88% of the mentors reported pedagogical content knowledge (PCK) aimed toward students as the most important in supporting early career teachers' content teaching, with knowledge and experience with assessments as the second most important. Though research indicates the importance of mentor knowledge, experience, and training (Achinstein & Davis, 2014; Carver & Feiman-Nemser, 2009; Spooner-Lane, 2017), California has the following requirements of induction mentors:

(1) Holds a valid California teacher credential. (2) Has achieved permanent status or, in a district with an average daily attendance of fewer than 250 pupils, has been employed by the district as a credentialed classroom teacher for at least three consecutive school years prior to the school year for which nominations are to be made. (3) Has substantial recent classroom teaching instructional experience. (Application of Individual Teachers for Mentor Teacher Designation)

DeAngelis et al. (2013) indicated that mentor and induction quality not only had a significant impact on teachers' career intentions and decisions, but also had the potential to moderate the negative impact of low-quality preparation programs on those career intentions. Another data point revealed in DeAngelis et al.'s (2013) study was that 70% of participants that indicated receiving helpful mentoring also engaged in other induction activities which were perceived to be helpful. This study indicated the positive impact of comprehensive induction programs rather than mentorship alone.

Furthermore, Squires (2019) reviewed existing literature with a focus on the role of mentorships in supporting new teachers. Several best practices were highlighted such as adequate matching of mentors and mentees, a holistic approach that includes supports at multiple levels, and a focus on overall well-being rather than just pedagogy or classroom management. This literature review supported the existing discussion on the importance of quality mentorships and comprehensive induction programs.

In contrast, Reeves and Hamilton (2022) found that teachers who were assigned a mentor reported lower self-efficacy while teachers in the mentor role reported higher self-efficacy. The authors noted that these associations may not be caused by the mentorship in and of itself, but rather other mitigating factors such as the level of self-efficacy an individual possesses prior to the mentorship. Though somewhat small, Reeves and Hamilton also identified a positive relationship between collegial cooperation and teacher self-efficacy.

Moreover, Surrette (2020) studied the impact of interactions with professional communities and mentors on the teaching practices of early career teachers. The study identified that ECTs more frequently sought out informal mentorships at their school sites for support and advice on teaching practices rather than from their formally assigned school-based mentors. Only two of the eight participants in the study reported that their assigned school site mentors supported their professional development and progress, whereas a significant number of the participants identified informal mentors and professional communities as influential in their teaching practices and growth. In a similar manner, many participants in Tompkins' (2023) study reported that their mentorships and induction programs were unhelpful and served as an added burden during an already challenging time. Conversely, when induction programs and mentorships were deemed useful teachers experienced less stress and were less likely to consider egress.

Peer Collaboration and Collegiality

Like Reeves and Hamilton (2022), much of the existing literature points to peer collaboration as another area that is crucial to the induction process. According to LeCornu (2013), peer support is "central to the development of early career teachers' resilience" (p. 12). The empowerment and encouragement that is fostered in peer relationships ultimately enhances the chance of retaining those teachers (LeCornu, 2013). Research has indicated that early career teachers need continuous opportunities to collaborate with their peers in order to acclimate to the school community and remove any feelings of isolation they might have (Algozzine et al., 2007; Burke et al., 2015).

Along with mentorships, common planning time and collaboration with other teachers have been shown to be one of the more effective induction activities in reducing attrition (Galosy & Gillespie, 2013; Smith & Ingersoll, 2004). More specifically, Brunetti and Marston (2018) indicated that teachers in their first three years of the profession were often dependent on their colleagues for advice and support when it came to carrying out their new responsibilities in the classroom. Sikma (2019) reported that novice teachers prioritized informal support such as co-planning and collaboration over formal support such as mentorship and induction programs. Furthermore, participants valued interactions with other new teachers. Speaking to other novice teachers allowed the participants to hear from individuals experiencing similar challenges and affirm their abilities.

Similarly, Galosy and Gillespie (2013) found that pre-service and beginning teachers that engaged in professional communities, collective inquiries into practice, and leadership opportunities had the most growth and sustainability. Of those opportunities, participants reported that professional communities were the most impactful on their teaching, confidence, and persistence in the profession. The study also revealed that teachers valued the collective work of evaluating and improving instructional practices in their professional communities. Galosy and Gillespie (2013) indicated a connection between the practice of collective inquiry and teacher sustainability.

Moreover, Newberry and Allsop (2017) found that teachers' career decisions were based on the varied combination or intensity of six factors which included "workload, stress, beliefs, professionalism, emotions and relationships" (p. 870). However, of all the issues mentioned by participants in this study, relationships with colleagues seemed to be the most influential in their decisions to leave. To illustrate, the authors described the struggle that teachers faced when they didn't have the time or environment to connect with their colleagues. Newberry and Allsop (2017) argued that a lack of support or collegiality fostered an environment of isolation, which made it easier for teachers to leave. In their study, Burke et al. (2015) found that teachers who planned on leaving the profession were more likely to report limited opportunities to work with experienced peers, supervisors, or mentors. For example, teachers with intentions to leave reported a lack of sharing resources between colleagues at a higher rate than those with intentions to stay.

Another avenue of support for early career teachers and veteran teachers alike are in-service learning and development opportunities. Studies have explicitly identified the importance of professional development that is individualized to fit teachers' specific contexts and foster growth (Anderson & Olsen, 2006; Fox et al., 2015). Fox et al. (2015) sought to examine the nature and power of professional development on early career and experienced teachers. Through reflective data and interviews, the authors found that early career teachers worked to build on pedagogical knowledge and confidence, while experienced teachers profited from more directed professional development. Similarly, Anderson and Olsen (2006) found that teachers had developmental differences in professional learning needs based on their personal and professional experiences. For example, early career teacher participants reported a greater need for guidance on balancing work demands while the more experienced teachers expressed interest in developing leadership skills.

Fox et al. (2015) also pointed to the importance of reflection as a crucial aspect of professional development for all teachers. To illustrate, the authors indicated that the participants expressed a continued trend toward higher efficacy and empowerment for early career and experienced teachers alike. Reeves and Hamilton (2022) also identified a positive relationship between self-efficacy and specific in-service development opportunities such as online courses, conferences, observations, and coaching. In this study, peer and/or self-observation and coaching were also connected to enhanced teaching practices. The authors indicated that professional development opportunities most associated with teacher self-efficacy often required more active involvement.

Summary

In sum, teachers face numerous challenges in the early context of their careers, which can serve as obstacles to establishing confidence in their practice and their sustainability in the profession. Working conditions, inadequate leadership, lack of agency, and minimal experience have been shown to hinder teachers' development and success (DeMatthews et al., 2022; Garcia et al., 2022; Geiger & Pivovarova, 2018; Tompkins, 2023). While self-efficacy has been shown to play a role in the growth and retention of teachers, it can be impacted by several factors including the challenges outlined in this literature review (Ensign et al., 2020; Putman, 2012). Though induction programs and supports are often implemented to onboard new teachers, specific features have been revealed as influential in retaining and sustaining teachers, including supportive relationships and other professional development opportunities (Brunetti & Marston, 2018; LeCornu, 2013; Newberry & Allsop, 2017; Tompkins, 2023). The following chapter will discuss key conclusions drawn from the literature, implications for practice and policy, and directions for future study.

Chapter 3: Implications

Introduction

The present study sought to identify key challenges that impact early career teachers as well as understand the nature of early career teachers' identity and self-efficacy development. The impact of induction support strategies on early career teachers' experience was also explored to highlight ways in which the persistent attrition of novice teachers may be mitigated. Considering the ongoing teacher shortage and significant attrition rate of early career teachers, it is imperative that the identified challenges new teachers encounter and their self-assessed competence are specifically addressed through induction supports. Retaining new teachers can lead to a more experienced workforce, a better school culture, and higher academic achievement. This chapter will address insights revealed through the existing literature, implications for policy and practice, and directions for future research.

Conclusions

Early Career Challenges

The early career context poses many challenges to novice teachers which can often lead to negative consequences such as burnout or even attrition. While it would be impossible to articulate all the challenges felt by beginning teachers, existing literature has revealed common struggles faced across the early educator workforce. These include such factors as poor working conditions, inadequate administrative support, marginalization, and lack of experience (DeMatthews et al., 2022; Garcia et al., 2022; Geiger & Pivovarova, 2018; Tompkins, 2023). Though this list of barriers to early career teachers' success is not exhaustive, it does highlight common issues to consider when planning onboarding and induction support.

Even though much of the research points to external factors, some studies also discussed internal characteristics that may play a role in the career trajectory of new teachers. Some of these traits included adaptability, resilience, depression, anxiety, and stress (Carver & Feiman-Nemser, 2009; Mc-Lean et al., 2017; McLean et al., 2023; Olson et al., 2021). Qualities such as depression, anxiety, and stress served as obstacles to early career teachers (Mc-Lean et l., 2017; Olson et al., 2021), whereas adaptability and resilience helped teachers persevere through their challenging circumstances (Karalis Noel & Finocchio, 2022; McLean et al., 2023). This dichotomy of external and internal features existent in the early career context demands that induction policies and practices address the whole teacher, rather than neglect the particular nuances of their experience. From the literature reviewed, it is clear that early career teachers require support that goes beyond instructional practices and classroom management strategies.

Teacher Development and Self-Efficacy

Early career teachers' experiences also have a significant impact on their developing teacher identities and self-efficacy, which often influences their career decisions. The research suggests a positive relationship between self-efficacy and teaching experience (Ensign et al., 2020; McLean et al., 2023; Putman, 2012). Thus, as teachers gain more experience in the profession, they also gain more self-efficacy.

While it is consistently portrayed that new teachers are less confident in their teaching abilities, the literature also revealed that this efficacy can be built over time (Ensign et al., 2020; Olson et al., 2021; Putman, 2012). A review of the literature suggests that working conditions can encourage or constrain this perception of efficacy (Ensign et al., 2020; McLean et al., 2023). This further demonstrates the importance of addressing the multifaceted nature of the early career experience in order to support and sustain teachers.

Induction Supports and Programs

In a like manner, the sheer existence of induction programs and supports, in and of themselves, is not likely to improve teacher self-efficacy or increase teacher retention. Rather, it is the quality, frequency, and comprehensive nature of these supports that have the potential to make a difference (DeAngelis et al., 2013; Ronfeldt & McQueen, 2017; Spooner-Lane, 2017). Overwhelmingly, the literature points to the importance of supportive relationships across the context of teaching (Brunetti & Marston, 2018; LeCornu, 2013; Newberry & Allsop, 2017; Tompkins, 2023). These relationships include, but are not limited to, peers, mentors, and administrators. Beginning teachers need to be surrounded by a community of experienced and trustworthy supporters in order to continue learning and growing in the profession. Creating and maintaining a workforce that feels confident and supported will not only help to reduce the teacher shortage, it will also serve to improve school environments and promote student achievement.

Practice Implications

Though induction programs are a vital part of the transition from pre-service preparation to in-service teaching, it is imperative to confront the other factors that work in tandem with those supports in order to develop and sustain new teachers. Maintaining quality leadership and reducing administrator turnover is one way schools may limit the negative impact of teacher turnover (DeMatthews, 2022). Studies have highlighted the impact of school leaders and administrators on creating a supportive, constructive, and positive school environment (Burkhauser, 2017; Carver-Thomas & Darling-Hammond, 2019; DeMathews, 2022; Nguyen et al., 2020). This productive environment can reduce feelings of isolation, anxiety, or insecurity that new teachers may be prone to (McLean et al., 2017; McLean et al., 2023).

Furthermore, induction support strategies should be combined to

create a comprehensive program for beginning teachers. As indicated by the literature, each additional type of support can reduce the likelihood of attrition (Ronfeldt and McQueen, 2017). Therefore, schools should work to create induction experiences that offer a variety of activities. These should include opportunities such as onsite mentorships, peer collaboration, subject-specific conferences, and other professional development opportunities.

Support should also focus on the disequilibrium teachers will likely face when their figured self conflicts with their figured worlds (Barnatt et al., 2017). Mentors should be trained to provide feedback and strategies to help ECTs not only cope with the demands of the job, but also reflect on their developing teaching identity in relation to their experiences. This is especially important when the realities of teaching are contrary to the expectations or beliefs of ECTs. Alternatively, schools could provide access to counselors or wellness centers for teachers to discuss their experiences and develop strategies for adapting to their new reality.

Policy Implications

In order to promote a supportive and constructive early career environment, school districts should work to adequately train administrators in the onboarding and evaluation of new teachers. Since administrators are often in the role of observing and providing feedback to new teachers, they have the power to encourage growth and development alongside induction programs (Kraft & Gilmour, 2016). In order to build and maintain quality induction programs that sustain new teachers, the development and competency of school leaders must be addressed.

New teachers need quality mentorships where they are paired with qualified and experienced mentors (Achinstein & Davis, 2014; DeAngelis, 2013). Therefore, statewide mentor eligibility requirements should be amended to reflect at least five years of consecutive classroom teaching experience. Beginning teachers are often defined as having five years or less of experience (Ingersoll et al., 2018). Thus, to be considered an experienced teacher worthy of mentoring an inexperienced teacher, it would follow that those individuals have at least five years of experience.

In a like manner, induction program requirements should be extended beyond two years. Research shows that about 23% of new teachers with less than two years of experience leave the profession while about 44% of new teachers with less than five years of experience leave the profession (Ingersoll et al., 2018). This indicates that a significant number of teachers leave the classroom even after the two-year induction period. Hence, the induction period must be extended to at least three years to sustain and retain teachers. A flexible time frame of three to five years may also be considered to address the individual needs of each teacher. Since research suggests that self-efficacy lowers as inductions supports are removed (Gamborg et al., 2018), a longer induction period may allow teachers to build confidence over time before losing complete support.

Teachers have varied preparation and experience when entering the profession, therefore their induction needs will likely vary. When creating policies for statewide induction programs, policymakers must consider the flexibility of those programs. As previously mentioned, a flexible time frame for induction would help to account for the varied experiences that ECTs bring to the classroom.

School districts and sites should also integrate induction programs, so they exist within teachers' specific context. Onsite mentors and induction activities would allow for the frequency and accessibility that new teachers' desire. This integrated approach would also foster a culture of inclusion rather than isolation for new teachers. Making induction visible to other staff on campus will further foster a sense of community. Onsite mentorship would allow the coaches to better support new teachers within their given context as they would be more aware of the realities of that specific school site and how they impact the teachers' development.

Integration of induction programs should also include reduced workloads or release time for induction activities that take place outside of the classroom. Many induction programs require meetings and other activities that demand additional time and attention beyond that of the responsibilities of a full-time teacher. Creating space for induction within the given work hours would serve to reduce the pressure to balance the demands of their job that often lead to stress or burnout.

Directions for Future Study

While the present study maintained a comprehensive focus on the experiences of new educators and induction supports, further research is needed on current induction programs in California. Though California transitioned to a new induction model in 2016 (Sacramento County Office of Education, n.d.), minimal research exists on teachers' perceptions or the effectiveness of the current program. Specifically, longitudinal data spanning pre-service preparation through five years of teaching is required to measure the impact of California's current induction model on early career teacher self-efficacy. Statewide data should be collected to account for local sponsorship variations between counties and school districts. From this data, a comparison of induction characteristics and attrition rates across counties could be made to identify methodologies and practices that are the most effective in retaining teachers.

Though some literature points to the impact of internal and external factors on early career teachers, a gap in research exists on the specific impact of school culture and environment on early career teacher well-being and subsequent success (Squires, 2019). Thus, perception data from teachers on specific aspects of their school should be collected and analyzed in relation to teachers' self-reported well-being and career longevity. Exit interview data should be collected from teachers that leave the profession and analyzed for

common themes. Future research should also look to psychological capital to better understand the internal factors that drive teachers to leave or stay (Karalis Noel & Finocchio, 2022). While literature points to self-efficacy as a predicting factor for attrition (Carver, 2021; Coladarci, 1992), more research is needed on other internal resources that may predict early career teachers' career intentions.

The present study focused on the impact of induction supports on early career teachers' development and self-efficacy, but little is known about the relationship between induction supports and student achievement. Prospective studies could compare teacher perception data on the quality of specific induction supports with student achievement data. Similarly, comparative analysis could be done between varied features of induction supports and student achievement data. Investigating this relationship could inform leaders and policymakers on effective practices for retaining high quality educators and positively impacting student learning.

Summary

In response to the ongoing teacher shortage and high rate of ECT attrition, the goal of this project was to examine the impact of working conditions and induction supports on ECTs' self-efficacy. The literature review explored studies that highlighted common challenges faced in the early career context, the relationship between self-efficacy and ECT's development, and the impact of induction supports on ECTs' development.

The study revealed shared obstacles within the early career experience of new teachers such as school climate, administrative support, marginalization, and inexperience (DeMatthews et al., 2022; Garcia et al., 2022; Geiger & Pivovarova, 2018; Tompkins, 2023). The identified challenges were found to impact the emotions, self-efficacy beliefs, and career paths of ECTs (Carver-Thomas & Darling-Hammond, 2019; Ensign et al., 2020; McLean et al., 2017; Olson et al., 2021). The literature review also identified a possible model to demonstrate how teachers develop their sense of identity and agency through their careers, pointing to the ongoing nature of learning in the profession (Brunetti & Martson, 2018). Furthermore, efficacy was revealed to be a quality that has the potential to grow with time and experience (Ensign et al., 2020; Putman, 2012). However, studies also pointed to the conceivability for efficacy to diminish under unfavorable circumstances (Ensign et al., 2020; McLean et al., 2023). Thus, efficacy was highlighted as a predictor for ECT attrition or retention (Bandura, 1997; Carver, 2021; Glickman et al., 1982).

Additionally, induction supports and programs were studied to identify their impact on ECTs' development and self-efficacy. Supportive relationships, specifically mentors and peers, were consistently emphasized as the most impactful on ECTs' transition into the profession and growing competencies (Brunetti & Martson, 2018; Ingersoll, 2012; LeCornu, 2013; Sikma, 2019; Tompkins, 2023). Other opportunities for professional learning and development were also deemed effective such as reflective practices, observations, and conferences (Fox et al., 2015; Reeves & Hamilton, 2022).

Though teachers encounter many unforeseen and nuanced circumstances early in their careers, the working conditions and induction supports within their context must be addressed in order to retain ECTs. Creative positive school climates and fostering supportive relationships can help teachers sustain through the induction process, leading to better schools and higher student achievement.

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The Impact of Insufficient Minutes in Physical Education in California on Children's Health and Well-Being Carlos Ramos

Abstract

Physical activity and fitness are two components of physical education that promote and sustain health. Students can benefit from physical education due to its positive effects on their physical, emotional, mental, and social well-being. Not only do students have the opportunity to expend energy, but they also can improve on learning and academic performance. In the past two decades, exposure to and experiences in physical education were either reduced or removed. In 2001, the No Child Left Behind Act became the federal education law for kindergarten through twelfth grade in the United States from 2002-2015. Though No Child Left Behind had good intentions in changing the educational landscape, one of its omissions was not valuing nor maintaining physical education within schools. No Child Left Behind primarily focused on general education and emphasized improvement in reading, and mathematics. In 2015, the Every Student Succeeds Act came into effect and is the current federal education law for kindergarten through twelfth grade in the United States. One of its goals was to focus on well-rounded schooling in which subjects like physical education are included in quality education. However, with Every Student Succeeds Act, schools neglect to reach all students, particularly with mandated minutes for physical education. In California, many elementary schools fail to meet the time requirements mandated by state Physical Educational law. As a result, during the school year, children were not provided with sufficient time for physical education and fitness.

Chapter 1: Introduction to the Project

Background

Physical education has a reputation for being identified as recess time, leisure time, sports, or game classes within American culture. It delivers more than just a time for play or recreation. Physical education provides students the opportunity to improve their physiological, emotional, psychological, and relational health. The human body can be fit and able, its immune system can be strengthened, sleeping patterns improved, and energy levels enhanced within physical health. The positive mental benefits received from exercise are reduced stress, anxiety alleviated, learning abilities improved, the brain remaining fit, memory sharpened, concentration strengthened, productivity promoted, and creative thinking elevated (Thompson et al., 2018). The level of happiness is increased, feelings of depression are reduced, and moods can be lifted within the emotional well-being of an individual. Lastly, students can gain positive engagements with their peers and create better social skills when physical activity is incorporated into their daily lives.

History of Physical Education

In the early 18th century, physical education was an educational component in helping avert sickness (Guedes, 2007). Physical education can be dated back to the conclusion of the American Revolutionary War. Education received more attention in that time period, including physical education. Modifications of educational goals and the importance of physical exercise were realized due to the Enlightenment Era. Benjamin Franklin, Noah Webster, Thomas Jefferson, Henry Barnard, and Alden Partridge were American benefactors who promoted change in education, including the addition of physical education (Jurkechová et al., 2011).

The Turner Movement, which involved German gymnastics, became popular in the United States at the start of the 19th century. The word "health" became more significant and received more awareness during the years 1800-1850. Hartvig Nissen, who brought the Swedish Gymnastic System to the US, increased exposure to the concept of healthy living (Jurkechová et al., 2011).

Catherine Beecher, the director of the Hartford, CT Seminary of Girls (1824), was an advocate for physical activity. She created a program of exercises for women and encouraged daily physical activities and healthy nutrition. With Beechers' efforts, universities and other educators began to take more notice of physical education during this time frame (Jurkechová et al., 2011). Fitness and strength became the center of activity for children and adolescents around the post-Civil War period. Sports also became more favored in the United States during that time frame. In the latter 19th century, physical education emphasized hygiene issues, strength training, calisthenics, and gymnastics as its main features (Bryan et al., 2013).

The Young Men's Christian Association (YMCA) was founded during the second half of the 19th century. Robert J. Roberts, Luther Halsey Gulick, and James Huff McCurdy were supporters of physical education and highly notable individuals in the YMCA institution (Jurkechová et al., 2011). During one of the conventions of the American Medical Association in the year 1885, Gulick titled physical education the "new profession." Regular physical exercise, gymnastics, and physical education were components Gulick endorsed for youth. Physical education, health, and human connection were central to Gulick's efforts to enhance humanity. Physical education received more recognition and guidance due to Gulick's contributions to education (Guedes, 2007). The Association for the Advancement of Physical Education (AAH-PERD; now SHAPE: Society of Health and Physical Educators) was established in the year 1885 (Jurkechová et al., 2011; Guedes, 2007). Physical education was integrated into educational organizations of five states, as a result of AAHPERD's initial plans of innovation within education. Physical education became part of the curriculum advocated by the National Education Association (NEA) in the year 1891. Gymnastics was concluded in physical education after the advocacy of NEA. Physical education was then developed into dance, sports, health education, and outdoor and recreational exercises (Jurkechová et al., 2011).

After the release of information on the physical fitness of the American soldiers from World War I, physical education was taken more seriously because of the benefits it provided for fitness and endurance. Physical education received more attention due to negative evaluations of soldiers' physical fitness during World War II. United States servicemen in the Korean War also did not meet the standard for physical fitness (Bryan et al., 2013; Jurkechová et al., 2011).

Therefore, in 1956, President Dwight D. Eisenhower instituted The President's Council on Physical Fitness, and the goal of it was to strengthen physiological performance principles in schools (Jurkechová et al., 2011). Furthermore, the National Association for Sport and Physical Education (NASPE, 1974) was created to address the declining health condition of the American people, through redesigning PE standards. New policies and programs brought change for American physical education teachers related to an adequate number of minutes in elementary school physical education (Jurkechová et al., 2011).

During the NCLB years (2002-2015), students saw a reduction in outside physical activity, including recess and physical education class time. Test scores, language arts, math, science, and technology became the driving focus for student success, leaving little time for specialized subjects (Cosgrove et al., 2018; Stuart-Cassel, 2015; Lee, n.d.). Even though NCLB's focus was to improve reading and math skills, it did not view physical education as a core subject area despite its important function in the development of healthy and physically educated students (Bryan et al., 2013; Tunnicliffe et al., 2006). The effects of NCLB were unfavorable toward physical education because it was an applicant for deduction or disposal to make more time for reading and math (Moore, 2016).

Physical Education Today in California Schools

According to the California Department of Education (1976), children from grades one through six are to receive "...a total time of not less than 200 minutes each 10 school days, exclusive of recesses and the lunch period" (EC Section 51210[a][7], para 59). The challenge of attaining the required number of minutes for students in physical education is not only a state issue, but a systemic one. Many elementary-aged children in California fall below the daily United States Department of Health and Human Services (HHS) recommendation, which is 60 minutes per day or more of moderate-to-vigorous physical exercise (Larrinaga-Undabarrena et al., 2023; CDE, 2022; Weaver et al., 2021; Egan & Miller, 2019; Thompson et al., 2018; Ferkel et al., 2014; Troiano et al., 2008). For students to reach the national goal, changes need to be made from the government level to the schools to make change possible.

Students of all ages can benefit from participating and engaging in physical activity when schools meet the required time for physical education. Movement is essential for the development and maturation of well-being, but it also can improve students' concentration in the classroom. Physical activity enhances student achievement while supporting brain movement and intellect (Käll et al., 2014 as cited in Pinto-Escalona & Martínez-de-Quel, 2019; Booth et al., 2013, Hillman et al., 2009). Mental, emotional, and relational health are key components derived from physical fitness and activity. Furthermore, schools have structured and integrated PE as part of the curriculum, but it has failed to meet the states' requirements for students' health.

Statement of the Problem

Children in California are receiving insufficient minutes for physical education and fitness within the school year. Physical activity is a vital component of overall health, wellness, and quality of life (Ferkel et al., 2014; Bryan et al., 2013). According to the CDC (2009) 16% of children were obese in the United States and the rate of obesity has tripled for children in the last 30 years (Bryan et al., 2013, p. 139). Most American children and teenagers were not implementing nor receiving the nationally advised 60 minutes of daily physical activity according to the 2016 National Physical Activity Report Card, the most current available, which received a grade of D- (Szarabajko, 2023; CDC, 2016; Katzmarzyk et al., 2016). Each student from kindergarten to grade 12 must be engaged in regular physical education for the whole school year to become physically educated people, as commended by the National Association of State Boards of Education (NASBE) and NASPE (Bryan et al., 2013).

In the state of California (1976), elementary schools are to adhere to a 200 minute mandate for physical education instruction time (EC Section 51210[a][7], para 59), or risk litigation for not complying. According to Kahan & McKenzie (2019) and Thompson et al. (2018) half of California's elementary school districts have not observed the state physical education law. In 2013, thirty-seven California school districts were discovered to be noncompliant in a lawsuit (Kahan & McKenzie, 2019; Thompson et al., 2018; Cal 200 et al. v. San Francisco Unified School District et al., 2014). The legal actions were intended to implement adherence to Physical Education laws so students can be assured of physical exercise during school. To promote compliance with California Physical Education laws, litigation seems to be an efficient accountability tool in this respect (Thompson et al., 2018). Therefore, policies for physical education and physical activity need to be supported by the districts to help improve the procedures (CDC, 2016).

Notably, schools in California are failing to meet the required minutes for physical education for students (Kahan & McKenzie, 2019; Thompson et al., 2018; Lee, n.d.). The loss of physical education time within the school day has generated unintended consequences for students' physical fitness, mental and emotional health, and social well-being as well as their ability to receive a quality education (Lee, n.d.). As stated by Bryan et al. (2013), the function of physical education must be to improve every student's physiological, cognitive, emotional, and relational development. The time for physical education provides more than just exercise, but it is also an opportunity for social interactions, movement, and a break from general education learning in the classroom (School Specialty, 2022).

Purpose of the Project

The purpose of the project is to bring awareness and encourage advocacy due to schools not adhering to the California mandated amount of time for physical activity & fitness in physical education. Students who receive insufficient time in physical education miss out on vital movement and learning from physical education. By schools adhering to the mandated instructional time for physical education, students will experience better health, have better concentration levels in their general education classes, and understand the importance of daily physical activity. Moreover, pupils engaging in daily physical education show better attendance, a more positive mindset towards schooling, and quality academic performance (California School Boards Association, 2006 as cited in the CDE, 2009). Some of the goals of physical education are to also help prepare students to become physically educated people in knowledge and guide their efforts into a physically active lifestyle.

By helping all stakeholders understand the significance of physical education, policy can be revisited, evaluated, and implemented for effective change. With the support of each physical education educator, parent, child, administrator, district personnel, and governmental education entities; students can increase their understanding of all-round health and well-being through the performance of physical education. Students can obtain comprehensive knowledge and minutes of physical execution of how physical education favorably affects their health, which can lead to an improved quality of life.

Among the advantages stated by the latest United States Surgeon General's report were a lower risk of early death, a reduced threat of heart disease, colon cancer, hypertension, diabetes, and osteoporosis, as well as enriched mental health and physical fitness. Furthermore, physical activity boosts strength and endurance, helps create stronger bones and muscles, helps regulate weight, lessens anxiety and stress, builds up self-esteem, mood, and focus, and can ameliorate blood pressure and cholesterol levels (The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity, 2001 as cited in CDE, 2009, pp. 7-8) In addition, physical education has the power to increase self-esteem, which can positively affect a student's view of themselves. A component of physical education offers kinesthetic learning, which allows students to learn through physical activity and build self-confidence. The information above explains why attention and advocacy are needed for the sufficiency of required minutes for physical education with California elementary students.

The follow research questions are essential to this project:

- Given California Executive Order N-56-20 mandating specific minutes for physical education, what is the impact on elementary students in schools that adhere to the requirement?
- Given California Executive Order N-56-20 mandating specific minutes for physical education, what is the impact on elementary students in schools that do not adhere to the requirement?
- In the past two decades, how have the changes in educational policy affected the minutes of physical education within elementary schools?

Theoretical Framework of the Project

Today's students in California elementary schools are not receiving adequate instruction in physical education (Kahan & McKenzie, 2019; Thompson et al., 2018). To reveal the needed tools for the issue at hand, change theory is a theoretical framework which seeks to solve problems through program planning and evaluation. The goal of change theory is to develop methods, evaluate practices, and set goals to bring about meaningful modifications in education and institutional settings (Hoffman-Miller, 2022). Change theory is the result of theorist Albert Bandura's research and most notably, his "application of behavioral science recognized the influence of individual behavior as the unifying event in the application of long-term systemic change" (Hoffman-Miller, 2002, para. 2). As a result, it leads to skill development and comprehension of efficient implementation (Bandura, 1977).

According to Anderson (2005), long-term change is achieved through repetitive exercises of evaluation and reasoning. The phases of identification and assessment within change theory allow educational institutes, government organizations, and project evaluators to improve preparation and valuation for long-term changes. Since change theory focuses on the impact of change within educational organizations, it serves as the framework for this study. By understanding the fundamental advantages of physical activity, change theory can help restore and sustain long-term goals.

Definition of Key Terms

The following terms are essential to this project.

Every Student Succeeds Act (ESSA): It is the federal K-12 general education law of the United States. ESSA was signed into law in 2015 and replaced the previous, general education law called "No Child Left Behind." ESSA extended more flexibility to States in education and laid out expectations of transparency for parents and communities (USDE, 2020).

Health: A state of complete physical, mental, and social well-being and

not merely the absence of disease and infirmity. As stated by Svalastog et al. (2017), Pinda defines health as "the harmonious functioning of the organs", focusing on the physical area of health, the physical body, and the overall functionality, followed by the feeling of comfort and absence of suffering. Even today, Pinda's description holds importance as a necessity for general wellness (Svalastog et al., 2017).

Minutes: A period of time mandated by California education law to provide 200 minutes of instruction for physical activity and physical education which benefits health and strength of body and mind (CDE, 1976, EC Section 51210[a][7], para 59).

No Child Left Behind Act (NCLB): It was the education law for K–12 general education in the United States from 2002–2015. The NCLB Act, which reauthorizes the Elementary and Secondary Education Act (ESEA), incorporates the principles and strategies proposed by President George W. Bush. These include increased accountability for States, school districts, and schools; greater choice for parents and students, particularly those attending low-performing schools; more flexibility for States and local educational agencies (LEAs) in the use of Federal education dollars; and a stronger emphasis on reading, especially for our youngest children (USDE, 2004).

Physical activity: Any movement produced by a skeletal muscle which uses energy (Braff, 2020). According to Piggin (2020), it is the result of the expenditure of energy by the use of physical motion with the performance of the skeletal muscles. A particular mechanistic action which concentrates on the skeletal thews and expenditure of vitality (Piggin, 2020).

Physical fitness: Good health, strength, and endurance are achieved through exercise. A measurable state through strength and/or endurance (Braff, 2020).

Relational health: It focuses on starting and maintaining important relationships with self, other people, groups, and communities. It builds from positive interactions and connections with others. Having a community, based on supportive relationships, can help reinforce feelings of contentment and safety (Harvard University Health Services, 2023).

Well-being: The state of being comfortable, healthy, or happy. It is not just the lack of disease or sickness. The health factors include the emotional, physical, mental, and social elements of an individual. It is connected to satisfaction in life, and characterized as how one feels about themselves and their life (Victoria State Government, 2021).

Summary

This project addresses the need for schools to be held accountable by their local school districts in providing the mandated minutes of physical education for the sake of students' health, fitness, and being physically educated people. Furthermore, when schools follow educational state laws, the chances of litigation are lower because school districts and administrators value the importance of all students having equal learning opportunities. Students can experience better well-being and overall education through adequate physical education and fitness. Physical education does not only improve physical health, but also emotional, mental, and relational health. Students who are exposed to and experience proficient physical education have an opportunity to learn lifelong habits for a healthy lifestyle.

Chapter 2 includes diverse elements of physical education; past and present educational policies, including NCLB and ESSA; physical education in California schools; and the outcomes of physical activity and fitness on students' health.

Chapter 2: Review of Related Literature

Introduction of Physical Education

Children can increase their health and fitness through the accessibility of schools offering physical education. One of the greatest mechanisms to promote public health among children is the establishment of physical education in schools (Thompson et al., 2018). It is a critical time for pupils to participate in quality physical education during the elementary school years. According to Healthy People 2020 (Office of Disease Prevention and Health Promotion, n.d.) enlarging the vital amount of daily physical education in elementary schools was one of its targets (as cited in Kahan & McKenzie, 2019). Over the past two decades, adherence to the California Physical Education minutes law and quality of physical education has been insufficient in elementary schools (Kahan & McKenzie, 2019). Children can raise their fitness and health through physical education.

Physical exercise that engage an increase heart rate and more muscle movements are elements that can improve cardiovascular health. Cardiovascular and muscular endurance are components of health which are enhanced during the implementation of physical education (Thompson et al., 2018). School-aged students are encouraged to participate in 60 minutes or more of moderate-to-vigorous physical activity per day according to directives from organizations around the world such as the World Health Organization (WHO), Centers for Disease Control and Prevention (CDC), Institute of Medicine (IOM), United States Department of Health and Human Services (HHS), and National Association for Sport and Physical Education (NASPE) (Larrinaga-Undabarrena et al., 2023; CDE, 2022; Weaver et al., 2021; Egan & Miller, 2019; Thompson et al., 2018; Ferkel et al., 2014). Granting this proposal, the latest approximations have indicated approximately 20% of children and adolescents in the world have reached this degree of daily physical activity (Larrinaga-Undabarrena et al., 2023; Fröberg, 2022). Physical education provides a space for physical activity where students' health and fitness can be elevated.

Physical education also creates other moments for an active lifestyle. It offers opportunities for the attainment of skills, knowledge, and actions

which support a long-term healthy lifestyle (Thompson et al., 2018). Physical education classes are not only for opportunities of physical exertion during the school day, but also to be viewed as a valuable part of the well-rounded education in the current national education policy. The purpose of this project is to bring awareness and advocacy that many elementary schools are not adhering to the California mandated amount of time for physical activity & fitness in physical education. Elementary students can attain beneficial results in health and academics by schools complying to the California Physical Education minutes law.

Children spend most of their waking hours at school and it is the ideal environment to offer students with health enriching degrees of physical activity (Fröberg, 2022; Weaver et al., 2021; SHAPE, 2016; Stuart-Cassel, 2015). The framework within elementary schools such as teachers and space provide a capacity for students to be physiologically engaged, and children can champion on those opportunities through the various parts of a customary school day whether it is in physical education classes or recess (Weaver et al., 2021; Egan & Miller, 2019). Moreover, in conventional school sections to offer exertion, there has been developing efforts by integrating physical activity into common classroom movement breaks (CMB) (Weaver et al., 2021; Daly-Smith et al., 2018). According to the CDC (2013) schools who aim towards providing the daily 60 minute or more of physical activity guideline, students reap several positive physical benefits as well emotional and psychological (Egan & Miller, 2019). Also, three days a week applied to vigorous-intensity physical activity and at the minimum three days a week of muscle-enhancing and bone-developing physical activity are listed within the national guidelines. These directives of physical activity and fitness have been created for children and adolescents grounded on scientific verification to promote good all-around health (Ferkel et al., 2014). Physical education is an important part of students' overall health and well-being. While it certainly addresses the physical aspect of fitness, it is also comprehensive in nature.

Children's physiological, mental, emotional, and relational health along with cerebral performance and educational success are by-products of consistent participation in physical activity (Weaver et al., 2021; Thompson et al., 2018). It renders as a defensive function against illnesses such as cancer, obesity, type 2 diabetes, and heart disease when physical exercise is frequently engaged (Weaver et al., 2021). Insulin resistance and cholesterol levels are improved through physical education engagement, which can be a positive intervention for battling against premature childhood obesity (Thompson et al., 2018). Furthermore, health-related conditions related to inertia are reduced, depression and anxiety are lessened, and muscles and bones are strengthened through the consistency of physical activity and fitness (CDC, 2013).

The national proposal of 60 minutes per day is low within the levels of children's physical activity (Larrinaga-Undabarrena et al., 2023; CDE, 2022; Weaver et al., 2021; Egan & Miller, 2019; Thompson et al., 2018; Ferkel et al.,

2014; Troiano et al., 2008). Over the last 20 years, the repeated record of publications shared the quantity of physical activity and level of moderate-to-vigorous physical activity given for children within the school setting has reduced (Weaver et al., 2021). This observation may be supported as research has revealed long-established opportunities for children to increase physical activity throughout the school day has lessened. According to Weaver et al. (2021), schools were urged to deliver 30 minutes of moderate-to-vigorous physical activity during a school day (Committee on Physical Activity and Physical Education in the School Environment et al., 2013; World Health Organization, 2007). In 2003 to 2010, there was a reduction in moderate-to-vigorous physical activity during the school day, from 2010 to 2015 there was no change, and in 2015 to 2019 it gradually grew (Weaver et al., 2021). Even with the 30-minute recommendation of moderate-to-vigorous physical activity toward schools who house students from ages 5 to 18, the allotment still fell short of the children's national physical activity quantity guideline (Larrinaga-Undabarrena et al., 2023; CDE, 2022; Weaver et al., 2021; Egan & Miller, 2019; Thompson et al., 2018; Ferkel et al., 2014; Troiano et al., 2008).

Students can experience better well-being and overall education through adequate minutes provided through physical literacy and fitness. Physical education can not only improve physical health, but also emotional, mental, and relational health (Committee on Physical Activity and Physical Education in the School Environment et al., 2013). Students who are exposed to and experience proficient physical education have an opportunity to learn lifelong habits for a healthy lifestyle.

NCLB

Focused Only on General Education

During the timeframe of NCLB, students did not receive adequate minutes of physical education whereas much of the focus was on other academic subjects. Since time and financial resources were allocated to more academic subjects and less attention was focused on physical education, the environment of "high stakes testing" and NCLB had a negative influence on physical education programs (Cosgrove et al., 2018; Stuart-Cassel, 2015). Due to the publishing of the 2016 Surgeon General's report and the data it provided for health, it emphasized the importance of physical activity and physical education. The report focused on the significance of efficient daily physical education and the obligation to provide daily physical education throughout all grade levels. Regarding human longevity, physical activity must be a "public health goal for physical education" (Bryan et al., 2013, p. 140). According to the National Association for Sport and Physical Education (NASPE, 2004), the purpose of physical education is to develop physically literate people who are informed, competent, and assured to value a lifespan of physical exercise (as cited in Bryan et al., 2013).

Physical Education Reduction/Removal

Physical education and other subjects had adverse effects due to sanctions, such as NCLB. Physical education was not integrated as a core subject in NCLB, a recommission of the Elementary and Secondary Education Act (ESEA). The inadvertent outcomes such as declines or entire removal of physical education programs led to government resources to enhance traditional subject matters, which was a result of neglecting to promote physical education (Moore, 2016; Stuart-Cassel, 2015). Effective recurring physical education for all students in pre-kindergarten to the 12th grade was endorsed in an area of the NASPE advocacy plan. In 2009, Senator Tom Harkin and NASPE advocated the Fitness Integrated with Teaching Kids Act (FIT Kids) after the announcement of NCLB. This event changed NCLB to have efficient daily physical education (Bryan et al., 2013). National educational policies like NCLB affected the minutes of physical education, but past advocates found ways to protect it in schools.

Educational subjects such as physical education are part of a systemized curriculum. Physical fitness, physical knowledge and ability, emotional, and relational growth are goals and gains within it. IOM (2013) acknowledged the contributions physical education provides to the health of the community and how it is a vital element of an all-inclusive school health plan. The minimum time stipulations for physical education at any academic level have been found exclusively in 22 states where legal or administrative procedures were constructed (Kahan & McKenzie, 2019). IOM (2013) also reported the duration of physical education lessened in elementary schools by around 40 min/week after NCLB and parents took notice of the reduction. Parents of elementary school-aged pupils officially announced 58% of their children acquired ≤ 2 days/week of physical education and 22% pointed out physical education received deficient importance (Kahan & McKenzie, 2019). During NCLB, there was a downward trend of minutes and physical activity within physical education.

ESSA

Focuses On All Subjects

NCLB eventually was replaced by the new education policy, the ESSA. It was established on December 10th, 2015 in the United States by President Obama (Tsuda et al., 2022; Lee, n.d.). ESSA's goal was to encourage an inclusive curriculum, which is defined as all pupils, regardless of background, receiving an equitable opportunity to accomplish the learning outcomes of their education (Durham University, n.d., para. 1). It allowed each state to develop its own measurements for student success, within a structure supplied by the federal government (Tsuda et al., 2022; Lee, n.d.). Schools who are low functioning receive continual support from the accountability structures that derive from ESSA (U.S. Department of Education [USDE], n.d.). Despite the implementation of ESSA, there was still a trend of many schools not meeting

the state standard requirement of minutes for physical activity each week.

Well-Rounded

The subject of physical education has been given special attention and opportunities through the birth of ESSA. During NCLB, physical education was not recognized as a vital educational field of study, but now it is composed of a "well-rounded education" in ESSA (Tsuda et al., 2022). Society of Health and Physical Educators (SHAPE, 2018) acknowledged the change in the reputation of physical education and how ESSA has advanced the significance of physical education in the education program. The fundamental functions in assisting a healthful, mobile way of living of pupils and supporting them to sustain their well-being are the long-term objectives of physical education programs (ESSA, 2015). Moreover, with physical education taking part of well-rounded education, it is presently qualified for Title I (schools who are low-income), Title II (professional growth opportunities), and Title IV (pupil support and educational improvement) funding (USDE, 2016). The instruction and learning spaces of physical education have the possibility to be strengthened through these financing opportunities.

Over the past two decades, physical education has experienced low economic possibilities due to a lack of accountability in education policy (Weaver et al., 2021; Kahan & McKenzie, 2019; Cosgrove et al., 2018; Stuart-Cassel, 2015; IOM, 2013). Despite embracement of ESSA, physical education has yet to determine the increase of instruction and learning through Title 4 (Larrinaga-Undabarrena et al., 2023; Fröberg, 2022). In the study of Tsuda et al. (2022) 10 out of 48 states specified having an accountability structure to quantify pupil understanding and achievement (seven states evaluated fitness and three states assessed learning results [e.g., motor abilities and comprehension]). Four described elements in the strong reporting systems involve law-making/procedure, documentation, data observation, and data assessment and dispersion (Tsuda et al., 2022). Containing all these components established that collected pupil literacy data was applied to regularly improved systems (Tsuda et al., 2022). Yet, the inadequate adoption of accountability structures in physical education has constructed a condition where inquiries were carried on concerning student acquisition of knowledge (Tsuda et al., 2022). School Health Policies and Practices Study (SHPPS) 2016 discovered for all school classifications around 60% of districts offered systems for how to evaluate pupil achievement in physical education (CDC, 2016). Based on the review of the literature, little is known regarding state-scale accountability systems of pupil comprehension and attainment, especially in California Physical Education.

Title 4

Under IV, Section A of ESSA, education for health, physical education and activity programs have a means of approaching consequential funding. This grant-in-aid is disbursed to states and then to local educational institutions (SHAPE, 2018). School districts can apply this financial backing to promote an all-round education, secure and healthy students, and computing. The Carol M. White Physical Education Program (PEP) from the U.S. Department of Education (USDE) provided funding to school districts, but it is obsolete. The allocation of funds is accessible in the block grant directly from Title IV, Part A and superseded the PEP allotment (SHAPE, 2018). Funding allows for better programing, and increase opportunities for student learning and performance.

Funding

In NCLB, physical and health instruction were not highly incorporated, which led to these programs being dismissed and financial support was reduced. Health and physical education are a part of ESSA, states and school districts can use crucial funding for these programs of studies (SHAPE, 2018). All the financial programs have been merged in ESSA into a substantial block grant of resources that is disbursed to states followed by school districts employing the Title 1 procedure which is determined by the state inhabitants and deprivation levels (SHAPE, 2018).

To acquire funding and have state permission, school districts must fill out needs evaluation and make a plan of action for how the resources will be used for the block grant. According to the report of California State Physical Education program monitoring (2022) the CDE does not acquire assigned state or federal funding to observe or give technical support for physical education. While state and federal funding were inaccessible to the CDE for offering physical education assistance, Local Educational Agencies (LEA) may specify allotted funds toward physical education resources to assist pupils' needs (CDE, 2022, p. 10). By implementing ESSA formulas, school districts can have entry to Title I, Title II, Title IV funding through their state division of education. The purpose of ESSA plans, organized by states and school districts, are to discover places where financial allocation is necessary. SHAPE (2018) encouraged supporters to think about helping on the board in their school district, which created these allotment plans to ensure school health and physical education are highly addressed. Physical education and school health programs are not assured funding without compelling state and local advocacy from all those within the physical and health schooling profession (SHAPE, 2018).

Economically disadvantaged schools and students receive funding from Title I (Tsuda et al., 2022). It is the most pliable and sizable pool of money in ESSA, approved at \$15 billion in fiscal year of 2017 (SHAPE, 2018). Based on the U.S. Department of Education Budget Summary (2023), the allocation request was \$88.3 billion in unrestricted income for the USDE. Principals, educators, and school staff were given funding for career development from Title II and it was warranted at \$469 million for 2017 (Tsuda et al., 2022; SHAPE, 2018). As stated by USDE (2022), the total appropriations for Title II, Part A in 2022 was \$2.1 billion. States obtain capital under Title IV, Part A (T4PA; Student Support and Educational Improvement Grants) to distribute to school districts to aid multifaceted academic opportunities, safe and vigorous pupils, and efficient usage of digital literacy. It was accredited at \$1.65 billion for 2017, of which 20 percent is required to apply for well-rounded fields of schooling and 20 percent is obligated to financially provide safe and healthy students projects such physical and health education (SHAPE, 2018). As reported by T4PA Center (n.d.) the total allotment for 2019 was \$1.17 billion. The total available amount of funding for T4PA in California was \$145.5 million (CDE, 2022) and at 20 percent, 29.1 million would be the available sum of funding.

The researchers of SHAPE (2018) discovered ESSA had more financial means which pertain to physical education and the health of school. USDE mandated states and school districts to render and complete progress reports that follow a quantity of various criteria. These measures involved participation of pupils and the environment of school, which could incorporate information associated with physical and health education programming (SHAPE, 2018).

State Ownership

The California Department of Education received autonomy in making decisions regarding student learning and performance from ESSA. In creating policies in the educational field, the aim of legislators was to establish stability between the corresponding roles of national, state, and district administrations (SHAPE, 2018). Self-rule was more assimilated within states and local governments to arrange their own learning priorities and give attention to the essentials of students in their own states. ESSA provides states and districts increased freedom and charge than NCLB (SHAPE, 2018).

Pupil examination is still a directive from ESSA for reading/language arts, math, and science in grades 3-8 and one time in secondary school. States are instructed to make their own programs for assessing student advancement and generate their own objectives. ESSA offered financial allocations for states to inspect, ameliorate and modernize evaluation procedures, and remove unnecessary and ineffective assessments (SHAPE, 2018). Based on the review of the studies, little is known concerning physical education being included in these processes of examinations for California Physical Education (Tsuda et al., 2022; SHAPE, 2018).

Parental Knowledge & Say

ESSA supports parents and caregivers to be more involved with their children's education. Local community members like parents are emboldened to ask about their child's physical education program (SHAPE, 2017). They are encouraged to probe about time-related advantages for students to ac-

quire knowledge of physical education. For example, questions about lesson frequency and quantity (min/week) are necessary to "ascertain whether the school values physical education" (SHAPE, 2017, para. 11). School and/or district webpages are a place where this data can be communicated and viewers of these websites "see the perceptions, ideas, and understanding of what is revealed, which include parents" (Gu, 2017, p. 137).

Teachers' Perspectives

Although the viewpoints of physical education teachers' around physical activity were beneficial in attempts to improve the health development of students, they were consistently on the receiving end of autocratic leadership. With new educational programming, the competency and routine involvement of physical education teachers were disregarded (Gill et al., 2020). A new comprehensive approach of composite systems and experience at work in the academic affairs was necessary with the intention of enhancing physical education quality (Gill et al., 2020; Morton et al, 2016). Namely, comprehending the outlook of physical education teachers can offer some awareness into how physical education can maximize an opportunity to elevate physical exercise and decrease misconduct among students. By appreciating physical education teachers' standpoints, additional health professionals can further efficiently support and collaborate with the physical education field to advocate physical fitness in schools (Gill et al., 2020).

An investigation from Gill et al. (2020) involved a group of middle school physical education teachers who engaged in a comprehensive study of interviews. This qualitative analysis derived from a substantial study called Project Shape. It was a community-participated physical education intervention targeted at improving moderate-to-vigorous physical exercise among junior high pupils in LAUSD. Altogether, 16 schools and 52 educators engaged in the initial research (Gill et al., 2020). The studies from Weaver et al. (2021) and Gill et al. (2020) found (a) physical education was not seen as a high priority class among administrators per participants illustrating their employment conditions. This undervalued standpoint materialized in the classroom; for instance, many educators shared limited structures or a high number of students in the classroom, components which infringed on their capacity to instruct. The study also discovered a participant's feeling concerning other's views on physical education: (b) "We're the stepchild of the school. Don't get treated as equal as everybody else. You always feel like 'oh well you only teach P.E. and it doesn't really matter.' That's what we always hear all the time" (Gill et al., 2020, p. 86). Moreover, this underappreciation embodied further into educators experiencing separation from or perceived lower in status compared to other "academic" concepts. For some educators, the exposures were formulated as this is the way things are or it is a ranking issue:

Well, P.E. is considered, like, a non-core academic class, it's more, you know, movement stuff so, like math, science, English, those kind of
classes, they don't want to pull the kids too often...and I agree, I think that if there's a class that they could maybe miss a day of, or a couple of days of, and catch up, or bounce back, then it's going to be my class. (Gill et al., 2020, p. 97)

ESSA embraces physical education and school health, and provides them equal opportunity with other educational studies (SHAPE, 2018). Removing pupils from any class to be given corrective teaching for a different course is firmly dissuaded by ESSA. This regulation refers to students being taken away from physical education learning to acquire schooling from an alternative part of curriculum (SHAPE, 2018).

Finally, one of the physical education teachers stated their viewpoint on the issue of receiving funding accompanied with taking initiative for their physical education program at their school.

> You know you have an option to get involved or not get involved... being involved at these physical education conferences...it led me to be more motivated and bring back new ideas to my students and the school...I actually became an advocate for my students, I started like calling I want this program um, writing grants, trying to get funding, because I notice[d] PE...was lacking in getting funding, like we were always the last to get monies or, you know when we ask we get like a certain amount that's not as much as the other subjects. (Gill et al., 2020, p. 86)

Gill et al. (2020) found an educator adapted to challenging working conditions and problem solved ways to improve the quality of programming. Ultimately, the students greatly benefitted from their physical education teacher who was assertive in finding solutions to make their physical education class impactful.

The State of California

Physical Education State Standard

In 2016, 19 out of 50 states in the U.S. had education regulations requiring a minimal amount of physical education minutes students must be given (SHAPE, 2016). In California, elementary pupils are mandated to receive 200 minutes of physical education each 10 days (CDE, 1976, EC Section 51210[a][7], para. 33). Schools were regularly noncompliant, particularly at the elementary position due to the lack of finances and resources to uphold physical education laws (Weaver et al., 2021; Thompson et al., 2018).

With the California Physical Education law (CDE, 1976, EC Section 51210[a][7], para. 59), half of its elementary school districts were noncompliant (Weaver et al., 2021; Calvert et al., 2020; Kahan & McKenzie, 2019; Thompson et al., 2018). In the 2022-2023 school year, there were 2,768,614 students enrolled in 5,857 elementary schools (CDE, 2023). Physical fitness measures were unlikely to be met by students in these public schools since there has been consistent trends of noncompliance. Additionally, a large number of Hispanic and African American students were located in noncompliant dis-

tricts, and a larger percentage of students qualified for free or reduced-priced meals in noncompliant districts than in law-abiding districts (Thompson et al., 2018). Race and income-related health discrepancies were possibly attributed from uneven and unfair supply of physical education.

Complaints of administration and legal actions in court have improved adherence to the physical law in California. Subsequently, an education guideline was created and forwarded by the Los Angeles Unified School District (LAUSD) which carried out the California Physical Education order (Kahan & McKenzie, 2019; LaFleur et al., 2013). The policy was created after obtaining organizational complaints and even being warned with legal proceedings (Thompson et al., 2018). Two years later, a 10-minute extension in physical education class period within LAUSD was implemented in financially successful elementary schools, but no increase among underprivileged schools (Kahan & McKenzie, 2019; LaFleur et al., 2013).

A sum of only thirty minutes per week was offered from explicit instruction and examination by teachers (Kahan & McKenzie, 2019). Conformity to physical education mandates were solely observed and checked every four years in California schools in that timeframe. Exemptions from physical education reviews were provided to schools who met other scholastic objectives. At the same time, the repercussions for noncompliance were negligible and it consisted of a written procedure for positive development from the schools (Kahan & McKenzie, 2019).

Generally, resident informers depended on self-reports by evaluating physical education time requirements/allotment versus using structured examination on sessions of teaching with research purposes (Carlson et al., 2013). However, schools have not matched the rightful policy measures even with information from self-reports. For instance, educators' schedule of classes was assessed from 20 San Francisco elementary schools and only 20% of them measured up to the state ordinance for physical education (200 min/10 days). Further assessments of classes showed pupils obtained physical education at best with an average of 45 min/week (Kahan & McKenzie, 2019). Additionally, schools in the San Francisco Unified School District (SFUSD) changed their physical education time after their data was regionally disclosed over news releases which involved radio broadcasts, newspapers, and TV (Thompson et al., 2015). Later contrasts demonstrated there were increased times for physical education within educators' schedules [from 71 to 82 min/week] and in the time of audited lessons [from 56 to 70 min/week] (Kahan & McKenzie, 2019).

Issues regarding insufficiencies in the proportion and condition of physical education in California, specifically in elementary schools where physical education were oftentimes provided by nonprofessional instructors and vocalized for decades (San Diego State University et al., 2008). To give an example, noncompliance was discovered with 48% of California elementary schools regarding the state physical education time order of 200 min/10 day

[California Education Code section 51.210.7] (Weaver et al., 2021; Calvert et al., 2020; Kahan & McKenzie, 2019; Thompson et al., 2018). Litigation

The consequences for not adhering to the California Physical law for minutes shifted from written plans of improvement to lawsuits. In 2010, a plaintiff sought the implementation of the state physical education statutes for his third-grade son in a California appellate court (Thompson et al., 2018). On the report of Kahan and McKenzie (2019) the judge ruled in favor of the parent due to the insufficient amount of physical education and activity minutes provided to his child (i.e., 120 min/10 days) than the quantity specified by law (Thompson et al., 2018; Doe v. Albany Unified School District, 2010). In the case of Doe v. Albany (2010), the attorney prosecuted the Albany Unified School District for not complying with California Physical Education law in elementary schools. The court-governed Physical Education law established a required requisite for school districts to deliver the mandated physical education minutes (Thompson et al., 2018). Both sides resolved the litigation, with Albany acknowledging to increase physical education minutes. Albany financed their own litigation costs, but it did not cover the damages (Thompson et al., 2018). Furthermore, the court ordered: (1) "state law enforces a binding requirement on school districts to give minimal physical education necessities, and (2) the state allowed parents to take legal action in order to seek imposition of the law" (Doe v. Albany Unified School District, 2010). As claimed by Kahan and McKenzie (2019) following the case above, another lawsuit was filed in 2013 by the same lawyer and effectively prosecuted against 37 school districts which were not adhering to the California Physical Education law (Thompson et al., 2018; Cal 200 et al. v. San Francisco Unified School District et al., 2014). For three years, physical education minutes had to be recorded, sustained, and presented by school districts in accordance with the lawsuit specifications through the 2017–2018 school year. The days, times, and length of physical education classes were not only reported, but also displayed on school webpages or teacher classrooms so it can be publicly accessible (Kahan & McKenzie, 2019; Thompson et al., 2018).

Various districts communicated community irritation surrounding the application of legal action and raised doubts about the prosecutors' intentions, while some proponents shared the triumph supported the advantages of physical education and the canon of law (Thompson et al., 2018). Others brought about issues regarding unexpected outcomes deriving from litigation which may have impaired physical education. To give an example, succeeding the 2013 legal dispute, many school districts failed to reverse the Physical Education minute law of California in an attempt to evade future judicial proceedings. Thereafter, California enacted legislation in 2015 (AB 1391), which allowed people to file an administrative grievance for infringement of physical education laws to guard public schools from careless litigation that subtracts financial resources from classrooms (Thompson et al., 2018). Lawsuits eroded

at schools' restricted funding and several reviews reported schools felt deficient in offering satisfactory physical education.

Moreover, educators as well were to finalize authentication reports for teaching durations, and if any amount of physical education minutes were missed, an alteration to the schedule would be necessary for the time to be recouped (Kahan & McKenzie, 2019). The physical education facts and statistics were given for all classes through a site agenda made by school administrators. These conditions gave physical education the opportunity to be assessed in compliance with state law and in accordance with the resolution. In regard to conveying physical education schedules through a communication system per the lawsuit requirements, school websites were suitable for them (Kahan & McKenzie, 2019).

After Legal Proceedings

In the report of Kahan and McKenzie (2019) 860 elementary schools (Grades 1 to 6) were evaluated with their websites between March and June 2018. During this time, schools were expected to gather and share physical education minutes information in accordance with legal agreement. Kahan and Mckenzie (2019) sought out schedules for physical education and examined webpages for any further writing regarding the repetition and length of physical education when an agenda was not presented. Physical education classes were individually searched along with the schools' main schedules or by grade level (Kahan & McKenzie, 2019).

Altogether, 92 schools (10.7%) publicized physical education plans on their website and an extra 14 schools offered weekly physical education lesson recurrence (1.0%) or lesson time (0.6%) in the absence of giving a particular agenda (Kahan & McKenzie, 2019). Specifically, LAUSD, the second biggest school district in the United States, had only 1.6% of its selected schools project a physical education agenda. A great number of schedules (51.1%) were up to date by 2017 or Spring 2018. In the preceding educational years, fourteen schools presented schedules for 2016-2017, nine for 2015-2016, three for 2014-2015, and one for 2013-2014. Eighteen schools (19.6%) had not indicated a certain school year or term on their displayed agendas (Kahan & McKenzie, 2019). The data demonstrated the need for accountability, which litigation mandated schools to increase compliance with California Physical Education law.

The schools created new structures to improve physical education programming. Physical education was planned with an average of 3.5 ± 1.3 days/ week for the 101 schools who reported lesson regularity and 31.2 ± 11.4 min was the amount of lesson time arranged within the 97 schools who displayed lesson duration (Kahan & McKenzie, 2019). In sum, the 92 schools planned and gave 99.0 ± 23.0 min/week of physical education exposure. Many schools (68%) arranged a physical education capacity which fulfilled the lawful directive equivalent to 100 min/week. However, even with school districts who had failed to win in court, 29 schools published a physical education arrangement which was beneath the state required minutes, with 9 schools planning physical education for ≤ 50 min/week. Furthermore, the nationwide physical activity guideline of 150 min/week established by SHAPE (n.d) was not pointed out in these schools' physical education programs and failed to meet its recommendation (as cited in Kahan & McKenzie, 2019).

As stated by LaFleur et al. (2013) past studies have examined alterations to physical education programs as a repercussion of district/state policy adjustments. Thompson et al. (2018) organized 97 phone screenings with employees in districts/schools connected to the legal dispute. The shared results from school staff were schools raised the amount of time in physical education because of the case, the primary hindrance to adhering with the legal agreement was the time necessitated for fulfilling records and matters about engaging in physical education-linked study for the reason of potential accusation (Thompson et al., 2018). Many schools established websites which supplied data on school objectives and schedules.

The research analyzed the corresponding school districts and schools possibly resolved adherence lasting for a considerable time to mandatory state physical education laws excluding legal action. The verbiage in state's education laws for legally providing physical education minutes should be assessed and verified in schools by physical education teachers, parents, and community shareholders to achieve compliance to state law (Kahan & McKenzie, 2019). Otherwise, if the insufficiency of physical education minutes is not informally settled with district and school administrators, there are pertinent cases for engaging in legal proceedings to assure physical education is lawfully given.

Barriers

California school districts recognized various obstacles to administering quality physical education (California School Boards Association & California Project LEAN, 2010), multiple related with district capacity which affect financial plans, scholastic competition, and transportation preferences (Stuart-Cassel, 2015; Boser, 2013). Within the education system, physical education is placed at a low level as reported by educators. Therefore, physical education teachers confront obstacles to instruction, such as substantial class sizes, programming conflicts for space, and insufficient financial support and materials (Gill et al., 2020).

Barrier	Primary Schools	Secondary Schools
Institutional	Access to and lack of facilities ^{a.h}	Access to and lack of facilities f
	Lack of time ^{<i>a</i>.<i>h</i>}	Lack of time ^{b}
	Crowded curriculum ^h	Restricted curriculum ^{b}
	Funding ^{<i>a</i>.<i>h</i>}	Funding ^f
	Access to and lack of equipment ^{$\underline{\alpha}$}	Ethos of PA for life within the school $^{\underline{b}}$
	Support from other staff ^{<i>a</i>}	Socioeconomic status of school ^{\mathcal{L}}
	Support from administration ^{a.h}	Time tabling ^f
	Access to professional development h	
	PE/sport not priorities in school $\underline{a},\underline{e}$	
	Large class sizes ^{a,h}	
	Budget constraints ^{h}	
	Insufficient infrastructure ^ℓ	
	Other teaching priorities $\underline{a}, \underline{e}$	
	Quality of facilities ^a	
	Level of professional development ^{h}	
	School executive attitudes toward $\mbox{PE}^{\underline{\alpha}}$	
	Insufficient number of PE staff ^{d, d}	
	Lack of performance measures for $PE^{\underline{e}}$	

Figure 2.1 Barriers to the Delivery of Physical Education and Physical Activity Programs to Primary and Secondary School Students. Many obstacles including administrators' attitudes toward physical education in elementary schools limited the opportunities for students to receive the adequate number of minutes in physical education and fitness (Committee on Physical Activity and Physical Education in the School Environment, 2013).

Direction For The Organization

Educators have small amounts of power over these difficult tasks which are connected to organizational components. For instance, administrators had the ultimate say concerning decisions about classroom occupancy and allotment of space (Gill et al. 2020). In addition, they establish the atmosphere for the understood worth and resulting treatment of physical education and physical education teachers (Gill et al. 2020). The research indicated administrators' perspectives of physical education as independent from other educational subjects as well as the overall trend within education concerning high-standard examinations (Gill et al. 2020). Physical education teachers attempted to perform outcome-based instruction and structured examinations for the purpose of supporting the subject's offering. Educators recognized these approaches in anticipation of approving physical education as an educational matter. Nonetheless, even with the attention of principles amid the educators in the analysis of Gill et al. (2020) past study has recorded irregularity and deficit of responsibility in the manner they are carried out (Sallis et al., 2012).

Effects of Physical Activity & Fitness Toward Students' Health Physical Health

Enhances Fitness & Heart Health

Heart disease prevention can start in childhood especially since it begins to progress in early childhood. Physical activity is an effective way to deter and delay the development of cardiovascular diseases (Proudfoot et al., 2019). Much of it has been discovered from data among adults who participate in physical activity. In addition, school-aged children who engage more in physical activity have better measures of cardiovascular fitness, calmer blood pressures, and more supportive indicators of arterial firmness (Proudfoot et al., 2019). These favorable connections seen in both adults and children directed the American Heart Association (AHA) to involve physical activity as a part of its plan of fundamental deterrence of heart disease (Proudfoot et al., 2019).

Based on the involvement of participants in physical activity, significant circulatory fitness, greater autonomic function, and reduced arterial stiffness in the time of earlier childhood were the results from the study of Proudfoot et al. (2019). Moderate-to-vigorous physical activity offered more advantages because it was linked with decelerating the gradual thickening of arteries, which is an indicator of atherosclerosis (Proudfoot et al., 2019). High blood pressure is connected to atherosclerosis because the hardening of the arteries takes place when fat, cholesterol, and other substances grow in the walls of arteries (Mount Sinai, 2022). An inflation of systolic blood pressure was also discovered in girls by engagement of moderate-to-vigorous physical activity (Proudfoot et al., 2019). The analysis from Proudfoot et al. (2019) expanded the data that physical activity was profitable to cardiovascular fitness and supplied a significant difference in the publications showing the preventative measures of physical activity on cardiovascular health start in the early years of youth.

Physical activity suggestions for school-age children and youth have been created by several countries and institutions. At the minimum, 60 minutes of daily moderate-to-vigorous physical activity is the proposed direction for children and adolescents (Larrinaga-Undabarrena et al., 2023; Weaver et al., 2021; Egan & Miller, 2019; Thompson et al., 2018; Ferkel et al., 2014). One of these guidelines was produced in the context of a narrative review which connected physical activity to many health and observable outcomes in school-aged children and adolescence (Strong et al., 2005). The CDC supported the meta-analysis and it was advanced by a multifaceted committee of experts (Janssen & LeBlanc, 2010). The group of specialists attained the following results: (a) Research-based information was compelling to deduce that physical activity had profitable outcomes on obesity (within physically heavy and obese youth), musculoskeletal health and fitness, and many elements of cardiovascular health. (b) Data from academic research was sufficient to infer physical fitness had positive impacts on adiposity measures in those with a standard body weight, normal blood pressure in youth, quantities of plas217

ma lipid and lipoproteins, conventional circulatory health risks (inflammatory signs, endothelial capacity, and irregularity rate of the heart), and multiple portions of mental health (anxiety, depression, and self-identity) (Janssen & LeBlanc, 2010). Research provided ample information on how physical activity and fitness benefits students' physical health.

Supports Healthy Body Composition

Physical activity in children can promote a decrease in body fat and promote a healthy body composition. A study completed by Sardinha et al. (2017) examined the effects of moderate-to-vigorous physical activity on body composition compared to sedentary students. The study included 386 participants and looked at body fat mass, body mass index, waist circumference, and trunk fat mass as outcomes. Replacing sedentary time with moderate-to-vigorous physical activity for 15 minutes in one group and 30 minutes in another resulted in lower body fat mass and smaller waist circumference for participants. Sardinha et al. (2017) also concluded simply replacing sedentary time with light physical activity did not have a significant impact on reducing the measurable outcomes. Moderate-to-vigorous physical activity for elementary school students has the potential to decrease body fat and promote a healthy body composition (Sardinha et al., 2017).

Strong Development in Bones

Bone health and muscle strength are components that are produced from physical fitness and activity. It is understood physical exercise throughout preadolescence supports the development in peak bone mass, which plays a part in lowering the threat of osteoporosis and fragmentations all through life (Proia et al., 2021). A structured analysis of 19 longitudinal studies authenticated the significance of physical activity for bone mass maturation, specifically in the stages of substantial development, namely in the initial months of life and puberty (Alves & Alves, 2019). Fuchs et al. (2001) reported the outcomes of a form of strong physical activity that is jumping, on bone mass from a mix of 89 students ages from 5.9 to 9.8 years (as cited in Alves & Alves, 2019). The control group carried out exclusively recreation movements, without impact, and the intervention group executed robust exertions; 100 jumps off a 2 ft stand, over seven months, three times a week. Amongst the two groups, there were no maturation variances within height, weight, and obesity; however, the intervention class increased more in bone mass compared to the control group, 4.5% vs. 3.1%, appropriately. Elementary students can increase their bone mass through physical activity according to the research of this study and jumping is a safe exercise to implement for bone density (Alves & Alves, 2019).

Boosts Immune System

The immune system can be strengthened through the application of physical exertion and fitness. After a physical activity session, children who

were overweight in contrast to their peers who were normal weight, displayed greater amounts of lymphocytes and a reduced T-cell percent at rest (Cicchella, 2022). The National Cancer Institute [NCI] (n.d.) explained lymphocytes as a kind of immune cell which is created in the myeloid tissue, and located in the blood and lymph tissue. There are two key forms of lymphocytes: T lymphocytes and B lymphocytes. T lymphocytes help destroy tumor cells and reinforce control immune reactions, and B lymphocytes produce antibodies. T-cells are also a form of white blood cells. They are connected to the body's defenses and grow from stem cells in the bone marrow. T-cells help guard the human body against infection and can help battle cancer (NCI, n.d.).

Students can reap the physical benefits of protecting their bodies from sickness through engagement of physical activity. This outcome was received by offering physical activities that consisted of circus movements, which made the experience physically testing and simultaneously entertaining (Cicchella, 2022). Momesso dos Santos et al. (2015) defined circus exercises as recreational and amusement activities which can be an engaging structure of involvement for children. Creative gymnastic motions are described for this type of physical exertion, which included acrobatic motions, dance, bar climbing, composure exercises, trapeze, and shuffling with balls and clubs. These movements call for both aerobic and anaerobic metabolism (Momesso dos Santos et al., 2015). Twice a week for 4.3 ± 0.5 , the children performed these activities. The exercises contained a 10-minute warmup with leisure and traditional dance accompanied by 40 minutes of solo gymnastics, with a mixture of spins, twists, and jumps on a springboard; stabilizing on a balance beam; and elementary gymnastics skills on a rope, trapeze, and podium. The physical activity session concluded with 10 minutes of stretching exercise and the entire session was 60 minutes at a mean pulse rate of 185 bpm (Cicchella, 2022).

Research showed strength, aerobic, elasticity, and coordination training are all fitting for boosting the immune system in children. An immediate impact on the elevation in the immune response of cells was produced by resistance training, and at the same time relaxation and stretching movements played a part in lessened stress and improved interior movement of calming hormones (Cicchella, 2022). Both healthy and ailing children can receive the many profound and strong outcomes of physical activity in energizing immunity.

Improves Sleep

There is evidence to support the connection between daily physical exercise and sleep framework in children and teenagers (Larrinaga-Undabarrena et al., 2023). Outdoor recreation and physical activity are positively related with nearly all sleep results in young pupils. An examination by Larrinaga-Undabarrena et al. (2023) searched the degrees of physical exercise and the grade of sleep in Northern Spain children aged between six and seventeen years old, and assessed the attainable distinctions between those who executed some type of physical sports activity and who did not. 1082 children (50.1% male and 49.9% female) were involved in the test and a sum of 723 (66.94%) of the students said they train in some physical sports activity (Larrinaga-Undabarrena et al., 2023). The study utilized accelerometers, which is an electronic tool that calculated how much activity one made while sleeping and this information was then applied to an algorithm to approximate sleep time and quality (Sleep Health Foundation, 2015). It acquired substantial differences in all degrees of physical activity, as well as in sleep efficacy, with advanced levels of physical activity (sedentary p = 0.001; light p = 0.017; moderate p = 0.002) and better sleep effectiveness (p = 0.002) in those children who completed some kind of physical sports activity. A major contrast in time spent in sedentary activities was also noticed between primary and secondary students of both genders and without consideration of the level of physical sports activity execution (Larrinaga-Undabarrena et al., 2023).

The amount of sleep displayed a crucial importance in various physical and mental operations. Depletion of sleep hours changed the degree of arousal during sunlight hours, obstructing active and productive actions (Larrinaga-Undabarrena et al., 2023). The operation of alertness, circumstantial awareness, watchfulness, degree of distraction, pressure and instruction of attention are all part of one's level of arousal. Essentially, how prepared an individual is to fulfill proper functions in a punctual and efficient manner (Skybrary, n.d.). Waking and sleeping patterns shift noticeably during childhood as a result of hormonal changes in the secretion of melatonin and the managing structures of sleep (Larrinaga-Undabarrena et al., 2023). The National Center for Complementary and Integrative Health [NCCIH] (2022) defined melatonin as a hormone the brain creates in response to darkness. It assists with the arrangement of one's circadian rhythms and with sleep. Being susceptible to light at night can also inhibit melatonin creation. Consequently, physical exercise was influential due to heightened melatonin levels and can have a beneficial effect on the deduction of insomnia (Larrinaga-Undabarrena et al., 2023). Physical exercise has been regarded as an efficient, drug-free approach to ameliorate sleep (Fonseca et al., 2021). Also, initiating an active practice and lessening light/blue light rays from digital devices in the time before sleep are correlated with better sleep accommodation, lesser nighttime awarenesses, and enhanced sleep length (Larrinaga-Undabarrena et al., 2023).

The outcomes of the review revealed moderate or vigorous physical exercise boosted sleep effectiveness in school-age children, with a shared relation, by which extended moderate or vigorous physical activity improved sleep duration and efficacy (Larrinaga-Undabarrena et al., 2023). Moreover, it was realized students who ran every morning for 30 minutes for 3 continuous weeks displayed enhancements in optimal levels of sleep, in the company with a declined sleep latency (Larrinaga-Undabarrena et al., 2023). Sleep Foundation (2023) describes sleep latency as the measure it takes for an individual to fall asleep after the lights are shut off. 10 and 20 minutes is considered to be the typical range for a wholesome person to fall asleep. Although various people encounter unalike sleep delays, exceedingly short sleep intermissions of less than eight minutes suggested tiredness and can be the outcome of sleep distress or defective sleep caused by a hidden sleep disorder (Sleep Foundation, 2023). This may be related to the effects of the current review, with notably higher sleep regulation in children and adolescents who repeated physical sports activity, in contrast to those who did not (Larrinaga-Undabarrena et al., 2023). A remedy to increase the grade of sleep in children and older youth was discovered in the endorsement of recreations namely outside play and structured sports programs.

According to Fonseca et al. (2021) extended periods of sleep and better sleep conditions were related with stronger levels of physical fitness. The goal of this study was to encapsulate the verification of the correlations between length and quality of sleep with cardiovascular and muscular exercise in youth ages 6-19 years (Fonseca et al., 2021). To boost common health and well-being, American children aged 6-13 years ought to sleep between 9-11 hours every night and teenagers aged 14-17 years sleep 8-10 hours each night as recommended by The National Sleep Foundation [NSF] (Hirshkowitz et al., 2015). Yet, it was repeatedly seen that brief lengths of sleep among older youth resulted from a discord between genetic intervals on amounts of sleep and social implications namely morning school routines, which constituted a valid wake-up time operator throughout the week (Fonseca et al., 2021).

The results from Fonseca et al. (2021) indicated decreased sleep lengths were connected to reduced cardiovascular exercise, lesser degrees of strength training, and flexibility in American older youth; however, no correlations were noticed between durations of sleep and cardiovascular training or resistance training amid a sizable case of European children aged 6-9 years old (Fonseca et al., 2021). The sleep latent quantity was favorably related with cardiovascular exercise (Countryman et al, 2013). Stronger cardiovascular health was associated with a lesser possibility of acquiring sleep-related anxiety complication in adolescents. Likewise, girls who identified as healthy were twice as likely to get better quality sleep than their out-of-shape peers. Nevertheless, deficient circulatory fitness was associated with girls who had poor sleep status. Furthermore, defective sleep value and condensed duration of sleep in girls were connected to lower degrees of muscular strength, cardiovascular health, and elasticity (Fonseca et al., 2021).

Mental Health

Reduces Feelings of Stress, Anxiety, & Depression

Physical activity lessens the negative conditions of mental health, which are stress, anxiety, and depression (Committee on Physical Activity and Physical Education in the School Environment et al., 2013). Anxiety and stress are many times applied correspondingly. However, while the two participate

in certain common conditions, there are further significant discrepancies. It is vital to comprehend these contrasts, as it can aid students in discovering the most profitable manner to cope with symptoms and boosts mental health (Clinical Partners, 2020). Collective signs consist of elevated pulse rate, perspiring, and experiencing nervousness or uneasiness. These indications happen due to stress and anxiety prompting the discharge of adrenaline in reaction to an anticipated or tangible risk (Clinical Partners, 2020).

Stress is a common reaction to a circumstance or situation which feels difficult. It is the human body's first response to stressors, namely school pressure and/or social difficulties among students (Clinical Partners, 2020). While tension can be unpleasant, it can further be a beneficial incentive to assist pupils to undertake a problem. Nevertheless, if pressures carry on and become long-term, they could cause physiological and psychological health complications, such as migraines, exhaustion, and depression (Clinical Partners, 2020).

Anxiety is a group of emotions specified by uncontrolled fear and worry, despite the fact there is not an evident danger (Clinical Partners, 2020). Contrasting stress, anxiety is not consistently connected to a special occurrence or circumstance. Individuals with anxiety disabilities may face emotions of fear, restlessness, or discomfort which can continue and impede a quality standard of living. Lifestyle alterations, such as physical activity, meditation, improved sleep are manners students can cope with stress. However, anxiety generally involves a more thorough method which covers psychoanalysis, medicine, and personal care strategies (Clinical Partners, 2020).

Numerous kinds of physical exercise-involving cardio activity, muscle endurance, yoga, dance, flexibility training, walking schedules, and weightlifting-have demonstrated enhancements in mood and additional mental health symptoms (Committee on Physical Activity and Physical Education in the School Environment et al., 2013). The verification is compelling for cardio-endurance exercising, specifically for alleviation of anxiety features and stress due to more executed reviews (Committee on Physical Activity and Physical Education in the School Environment et al., 2013). It is no wonder physical movement increases mental health and is physically recognized to strengthen the communication of monoamines, a result resembling antidepressants. Monoamines are neurotransmitters which contribute to the development of the central nervous system (Sarkar et al., 2018). Researchers from Duke University discovered physical exercise was more advantageous than sertraline (Zoloft) in alleviating depression (Blumenthal et al., 2020). The 14-week study consisted of 156 middle-aged and elderly patients diagnosed with major depression. Blumenthal et al. (2020) followed up with the participants six months later and found 8% of patients in the exercise group had depression reappear, while 38% of the drug-only group and 31% of the exercise-plus-drug group regressed. Physical exercise has a significant effect on cognitive capabilities and mental health, and it is directly one of the greatest remedies we have for most psychiatric issues (Ratey & Hagerman, 2008).

Physical exercise also triggers the secretion of endorphins, which possess a prohibitory outcome on the central nervous system, producing a sense of peace and refreshed mood. Discontinuation of physical activity can bring about irritableness, agitation, anxiousness, and annoyance as an outcome of a decreased level in endorphins (Committee on Physical Activity and Physical Education in the School Environment et al., 2013). In addition, it seems the positive effects of physical exercise on the prohibition and handling of depression may be the outcome of modifications in the central nervous system intervened in some measure through elements of neurotrophy, which influence the neural cell endurance, improvement, and operations (Committee on Physical Activity and Physical Education in the School Environment et al., 2013). A review from Martikainen et al. (2013) discovered children who were more able-bodied created fewer amounts of cortisol in the reaction to stress, recommending physical activity develops mental health by balancing the hormonal feedbacks to stress.

Beyond just the traditional forms of physical activity, yoga has been exhibited to be an efficient manner to cope anxiety in children. Many schools and teachers have accepted and integrated yoga into their physical education curriculum. Compelling outcomes of yoga were seen in boosting the health conditions of students with disabilities, such as the visually challenged, on the autism spectrum, and those with Down syndrome (Cicchella, 2022). Latest findings on the outcome of yoga amid the COVID-19 pandemic displayed the benefit of yoga and reflection in decreasing anxiety and mental distress in children. The enlarged flow of Gamma-aminobutyric acid (GABA) in the thalamic cells of the brain appear from the physical fundamental processes of these unhurried movements (Cicchella, 2022). As stated by the Cleveland Clinic (2022), GABA is a chemical messenger in a person's brain. It impedes one's brain by obstructing particular signals in the cerebrospinal nervous system (brain and spinal cord). It is acknowledged for creating a serene effect and reported to play an important part in managing nerve cell hyperactiveness connected with anxiety, stress, and fear. The cells in the thalamus (like the size of a peanut) help relay information throughout the human body (Cleveland Clinic, 2022). Any information perceived through the body's senses (excluding smell) requires process through one's thalamus prior to being directed to the brain's cerebral cortex for explanation. Furthermore, the thalamus influences sleep, alertness, awareness, learning, and memory (Cleveland Clinic, 2022). Following a 12-week, 60 min/week yoga exercise program, the quantities of GABA in children remarkably elevated compared to other contents implementing low-density calisthenics (60 minutes of walking on a treadmill at 2.5 mph), with both exercises carried out at a metabolic identical of 3 METS (Cicchella, 2022).

MET means metabolic equivalent of task and a proportion of engaging metabolic rate relative to inactive metabolic rate. It is the percentage of energy dispersed per unit of time (Healthline, 2019). The force of movements or exercises are a way of illustrating metabolic rate. The vigor a person expends seated at rest is one MET – the resting or basal metabolic rate. For example, an exercise with a MET worth of 4 implies one is deploying four times the power than one would if they were seated still (Healthline, 2019).

Light < 3.0 METs	Moderate 3.0–6.0 METs	Vigorous > 6.0 METs		
Sitting at a desk: 1.3	Housework (cleaning, sweeping): 3.5	Walking at very brisk pace (4.5 mph): 6.3		
Sitting, playing cards: 1.5	Weight training (lighter weights): 3.5	Bicycling 12–14 mph (flat terrain): 8		
Standing at a desk: 1.8	Golf (walking, pulling clubs): 4.3	Circuit training (minimal rest): 8		
Strolling at a slow pace: 2.0	Brisk walking (3.5–4 mph): 5	Singles tennis: 8		
Washing dishes: 2.2	Weight training (heavier weights): 5	Shoveling, digging ditches: 8.5		
Hatha yoga: 2.5	Yard work (mowing, moderate effort): 5	Competitive soccer: 10		
Fishing (sitting): 2.5	Swimming laps (leisurely pace): 6	Running (7 mph): 11.5		

Figure 2.2 This chart provided an approximate MET values for a variety of light, moderate, and vigorous activities (Healthline, 2019).

A parallel result was discovered for tai chi, an historical Chinese practice of physical activity and fitness. As claimed by Lee (2020) tai chi is a structure of sustained and uninterrupted activity that can be exercised for health or as a martial art. Children with disabilities and in normal school classes experienced a lessening of anxiety and mood improvements due to the positive effects of tai chi, and it is included in the physical education curriculum in China (Cicchella, 2022).

Improves Focus & Concentration

A systematic analysis completed by Daly-Smith et al. (2018) comprehended critical physically active learning (PAL) and classroom movement breaks (CMB) on student's physical exercise, cognition, educational success, and classroom conduct. As claimed by previous research, highly developed sessions of movements have significant effective results on cognition (Erickson et al., 2019; Michael et al., 2015). One of the new findings within examination is classroom behavior was positively enhanced following extended moderate-to-vigorous physical activity (>10 min), or a briefer vigorous period (5 min) within CMB/PAL rounds (9 out of 11 interventions) (Daly-Smith et al., 2018).

Some of the subject matters which were also examined through use of physical activity are the management system of the brain and time-on-

task (ToT) measurements (Erickson et al., 2019; Daly-Smith et al., 2018). ToT can be described as the quantity of time one expends on being energetically engaged in the process of learning, attaining new abilities, understanding, principles, and perspectives (Wade, 2020). Two CMB examinations evaluated ToT and one estimated academic success. For ToT, the application of 4 minutes of high-intensity interval exercise (d=0.31 to 1.076) ameliorated the students' mental capability (Erickson et al., 2019; Daly-Smith et al., 2018). In the examination of evaluating academic attainment, enhancement was observed in the amount of math problems responded appropriately after the 10- and 20-min settings, yet not the 5 min position, proposing a viable threshold result (Daly-Smith et al., 2018). Eight cognitive operations were analyzed over six reviews: time in responding, attentiveness, hesitancy, short-term memory, supervisory attentional system, velocity and recollection, word remembrance and processing speed (Daly-Smith et al., 2018). Comprehensively, outcomes indicated no alteration on the account of involvement in the CMB with only two favorable effects at the separate exam level (attentiveness and word remembrance) (Daly-Smith et al., 2018). CMB provided more opportunities for physical activity, and improved focused engagement in academic learning and performance.

Keeps The Brain Fit

Physical exercise provides not only for the body to be strengthened, but also the brain. According to Ratey (2017) physical activity is vitally important to the fitness of the brain since it is considered a muscle. "Exercise is like fertilizer for the brain...it is so good, it's like Miracle Gro" (Ratey, 2017). Blood circulating throughout the body makes the brain operate at its best and to sustain peak fitness for the brain, bodies must be highly physically engaged (Ratey & Hagerman, 2008). Ratey and Hagerman (2008) continued to argue the focal point of physical activity is to enhance and condition the brain. A Stanford University study learned just performing something as straightforward as walking, imaginative production was improved by 60% while walking and the result carried on for the following 10 minutes after participants ceased

Population or Measure	Outcome	Grade
Children <6 yr	Insufficient evidence to determine the effects of moderate- to vigorous-intensity PA on cognition	Not assignable
Children 6–13 yr	Both acute and chronic moderate- to vigorous-intensity PA interventions improve brain structure and function, as well as cognition, and academic outcomes	Moderate
Children 14–18 yr	Limited evidence to determine the effects of moderate- to vigorous-intensity PA on cognition	Limited
Young and middle-age adults 18–50 yr	Insufficient evidence to determine the effects of moderate- to vigorous-intensity PA on cognition	Not assignable
Older adults >50 yr	Both acute and long-term moderate- to vigorous-intensity PA interventions improve brain structure and function, as well as cognition	Moderate
Adults with dementia	Evidence suggests that PA may improve cognitive function	Moderate
Risk of dementia and cognitive impairment	Greater amounts of PA reduce the risk for cognitive impairment	Strong
Other clinical disorders (i.e., ADHD,	Evidence that moderate- to vigorous-intensity PA has beneficial	Moderate
schizophrenia, MS, Parkinson's, stroke)	effects on cognition in individuals with diseases or disorders that impair cognition	
Biomarkers of brain health	Moderate- to vigorous-intensity PA positively influences biomarkers, including MRI-based measures of function, brain volume, and white matter	Moderate
Acute bouts	Short, acute bouts of moderate- to vigorous-intensity PA transiently improves cognition during the postrecovery period	Strong
Overall	There is a consistent association between chronic MVPA and improved cognition, including performance on academic achievement tests, neuropsychological tests, and risk of demontia Effects are demonstrated across a cardient of	Moderate

normal to impaired countive health status NF & SCIENCE IN SPORTS & EXERCISE

(Oppezzo & Schwartz, 2014).

Table 2.1 Committee-assigned Grades for the Effects of Physical Activity on Various Ages and Clinical Outcomes. A review from Erickson et al. (2019) determined effects of phys-



ical activity on brain function and ranked the outcomes of them.

Figure 2.3 Children's average cognitive action who performed an exam following 20 minutes of sitting in contrast to 20 minutes of walking. Blue shows lower brain motion, while red points out higher brain movement (Ferreira & Billings, 2016).

Sharpens Memory

Memory plays a critical role in the cognition of students recalling and understanding information. An area of memory is visual and more specifically the Visual Spatial Working Memory (VSWM). As reported by Kulman (2015) VSWM controls the optical information saved in the brain to sort through knowledge. Its abilities contain the capacity to remember coloring and forms plus their motions and positions (Kulman, 2015). These capabilities help stu-

functions require a certain degree of visualization (Kulman, 2015). A study by Howie et al. (2015) had ninety-six 4th and 5th grade students in 5 South Carolina classrooms to ascertain the cause-and-effect relationship of CMB with executive function and math accomplishment. Students were intermixed to acquire each of 4 treatments: 5-min, 10-min, or 20-min physical exertion intermission or 10 min of inactive teaching guided by research personnel. The analysis disclosed 10 min and 20 min of keen CMB satisfactorily sharpened performance on a math exam and 5, 10, or 20 min did not adversely affect achievement on the math or executive function operations (Howie et al., 2015). The results directed influence for educators to administer physical exercise in classrooms at a minimum of 10 minutes to attain possible educational gains. With inflexible school programming and coursework, most physical activity breaks were executed in schools less than 10 minutes (Howie et al., 2015). Supplementary development and resources may support educators and administrators to direct 10-minute CMB. If facilitating physical activity breaks for at the bare minimum of 10 minutes is not viable, schools could perform other physical exercise opportunities of related lengths to obtain acceptable developed academic advantages (Howie et al., 2015)

A meta-analysis conducted by Breslin et al. (2023) discovered the positive impacts of The Daily Mile[™] (TDM) on children's physical fitness, physiological health, mental health, well-being, educational achievement, and physiological performance from 13 studies. The systematic review began from the birth of TDM (2012) and concluded on June 30, 2023 (Breslin et al., 2023). TDM was implemented in over 18,021 schools and preschools throughout the globe, along with other approaches to support public health (TDM, 2022). Vlasova (2023) stated there are 130,930 K-12 schools in the United States of America per the National Center for Education Statistics [NCES], and only 2,605 of those schools are participating in TDM (TDM, 2022). One of the beneficial effects which came from children engaging in physical activity and fitness through TDM was VSWM (Stuart-Cassel, 2015). A short duration of TDM was not detected to increase cognitive performance; however, two reviews stated longer periods of involvement in TDM (3 months or more) elevated VSWM than those who did not engage in it (Breslin et al., 2023; Booth et al., 2022).

Emotional Health Increased Self-Esteem & Happiness

Physical activity can also improve positive conditions in emotional and mental health such as self-concept and self-esteem. A meta-analysis was conducted to identify how self-concept and self-esteem were improved in children and adolescents through physical activity (Liu et al., 2015). Self-esteem was explained as emotions of one's own self-respect, registering a person's estimation of his or her own perception. Self-concept is an individual's understanding of himself or herself, such as what a human being ponders about themselves. Both two components in a person have extensive effects on mental status and conduct (Liu et al., 2015). Positive self-concept was seen as a beneficial result in numerous educational and cognitive circumstances, and self-concept was considered as an arbitrating feature for helping the attainment of specific goals, namely as scholastic accomplishment (Liu et al., 2015). The narrative review offered additional proof that intervention of physical activity by itself characterized an ameliorating effect on self-concept and self-worth in children and teens (Liu et al., 2015; Committee on Physical Activity and Physical Education in the School Environment et al., 2013). The outcomes supported guidelines for expanding physical activity to develop physical and mental health. The conclusions of this study also disclosed the environment of physical activity intervention was likely essential to influence the result of physical activity intervention on self-esteem.

Physical activity and fitness play a part in elevating mental and emotional health dispositions, such as happiness. Richards et al. (2015) analyzed the connection between physical activity and happiness within 15 European countries. The goal of the study examined the domain and intensity-fixed connections of physical activity with happiness. The research aimed to inform future studies and systems on addressing physical activity interventions to increase happiness and further positive forms of mental and emotional health (Richards et al., 2015). From a public health approach, "intentional behavior" is an indicator which is independently changeable and as an illustration of this, physical activity was discovered as a plan of action can influence happiness (Richards et al., 2015, p. 2). Based on the responses from the participants in this study, there was a remarkable and beneficial connection between physical activity engagement quality and happiness, with approximately 86% of those who were exceptionally active communicating feeling cheerful (Richards et al, 2015). A favorable cause and effect association discovered the quantity of physical activity and merriment. In comparison to inactive participants, the altered differences of being cheerful was 20% greater for people inadequately active and this escalated to 29% and 52% greater for those satisfactorily and highly active, respectively.

With regards to gender, there were no crucial reactions with sex for the examinations of walking or adequate physical activity. Richards et al. (2015) though learned a profound relationship with gender for vigorous physical exercise. The gender arranged review discovered an outstanding connection between vigorous physical training and happiness for females [OR = 1.07, 95% CI = 1.03- 1.11], but not for males [OR = 1.01, 95% CI = 0.98-1.03] (Richards et al., 2015).

Relational Health Better Social Skills

Various reviews investigated the connection between physical activity, health effects, and comprehension in children with special needs. One examination evaluated the outcomes of a 12-week organized physical movement program on relational interplay and conversations in children with autism spectrum disorder (ASD) (Gao et al., 2018). A randomization of 50 children with ASD were designated into test (n = 25) or control (n = 25) groups. Remarkable developments in dialogue, teamwork, relational connections, and self-restraint sections were distinguished in the test group, whereas no considerable variances were discovered in the control group. It was determined the 12-week physical movement program favorably influenced interpersonal abilities, discourse, efficient feedback, and recurrence of articulation for neurodivergent children (Gao et al., 2018). Both the general public of students and children with special needs can gain positive relationships when physical activity is involved into their daily lives.

Furthermore, research advocated social environment and welfare in schools may affect how intently pupils engage in physical education and activity. For instance, an analysis searched the long-term association between bullying, physical exertions, and standards of living, observed children of average weight who encountered bullying in their physical education classes were less presumably after one year to exercise and pursue fitness (Jensen et al., 2013). The reporters inferred attempts to inhibit ridicule and enhance relational health in physical education might strengthen the measures of children's physical activity and health-related standards of living (Jensen et al., 2013). An associated study noticed pupils who were bullied at school appeared to have fewer days of physical education and were less able to accomplish their daily aimed objectives than students with no bullying subjection (Stuart-Cassel, 2015). Physical education teachers can think of ways to limit and/or remove any amount of bullying for the sake of having a healthy-learning environment for all students.

Academically

Improves Academic Performance

Educational institutions provide a distinctive space to positively impact children's physical activity measures. A systematic review by James et al. (2023) analyzed publications encompassing physical activity's byproduct on educational achievement and produced an understanding of the factors connected to the linked outcomes. Children who were obese, commonly growing, normal weight, challenged, with a progressive impairment, from an impoverished class, or a diverse minority were added into the review. A total of 19 evaluations were inserted, with a total of 6788 participants, a mean age of 9.3 years (50.2% boys, and 49.8% girls). Altogether, 63.2% were able-bodied, while 36.8% were confirmed with a disablement (James et al., 2023). The review accepted physical exercise as either favorably related with academic achievement or there is a nonsignificant connection between the two factors in either direction. It was not able to prove an ideal regularity of physical activity to enhance academic success; nevertheless, it noticed complete quantity, length of time, intensity, and category of physical activity can have a crucial outcome (James et al., 2023). Physical exercise degrees of 90 minutes or more per week were correlated with improved scholastic performance, as was physical activity implemented at moderate-to-vigorous and strong intensity levels. The prime extent of physical fitness was observed to be 30-60 minutes for each bout (James et al., 2023).

However, data specified cardiovascular fitness and agility-based games were most beneficial with a handful of academic achievement measures, i.e., mathematics, reading, and spelling performances. In addition, many studies communicated lengthened time assigned to physical activity did not have a damaging result on educational performance. Quite the opposite, numerous reviews revealed more time allotted to physical movements was effectively related with academic success (Michael et al., 2015). The objective of James et al. (2023) was to help communicate scientific-based interventions and policies encircling the execution of physical activity in schools, by which health advocacy and excellent academic achievement must be a prime concern.

Improves Test Scores

A public high school in Naperville, Illinois (Naperville Central) validated test scores can ameliorate through the implementation of daily physical education and activity (Ratey, 2017). In 2015, The Naperville School district contained 19,000 pupils and detected the athletic adolescents predominantly participated in physical education classes. The high school modified their physical education program and concentrated on acquiring all students to engage. Heart rate monitors had a role in students' grades and it was frequently discovered pupils who did not look physically strong were in fact applying themselves more in physical education than some of the student-athletes, and all became fit (Ratey, 2017).

In 2012, the U.S. National adult obesity rate and California's child obesity rate was more than 33% which included overweight status (Ferreira & Billings, 2016; SHAPE, 2016; CDC, 2015). In the 2016 Shape of the Nation Report, 54-84% of parents considered physical education as slightly as significant as other educational subjects. However, 76% of parents deemed more physical education in schools can help manage or stop childhood adiposity (SHAPE, 2016). Furthermore, the U.S. population was 323.1 million (United States Census Bureau, 2016) and Naperville Central lowered the national percentage by 3% (a difference of 9.7 million and new total of 313.4 million) (Ratey, 2017). Mathematically, 313.4 million people were still considered obese and overweight. Adiposity in the U.S. impacts 100.1 million (41.9%) adults and 14.7 million (19.7%) children, and accounts for nearly \$147 billion in yearly Furthermore, the students at Naperville Central did not simply gain more fitness, but educators learned examinations improved from the youth (Ratey, 2017). The school requested to participate as their own nation for the TIMMS exam, a global systemized assessment on math and science capability, where the U.S. generally placed in the upper teens and 20s. Naperville School district 203, adding it as a country, arrived at #1 in the globe in science and #6 in math—and a critical component was the fitness program that over 20 years had progressed, in which all pupils spent a daily 40-minutes of fixed exercise on health in the physical education classes (Ratey, 2017).

Better Attendance

Physically active students tend to have ameliorated school attendance (CDC, 2014). A 2015 summary from the National Collaborative on Education and Health revealed offering pupils with healthy school conditions, along with consistent access to physical education and physical exercise, is a significant approach for handling habitual absences. In the past decade, the quantity of studies assessing the connection between physical activity and fitness, and student performance improved (Stuart-Cassel, 2015). The output of analysis incorporated a quantity of comprehensive school-based examinations which investigated the relationships between cardiovascular exercise, body mass index (BMI), and production on systemized reading and math exams (Stuart-Cassel, 2015). The Texas Fitness Study is one influential investigation that consisted of over 2.4 million public school pupils (Welk, 2009). The analysis noticed children with stronger cardiovascular fitness measures and lower BMIs achieved greater scores on systemized assessments, improved on school attendance, and had fewer disciplining matters than students who were less vigorous (Welk, 2009). Equivalent reports in California and Nebraska discovered corresponding outcomes, supplying additional data which students who were more healthy and physically energetic also achieved better results on established measures of educational performance (Stuart-Cassel, 2015).

In another study completed by de Jesus et al. (2022) inquired about the correlation between weekly attendance in physical education and the regularities of various structures of physical activity amongst children in public schools. The findings demonstrated a greater weekly attendance in physical education (≥ 2 /week) was connected to effective play and organized physical activity between boys and girls. The inactive recreation was adversely affiliated with age (10–12 years) amid boys. Moreover, boys who appeared at physical education ≥ 1 /week also demonstrated a greater recurrence of organized physical exercise (de Jesus et al., 2022). Inclusively, boys and girls with a greater weekly attendance in physical education (≥ 2 /week) equally displayed an increased rate of occurrence in daily physical activity and simultaneously a decreased frequency of sedentary behaviors. Appearing at physical education ≥ 1 /week was linked with a reduced frequency of inactive habits only among girls (de Jesus et al., 2022). These outcomes were applicable and validated the evidence to strengthen the significance of physical education, as a fundamental component for the health development of children.

Summary

According to the literature, children and adolescents participated in relatively 40% to 45% of moderate-to-vigorous physical activity during physical education (Fröberg, 2022; SHAPE, 2016). For this reason, physical education seems to be an efficient sphere for the advancement of physical exercise, specifically among physically inactive children and teenagers, given that physical education could potentially be the only occasion for involvement in structured physical activity. This chapter addressed the various components of physical education, two national educational policies with a few of its facets, physical education in California schools and the consequences that derive from it, and the effects of physical activity and fitness on students' health. Chapter 3 involves policy recommendations to meet California Physical Education minutes and improved accountability systems for practice implications. In direction for future study, follow-up will be researched on the litigated school districts, and the need for physical education and the purpose of adhering to minutes will be the conclusion of this project.

Chapter 3: Implications

Introduction

Based on literature about physical activity in children, sedentary lifestyles are too common, many students do not satisfy the national directives for physical activity, and minutes for physical education are not being adequately supplied (SHAPE, 2016). Several different global health organizations such as the World Health Organization (WHO), Centers for Disease Control and Prevention (CDC), Institute of Medicine (IOM), United States Department of Health and Human Services (HHS), and National Association for Sport and Physical Education (NASPE) encourage children to engage in at least 60 minutes or more of daily moderate-to-vigorous physical activity while evading extended durations of inactivity (Larrinaga-Undabarrena et al., 2023; CDE, 2022; Weaver et al., 2021; Egan & Miller, 2019; Thompson et al., 2018; Ferkel et al., 2014). The national proposal of 60 minutes per day is low within the levels of children's physical activity (Egan & Miller, 2019; Kahan & McKenzie, 2019). Numerous elementary-aged children in California fall below the daily national recommendation and lower than 50% of schools were acquiescent with the California Physical Education minute guideline (Calvert et al., 2020;

Egan & Miller, 2019; Kahan & McKenzie, 2019). Students in California from grades one through six are to receive "...a total time of not less than 200 minutes each 10 school days, exclusive of recesses and the lunch period" (CDE, 1976, EC Section 51210[a][7], para 59). A great deal of elementary students in California are receiving insufficient minutes for physical education and fitness within the school year.

The knowledge of this guideline allows schools to employ resources for programming and planning; moreover, physical education classes encourage and build up physical activity all through the day (Egan & Miller, 2019). In addition, the importance of following the correct amount of physical activity and fitness has shown positive factors in children. Exposure to and experiences in physical education dwindled or was eliminated within the past two decades. With students having to undergo two national educational policies, physical education was and has not been defended nor highly regarded by administrators (Gill et al. 2020). According to the NASPE, the aim of physical education is to build up physically literate individuals who are informed, competent, and assured to appreciate a lifetime of physical activity and fitness (Bryan et al., 2013). Physical education, in its essence, is about fitness and health. As a result, the core value and motivation of physical exertion is that it directs to fitness and health (Swaithes et al., 2021). In the upcoming sections of this chapter, a policy recommendation to suffice California Physical Education minutes and increased accountability for practice implications will be discussed. Follow-up will be discussed on the school districts that were in litigation. Lastly, the necessity of physical education and the purpose of complying to minutes will be the conclusion of this project.

Conclusions

The first determination observed within the literature was academic performance and examinations improved as a result of students engaged in physical activity and fitness. The byproduct of exercise for consistency was not proven; however, the quantity, length of time, intensity, and category of physical activity were (James et al., 2023). The concern of regularity in James et al. (2023) is contradictory due to organizations such as SHAPE America encouraging students to have a lifetime of healthful physical activity. In addition, the state of Illinois was one of the leading states in the U.S. that mandated daily physical education in which students performed better in school due to consistency. Programs namely Naperville Central High School demonstrated test scores can be ameliorated through the implementation of daily physical education and activity (Ratey, 2017). Moreover, the pupils at Naperville Central not only improved examination results, but also gained more fitness.

Research showed pupils who are offered weekly physical education exhibit better attendance. The findings from de Jesus et al. (2022) demonstrated a higher weekly attendance in physical education was related to effective play and structured physical activity between boys and girls. Schools need students

to attend on a regular basis, so they do not miss out on instruction and learning. When it becomes habitual, pupils can regress and encounter educational difficulties with lower achievement as well as undergo challenges outside the classroom (Kipp Texas Public Schools, 2022). Comprehensively, the boys and girls in the de Jesus et al. (2022) study demonstrated an increased rate of occurrence in daily physical activity and simultaneously a decreased frequency of sedentary behaviors due to a higher weekly attendance in physical education. Inactive lifestyles are factors that could arise within children when students are not consistently showing up to school, in which physical education can confront those issues to increase physical activity and improve attendance. Furthermore, states such as California provide funding to school districts based on the number of students who attend school. For example, if a student misses school in the San Marino Unified School District, the District loses a daily \$50 when a student is not in school (Woods, n.d.). According to Woods (n.d.) numerous pupils were not in school due to the flu season in the 2007-08 school years. Consequently, the District missed out on funding for what added up to a total of 17 pupils or converted into dollars, a reduction of \$105,000 in expected income for that school year. It was a great financial loss to the District since it is a small district with a budget of \$28.5 million (Wood, n.d.). It is imperative for parents to have their children attend school on a daily basis for the purpose of learning, funding, and community.

Another result of physical activity and fitness toward students' health is the relational development which is offered through physical education. Pupils can increase their social skills and understand the importance of teamwork. The study of Gao et al. (2018) reinforced the significance of physical education through a 12-week physical exercise program which positively influenced interpersonal abilities, communication, efficient feedback, and recurrence of articulation within neurodivergent children. These children probably experienced higher levels of oxytocin, which is a chemical in the body that enhances social connection and may assist in feeling more positive emotions (McCallum, 2021). Harvard University Health Services (2023) stated relational health is about building positive interactions and connections with others, which strengthens the emotions of security and happiness. Physical education can provide opportunities for positive relationships for all students including special needs. On the contrary, bullying is a factor that may arise in physical education, which diminishes relational health. Physical education teachers need to make efforts to reduce any amount of bullying within physical education (Jensen et al., 2013). When students feel welcomed and respected, they are more prone to be physically active and seek fitness.

Physical education helps develop positive self-esteem within students. Liu et al. (2015) performed a meta-analysis to identify self-esteem and self-concept within children and adolescents through physical activity. Both of these elements within mental and emotional health improved through ameliorating effects of physical exercise. Students who struggle with self-esteem can enhance their self-confidence. According to the Cleveland Clinic (2020) the endorphins in the human body activated by physical exercise can improve levels of confidence, which leads to an increased self-esteem. For example, this author had a fifth grader this past school year who had difficulty believing in themselves. Motor skills and foot-eye coordination were low, and thoughts of what others think negatively influenced his performance. After providing one-on-one support and advising the rest of his peers to cheer him on, this student overcame his obstacle of unbelief and executed the appropriate motor functions associated with the physical education activity. Liu et al. (2015) also shared the environment of physical activity intervention was likely essential to affect the result of physical activity intervention on self-importance. With more consistent opportunities of physical education, students can gain high levels of self-esteem and self-concept, which favorably influences their cognitive and academic performance.

Physical activity and fitness plays an important role in increased happiness as well. Richards et al. (2015) explored the relationship between physical activity and cheerfulness, and discovered 86% of the participants felt happiness through heightened levels of physical exercise. This comes to no surprise as one of the benefits of physical activity and fitness is how the human body releases endorphins. These are chemicals (hormones) within the body deliver when it experiences stress or discomfort, and it is the body's inherent painkillers (McCallum, 2021). Endorphins are distributed during enjoyable activities such as exercise (Cleveland Clinic, 2022); for instance, elevated measures of endorphins through running goes with the saying "runner's high".

However, not all people are able to jog. Other forms of physical activity which can increase endorphins are hiking, dancing, and power walking. Moreover, individuals who are deficient in endorphins may struggle with anxiety, depression, attention-deficit/hyperactivity disorder (ADHD), aches and pains in the body, and sleep complications (Cleveland Clinic, 2022). There are other hormones in the body that are increased through physical activity and fitness, which are dopamine and serotonin. Dopamine is another chemical which makes a person happy and exercise is involved in that production of endorphins. It also encourages an individual to do more activity since chemicals connect to the brain's reward centers (Cleveland Clinic 2022). Serotonin, although not an endorphin, does increase happiness and it balances mood and well-being (Cleveland Clinic, 2022; McCallum, 2021). The physiological components of physical activity and fitness enhance happiness within students, which speaks of the importance for elementary schools to follow the California Physical Education law for minutes. By schools adhering to the order, students can be happy with themselves and in their learning. It is one of the many reasons why schools need to increase time and days for physical education.

Many studies revealed physical activity and fitness demonstrated improved mental health for both children and adults. For areas where students experience stress, such as academic pressure, physical exercise can provide relief and a renewed mindset of confidence. With anxiety when it pertains to social challenges, physical education can incorporate teamwork and collaboration among students, which as a result increases relational and mental health (Gao et al., 2018). Therefore, whether it is cardiovascular or resistance training, dance, yoga, stretching, walking, or weightlifting, dispositions within mental health are enhanced (Committee on Physical Activity and Physical Education in the School Environment et al., 2013). The study from Martikainen et al. (2013) strengthened the concept and application of physical exercise within children. The participants who were healthier experienced lesser quantities of stress due to physical activity stabilizing the body. Remarkably, yoga has been shown to boost the health conditions of students, especially those with disabilities, such as the visually challenged, autism spectrum, and Down syndrome (Cicchella, 2022).

With regard to depression, children are not immune to this mental illness particularly when there is an accumulation of stressful life events. Children are people, and they have real emotions and stressors. Many of them may not know or understand how to cope with stress, anxiety, or depression. However, physical education is a helpful and appropriate environment where they can decrease these symptoms within mental health. The 14-week study from Blumenthal et al. (2020) demonstrated physical activity displayed better results in participants than consuming sertraline (Zoloft) at reducing clinical depression. The researchers from Duke University were astonished at the findings of this examination. Ratey and Hagerman (2008) shared physical activity and fitness are one the best antidotes for mental and cognitive difficulties. As a result, physical exercise within physical education can reinforce positive mental health for children.

With so many distractions, such as phones, social media, family life, or academic troubles; students are encouraged by their teachers, parents, and school personnel to be focused in the classroom. They at times may have difficulty concentrating; however, in conjunction with physical education, levels of attention and concentration can be increased. Erickson et al. (2019), Daly-Smith et al. (2018), and Michael et al. (2015) all showed relative results pertaining to improved degrees of cognition. One of the functions within the brain is time-on-task (ToT) and simply the execution of a 4 minute high-intensity workout within a classroom elevated pupils' mental ability (Erickson et al., 2019; Daly-Smith et al., 2018). With academic performance, improvement was seen in a quantity of math problems due to 10- and 20-minutes of physical exercise in the classroom. What can be conceived when elementary schools implement these degrees and minutes of physical activity for physical education? It can not only enhance student learning, but also academic success.

It is imperative for all school staff, including administrators, to view the purpose and function of physical education is to not only get students moving or give classroom teachers a break/prep period, but to have students' brains become fitter and healthier (Bryan et al., 2013). As stated by Ratey (2017)

physical exercise is crucially significant to the fitness of the brain since it is regarded as a muscle. "Exercise is like fertilizer for the brain...it is so good, it's like Miracle Gro" (Ratey, 2017). In the review of Erickson et al. (2019) positive biomarkers of brain health were associated with moderate-to-vigorous physical activity including brain capacity, function degrees, and white matter. The large collection of nerve fibers in the brain are called white matter and it permits the trade of information and communication between various areas of the brain (Cleveland Clinic, 2022). For white matter to be in good shape, it must have healthy blood flow and nutrients. The opposite of that could create harm to it such as swelling, shattering and complete loss. Just as one's lawn may not look in good condition without water and supplements (sunlight and fertilizer), the brain can get impaired with inadequate blood flow and improper nutrition (Cleveland Clinic, 2022). This is why Ratey & Hagerman (2008) argued blood movement throughout the body makes the brain function at its best and to maintain peak health for the brain, bodies need to be highly physically active. Elementary schools in California can offer these types of activities by adhering to the mandated minutes in physical education. When time is valued for physical education by school districts and school personnel, then students reap the benefits of a healthier and fitter brain.

Another component of physical activity and fitness toward students' health is sharpened memory. Visual Spatial Working Memory (VSWM) is an element of the brain which assists students in remembering letter/number reidentification, reading, handwriting, and mathematics (Kulman, 2015). To support this function that is increased by physical exercise, Howie et al. (2015) explored the relationship between classroom movement breaks (CMB) with executive functioning and math achievement. The results showed 10 min and 20 min of sharp CMB sufficiently enhanced performance on a math exam (Howie et al., 2015). Administrators and teachers can see how the importance of incorporating more physical activity and fitness in the school day would improve student learning and attainment. If it is not possible to create a minimum of 10 minutes of CMB, then the other option and potential solution is to increase the amount of time in physical education programming since it can help raise pupils' memory and academic performances.

California elementary schools can create and increase positive impacts not only in mental, emotional, and relational health, but also in physical health by adhering to the mandated minutes within physical education. No child should ever have to deal with cardiovascular diseases, especially since children spend the majority of their time at school during the school year. Physical education can be the environment where the progression of heart diseases are deterred, delayed, and/or prevented (Proudfoot et al., 2019). Childhood obesity is a common occurrence, in today's schools, which is a saddening and alarming state of health. According to the State of Childhood Obesity (2022), the rate of obesity within California children aged 10-17 was 14.4% in the year 2021. As claimed by KidsData (2021) the population of California children

from 0-17 years old was 9 million, which would mean 1.3 million children were considered obese or overweight. That number is unacceptable and school districts must do a better job at having their schools comply with the California Physical Education law. The study of Proudfoot et al. (2019) revealed the benefits of moderate-to-vigorous physical activity reducing the progressive hardening of arteries, in other words is a trend of coronary artery disease (Proudfoot et al., 2019). As maintained by the American Heart Association (AHA) (n.d.) cardiovascular disease is the number #1 threat to life globally and stroke ranks second worldwide. These conditions can create long-term impairments, decrease the standard of living, and possible death. The CDC (2023) calls strokes as "brain attacks". Moderate-to-vigorous exercise can be implemented on a daily basis during school to help prevent these negative health states. Physical education is the space where students can reap these advantages of heart health, and decrease their chances of obesity, heart disease, and strokes. In addition, moderate-to-vigorous physical activity for elementary school students provides the potential to lessen body fat and support a healthy body composition based on the review of Sardinha et al. (2017).

Bone health is another integrant toward the development of students' health. The risk of osteoporosis and fractures are lessened through the application of physical exercise (Proia et al., 2021). Many educators and administrators may not think about bone health during the school day, but physical education is the environment where students can develop peak bone mass. Fuchs et al. (2001) demonstrated a intervention group from 89 students ages 5.9 to 9.8 years who applied 100 jumps off a 2 ft stand, over seven months, three times a week increased in bone mass in contrast to a control group who simply performed recreational movements, 4.5% vs. 3.1%, respectively (as cited in Alves & Alves, 2019). As a result, jumping is a safe exercise and method for cardiovascular fitness and bone health.

An imperative element which derives from physical activity and fitness is the human immune system becoming stronger. An astonishing outcome from Cicchella (2022) demonstrated higher levels of lymphocytes and a reduced T-cell percent were produced at rest within normal weight children after they engaged in a physical exercise session. This is a remarkable explanation to argue for minute-mandated compliance in California Physical Education law. The National Cancer Institute (NCI, n.d.) defined lymphocytes as a kind of immune cell and t-cells are a form of white blood cells. There are two forms of lymphocytes; T lymphocytes assist in putting an end to tumor cells and strengthen immune responses and B lymphocytes create antibodies. T-cells are attached to the immune system and help fight cancer (NCI, n.d.). Strength, aerobic, flexibility, and coordination exercises are all connections for boosting the immune system in children. Resistance training showed a direct influence on the promotion in the immune response of cells (Cicchella, 2022). If all stakeholders see the profound effects which come from physical activity and fitness, then they would be more inclined to advocate for daily physical education in schools.

Every parent, teacher, and administrator desires to have students who are alert and ready for the school day. Quality and quantity of sleep is needed for that to happen for students. According to Larrinaga-Undabarrena et al. (2023) there is a positive correlation between daily physical activity and sleep in children and adolescents. That is wonderful news because it creates a greater opportunity for students to be prepared for learning. However, the reduction of sleep hours alters the level of arousal during daylight times, hindering active and efficient learning (Larrinaga-Undabarrena et al., 2023). Students who do not get enough sleep are more susceptible to lower levels of alertness and attention, which are functions that are necessary in the classroom. As stated by Larrinaga-Undabarrena et al. (2023) another byproduct of physical exercise was increased levels of melatonin, and it supported the order of one's 24-hour internal clock and with sleep (NCCIH, 2022). The review from Fonseca et al. (2021) shared physical exercise has been deemed as an effective, drug-free way to improve sleep. Both Larrinaga-Undabarrena et al. (2023) and Fonseca et al. (2021) provided evidence that physical activity can improve sleep quality and extended periods of sleep.

Even though ESSA has included physical education as a core subject among the other courses of study, it is still undervalued. Weaver et al. (2021) and Gill et al. (2020) explained much of physical education's understood worth and treatment stemmed from the views of the administrators, which was not positive. Funding is now available to physical education teachers through Title IV, Part A, but it is dependent on the LEAs (CDE, 2022). For years, educators thought funding was the issue, but the problem resided in the priorities and preferences of the administrators.

After the 2013 lawsuit, the 37 school district attempted to appeal the 200 mandated minute law, but was unsuccessful. However, AB 1391 came into effect in 2015, where grievances can be filed against schools who are not adhering to the mandated minutes of physical education (Thompson et al., 2018). The bill's purpose was to protect schools from being sued again for the lack of implemented physical education minutes and losing funds. Presently, a uniform complaint system has been established in California school districts to address any noncompliance issues with Physical Education law of minutes in schools. According to the Dry Creek Joint Elementary School District (DCJESD, 2022) the compliance officer is the superintendent of the school district. A written complaint is to be sent to the district for the compliance officer to review and provide mediation between the affected parties. If the alternative dispute resolution does not work out the issues within the specifications of law, the compliance officer must move forward with an examination of the grievance. When a grievance is discovered to have credit, a proper treatment be offered to the complainant or other affected person settled by rule of the State Board of Education (DCJESD, 2022). Any petitioner who is unsatisfied with the district's examination report on a grievance concerning physical education minutes can file a petition in writing with the California Department of Education within thirty calendar days of obtaining the district's assessment review. Yes, this is all a tedious process; however, it guards schools from litigation and possible financial loss. Submitted grievances to school districts can play a part in enforcing mandated minutes of physical education in schools, but the question is it an effective approach for long-term change? It is not because change needs to come in two forms: advocacy from stakeholders and policy changes in the language of California Physical Education law.

With reference to litigation, lawsuits eroded at schools' restricted funding and several reviews reported schools felt deficient in offering satisfactory physical education. However, the laws of physical education exist to protect students in gaining physical activity during school and the legal proceedings were meant to implement conformity with those physical education regulations (Thompson et al. 2018). The past lawsuits also spoke of education neglect with regards to physical education. It is a shame litigation arose within 38 California school districts when students could have benefited from responsible school systems to employ mandated minutes of physical education prior to legal proceedings. In addition, those school funds could have been used elsewhere instead of paying legal fees. All stakeholders need to take better care of students, not just focus on academics. The aim needs to be focused on a holistic approach - physical, mental, emotional, relational, and educational. Physical education has the ability to positively influence health, academics, and encourage students to have successful and healthy lifestyles.

Policy Implication

Daily Physical Education

		iber of st	ates
State law provisions	ES	MS	HS
State law requires <90 (ES)/<150 (MS/HS) minutes/week of PE or no requirement	38	45	47
No PE time requirement or recommendation	1	1	1
Recommends a PE time requirement or state requirement for physical activity includes an option for PE	0	1	1
Required <60 min/week (ES)/<90 min/week (MS/HS) or unspecified time	34	39	42
Required ≥60 and <90 min/week (ES)/≥90 and <150 min/week (MS/HS)	3	4	3
State law requires ≥90 (ES)/≥150 (MS/HS) min/week of PE	13	6	4
Required ≥90 and <150 min/week (ES)/≥150 and <225 min/week (MS/HS)	7	3	2
Required ≥150 min/week (ES)/≥225 min/week (MS/HS)	6	3	2
State law requires daily PE	4	5	2
Number of states with each policy provision reported by grade level. N = 50 states and District of Columbia. ES elementary school; MS middle	school; HS	high schoo	ol.

Table 3.1 Frequency of State Laws Governing Physical Education Time and Frequency. State legislators may weigh in on approving laws which mandate daily physical education, if possible (Piekarz-Porter et al., 2021).

In the section, "Why is physical education taught in California public schools?" from Physical Education FAQs of California Department of Education's online page, it states: *Daily* physical education for all students is recommended by numerous national associations, including the Centers for Disease Control and Prevention (CDC), the National Association for Sport and Physical Education (NASPE), the National Association for State Boards of Education (NASBE), the American Academy of Pediatrics (AAP), and the American Heart Association (AHA), and is noted in the Healthy People 2020 document (CDE, 2022, p. 26).

It is contradictory for the CDE to communicate daily physical education in its database when half of its elementary school districts were noncompliant (Weaver et al., 2021; Calvert et al., 2020; Kahan & McKenzie, 2019; Thompson et al., 2018). One of the leading states in the U.S. for physical education was Illinois. It was exclusively the state which ordered daily physical education for all pupils, K-12 thus far. However, many school districts have searched to avoid the law by implementing waivers (Swaithes et al., 2021).

Requirement	Total (%)	Elementary schools (%)	Middle schools (%)	High schools (%)
Students must take physical education as a requirement for graduation or promotion to the next grade level or school level	76.5 (71.9-80.5)	67.7 (60.4-74.1)	78.8 (72.0-84.3)	95.5 (89.3-98.2)
Requires students to take specific courses that include instruction in physical education	46.6 (37.2-56.1)	30.8 (16.1-50.8)	52.5 (34.6-69.8)	60.5 (49.9-70.2)
Students choose from courses to meet general physical education requirement	12.5 (8.2-18.5)	3.8 (0.5-23.0)	1.6 (0.2-11.1)	29.3 (20.6-39.8)
Mean number of required electives ¹	1.6 (1.2-2.0)	NA	1.0 (1.0-1.0)	1.6 (1.2-2.0)
Requires daily physical education or its equivalent ² for entire school year (36 weeks)	3.7 (2.3-5.9)	3.6 (1.8-7.4)	3.4 (1.4-8.5)	4.0 (1.8-8.7)
Requires daily physical education or its equivalent ² for half the school year (18 weeks)	5.9 (4.2-8.3)	4.6 (2.4-8.6)	6.9 (3.9-12.2)	7.8 (4.3-13.6)
Requires physical education at least 3 days per week for entire school year (36 weeks)	11.5 (8.7-15.0)	15.3 (10.7-21.4)	8.5 (5.1-13.8)	5.9 (2.9-11.8)
Requires physical education at least 3 days per week for half the school year (18 weeks)	15.3 (12.1-19.1)	16.9 (12.1-23.2)	14.0 (9.5-20.0)	12.8 (7.9-20.0)
Requires physical education, but not in a specific grade	26.5 (22.2-31.2)	20.9 (15.3-27.9)	21.8 (15.9-29.1)	46.6 (38.5-54.9)
Requires physical education in a specific grade	52.1 (46.9-57.3)	49.6 (41.9-57.3)	57.0 (49.1-64.5)	52.2 (43.8-60.5)

NOTE: Numbers in parentheses indicate 95% confidence intervals. Confidence intervals cannot be calculated for 0% or 100%.

No elementary schools responded to this question

² Defined as physical education for students in all grades in the school for 150 minutes/week in elementary schools and 225 minutes/week in middle and high schools.

Table 3.2 Percentage of Schools with Physical Education Requirements, by School Level. Results for daily physical education for the entire school year were closely related to Piekarz-Porter et al. (2021), determining a low percentage of states requiring physical education per day (Voices for Healthy Kids, 2020; CDC, 2015).

Variable	% (weighted)
School characteristics	
Student race/ethnicity (district level)	
≥66% white	43.5
≥50% black	7.8
≥50% Hispanic	13.8
Other	34.9
District child poverty rate	
Poverty <20%	52.3
Poverty ≥20%	47.7
School urbanicity	
Urban	23.6
Suburban	44.4
Rural	32.1
School size (student enrollment)	
≥1000	3.3
500–999	43.6
<500	53.1
Region	
West	21.9
Midwest	26.8
South	34.7
Northeast	16.6
Policy characteristics: state level	
State policy on daily physical education	
No policy or provision	88.4
Weak policy	4.2
Strong policy	7.4

Table 3.3 Characteristics of National Elementary School Sample. Calvert et al. (2020) indicated less than 12% of U.S. elementary schools had a policy on daily physical education, which failed to meet the daily recommendation from CDC, NASPE, NASBE, AAP, and AHA, and was noted in the Healthy People 2020 record.

Grade	Mean number of weeks	Mean number of days/week	Mean number of minutes/class period
Kindergarten	35.5 (34.0-37.0)	3.2 (2.6-3.8)	36.9 (34.7-39.1)
1	35.1 (33.5-36.7)	3.1 (2.5-3.7)	38.5 (36.5-40.4)
2	35.2 (33.6-36.8)	3.2 (2.6-3.8)	38.9 (36.9-41.0)
3	34.8 (33.1-36.5)	3.4 (2.7-4.0)	39.4 (37.3-41.4)
4	34.6 (32.9-36.3)	3.3 (2.7-3.9)	40.4 (38.2-42.5)
5	34.2 (32.5-36.0)	3.4 (2.8-4.1)	40.7 (38.7-42.8)
6	32.1 (30.3-33.9)	3.9 (3.3-4.6)	46.3 (43.7-48.9)
7	30.1 (28.2-32.0)	3.8 (3.3-4.4)	49.3 (46.5-52.1)
8	30.8 (28.8-32.8)	3.9 (3.3-4.5)	49.1 (46.3-51.9)
9	26.6 (24.2-29.1)	5.0 (4.5-5.4)	58.5 (53.9-63.2)
10	28.0 (25.4-30.7)	4.9 (4.3-5.5)	56.0 (51.4-60.7)
11	30.4 (27.8-33.1)	4.8 (4.0-5.5)	53.9 (48.1-59.8)
12	30.4 (27.5-33.3)	4.6 (3.9-5.4)	54.8 (48.4-61.2)
Required courses (not grade specific) ²	26.7 (24.2-29.3)	3.8 (3.4-4.2)	56.2 (51.6-60.9)
Required electives ³	24.3 (19.6-28.9)	4.6 (4.3-4.9)	65.9 (57.1-74.7)

NOTE: Numbers in parentheses indicate 95% confidence intervals. Confidence intervals cannot be calculated for 0% or 100%.

Among schools with students in that grade.
 Values averaged across all required courses.

³ Students choose from courses to meet general physical education requirement; values averaged across all required electives

Table 3.4 Duration of Required Instruction in Physical Education in Each Grade. Elementary students, on a national level, received an average of 3 days CDC, 2015).

The Comprehensive School Physical Activity Program (CSPAP) is a national program which aids students in reaching the national recommendation, increasing their health, and educational results (CSPAP, 2015). Students can engage in school-related physical exertion opportunities throughout the

school day with an all-comprehensive method which is to be supplied by the school districts and schools. It offers a national structure for physical education and physical activity for youth. Five elements are involved in a CSPAP: physical education, physical exercise in the time of school, physical activity before and after school, staff engagement, and family and community involvement (CDC, 2015). Physical education functions as the base of a CS-PAP and is an education subject categorized by an organized, logical K-12 curriculum derived from national principles for physical education. Students acquire knowledge and perform skills to create and sustain physically active lifestyles through a well-planned physical education program (CSBA, 2016). These applied opportunities and understandings can progress into childhood, adolescence, and adulthood. Daily physical education for all students in grades K-12 is recommended by organizations such as CDC, IOM, and SHAPE. The Healthy People 2020 also expressed its objectives to enhance the amount of the Nation's public and private schools in mandating daily physical education for every student (Kahan & McKenzie, 2019; CDC, 2015).

Policy or practice	2000	2006	2012	2016	Trend
Requires elementary schools to teach physical education	82.6	93.3	93.6	92.6	Increased
Requires or recommends elementary schools use one particular curriculum developed by a commercial company	NA	4.8	11.6	19.1	Increased
Requires or recommends that schools at each level use Fitnessgram:					
Elementary schools	12.8	21.5	36.5	53.4	Increased
Middle schools	9.5	24.1	40.2	54.8	Increased
High schools	8.3	21.2	40.3	47.3	Increased
Requires or recommends that schools at each level use any other fitness asses	sment:2				
Elementary schools	NA	NA	8.7	24.4	Increased
Middle schools	NA	NA	9.4	26.0	Increased
High schools	NA	NA	12.4	30.0	Increased
Requires schools to meet the physical education needs of students with disabili	ities by using	the following	strategies:		
Mainstreaming into regular physical education as appropriate	82.3	98.5	97.8	97.2	Increased
Providing adapted physical education as appropriate	74.6	92.7	92.8	91.0	Increased
Using modified equipment or facilities in regular physical education	65.0	93.2	91.5	89.4	Increased
Using teaching assistants in regular physical education	57.2	86.5	79.2	78.6	Increased
Requires students to wear appropriate protective gear:					
When engaged in interscholastic sports	73.4	84.2	83.7	83.7	Increased
When engaged in physical activity clubs or intramural sports	40.8	44.8	57.9	51.6	Increased
Provided funding for professional development or offered professional developm on the following topics: $\!\!^3$	nent to those	who teach pl	nysical educa	tion	
Administering or using fitness assessments	49.8	62.5	71.1	67.6	Increased
Assessing or evaluating student performance in physical education	48.0	62.2	66.3	69.4	Increased
Developing, implementing, and evaluating a Comprehensive School Physical Activity Program (CSPAP)	NA	NA	42.2	22.7	Decreased

Table 3.5 Significant Trends Over Time in the Percentage of Districts with Specific Physical Education and Physical Activity Policies and Practices. CSPAP was not implemented well over the course of 16 years, which impacted the number of minutes students missed for physical activity and fitness in physical education (CDC, 2016).

In the report of the 2014 School Health Policies and Practices Study, U.S. schools have numerous plans and implementations to reinforce a CSPAP, but attempts are necessary to apply all five elements of a CSPAP. For instance, with physical education being the base of a CSPAP, and even with 90% of schools adhering to national, state, or district physical education benchmarks,

not many schools mandated daily physical education and hardly any offered the quantity of daily minutes recommended by WHO, CDC, IOM, HHS, and NASPE (CDC, 2015).

These current trends communicate noncompliance in which as a nation we cannot expect to have healthy students in the future. The public may see the rate of childhood obesity increase due to the lack of daily access for physical education to meet the national recommendation of daily physical activity. Traditionally, obese children tend to not perform well in school and have lower self-esteem issues. In addition, an increase of negative health issues could arise when schools do not provide physical education per day. The cost of healthcare expenses might become greater for families in managing or stopping childhood obesity, which creates a burden that could be prevented through the application of CSPAP in schools and communities. SHAPE (2016) reported 76% of parents deemed more physical education in schools can support the management or prevention of childhood adiposity. The CDC (2023) reported \$147 billion accounts for health management in illnesses such as obesity. In accordance with an economic evaluation, every \$1 promoted in school-based physical activity brings about a \$32 of valuation [attributed to advantages such as reduced health care expenses] (Becker, 2021). However, positive trends can be made through the implementation of daily physical education. For instance, Naperville School District showed their daily 40-minutes fixed physical exercise program lowered the national percentage of obesity by 3% (Ratey, 2017). If school districts around the U.S. applied a daily physical education policy, students' health and academic performance could improve drastically due to the supported literature which speaks of the importance and results of physical exercise in physical education. Furthermore, the national expenses for healthcare management may decrease, which would make our nation more fiscally successful and prudent.



Solving the physical activity equation

When students are active, they are more focused in class and develop healthy habits that can last a lifetime. Studies confirm what educators already know: students aren't getting the exercise they need.

That is why The Alliance for a Healthier Generation's Healthy Schools Program is challenging California students, school leaders, and parents to achieve 60 minutes of physical activity every school day, including activity before, during and after school.

The solution: 10+20+30=60 in elementary schools—10 minutes of physical activity breaks; 20 minutes of recess; and 30 minutes of physical education. For middle/high schools, the equation changes to 20+40=60. That's 20 minutes of physical activity breaks and 40 minutes of physical education.

Figure 3.1 This equation would suffice the national 150-minute weekly recommendation for schools and provide daily physical education for students (The Alliance for a Healthier Generation, n.d. as cited in Ferreira & Billings, 2016).

With regards to the study of James et al. (2023) quantity and length of time were critical components to academic achievement, but also infers how essential the practice of daily physical education is for students. Additionally, students from the study gained better physical fitness in 30-60 minute sessions, which is directly related to the daily national recommendation for moderate-to-vigorous physical activity (James et al., 2023). In addition, increased time assigned to physical activity did not have harmful effects on academic performance. Conversely, more time allotted to physical movements was efficiently connected with academic success such as increased on-task classroom conduct and cognitive improvement (Michael et al., 2015; Committee on Physical Activity and Physical Education in the School Environment, 2013). Moreover, establishing daily physical education in schools could raise the grade of the National Physical Activity Report Card, which currently stands at D- (Szarabajko, 2023; CDC, 2016; Katzmarzyk et al., 2016). The study from James et al. (2023) and Michael et al. (2025) encouraged longer amounts of physical education to improve academics through scientific-based practices and policies surrounding the implementation of physical activity in schools, and it must be viewed as a priority.

Another aspect of creating and implementing daily physical education from the state-level is legislators using clear verbiage for policy. The study of Piekarz-Porter et al. (2021) demonstrated more distinct and mandated terminology in state-level policy can support schools to practice compliance to the government code. Schools within states with well-established policies concerning daily physical education had greater opportunities of providing daily physical education (over 5 times higher) than schools in states with no such policy (Piekarz-Porter et al., 2021). The results from Calvert et al. (2020) showed six times the odds of all students taking daily physical education, consequently supplying more occurrences for students to be physically active and engaged in a well-rounded education according to the ESSA. Therefore, strong policy was greatly associated with schools who offered physical education per day (Calvert et al., 2020). State legislators can employ the outcomes of both of these studies in contemplating policies to secure daily physical education for the support of students' health and academic performance.

Practice Implications Physical Education Teaching Programs

In confronting the insufficient number of minutes in physical education programming and the childhood obesity growth, teacher education organizations are critical to the fate of the profession and training of future physical education teachers. Teacher applicants who are registered in Physical Education Teacher Education (PETE) programs can deliver an added opportunity for advocacy (Bryan et al., 2013). Issues in the physical education field such as health and best practices are necessary for physical teachers to be aware of. Future physical education educators need to address them so as to achieve advocacy in the occupation (Bryan et al., 2013). With the purpose of helping and motivating children to be more active, teacher education programs must offer a public health viewpoint. It is imperative for all educators to believe in it, so youth can be recipients of a learned physically active lifestyle (Bryan et al., 2013).

Furthermore, different settings with a mixed population of pupils are opportunities for PETE candidates to undergo in field experiences intending to increase their knowledge and advocacy for the profession (Bryan et al., 2013). Creating a curriculum to support and elevate physical activity and motivation in students needs to be a priority for these candidates, regardless of the ethnic or economic environment they are placed in. A study of enhanced positive behaviors toward physical exercise was 90% of the purpose within K-12 physical education programs (Burgeson et al., 2001 as cited in Bryan et al., 2013). Therefore, students will choose to participate in physical activity when PETE applicants understand how to produce learning environments which cultivate positive attitudes toward physical education. It is imperative for future physical education educators to be aware of the current health explorations and even more to be "analytic consumers" of research and data (Bryan et al., 2013). The information acquired through investigation can play an important role when advocating for the profession and its recipients. Research must be read, examined, have meaning, and be pertinent to an environment in an acceptable way to be used, but these are skills which need to be acquired by PETE candidates (Bryan et al., 2013). A commitment and growth mindset on continual learning and professional development training are assets PETE faculty can assist candidates to strive for in their expedition of education.

Increased Advocacy

At the district, state, and national standings there is a lack of advocacy for physical education (Bryan et al., 2013). It continued to be classified as an unimportant section of the curriculum which simply benefitted the objective of giving a "planning moment" for classroom educators without strong endorsement attempts. An advocacy strategy needs to be created by each physical education educator to teach policymakers the value of the profession (Bryan et al., 2013). Every year a blueprint needs to be reviewed, used, and should seek to revise procedures across each level. If the profession intends to remain a useful share of the educational plan, then this course of action will take time and effort (Bryan et al., 2013).

NASPE created an advocacy resource material to help with educating policymakers to improve endorsement efforts at the local level. Addressing the state data is a way of confronting and positively influencing state policies. The 2016 Shape of the Nation Report is an excellent resource which helps create change in physical education. To make change in policy, utilizing measures of advocacy and state information will supply instructors to share with policymakers (Bryan et al., 2013). Yet, black tops, fields, and/or gymnasiums are where one will find the greatest advocacy assets in the nation. The ideal promoters for physical education program. Their excitement has the potential to make parents quality advocates for physical education and with ESSA now in place, parents have a say in how to help shape their children's education. The improvement of advocacy efforts stem from establishing more well-thought-out programs (Bryan et al., 2013).

Accountability Systems

It is vital for physical education teachers to display data of student knowledge and attainment now that physical education is an essential part of a well-rounded education. Specifically, ESSA stresses the significance of utilizing pupil understanding and performance information to involve parents and other shareholders in their regional academic structures (USDE, 2016). In addition, to approach accessible funding opportunities, supplying the data on pupil knowledge and achievement is fundamental (Tsuda et al., 2022). The change toward obtaining an arranged accountability structure is essential in the subject as "US school physical education programs have, for the most part, been allowed to do their own thing" (Hastie & van der Mars, 2014, p. 334).

The importance of accountability procedures within ESSA is the federal institution offers states with greater pliability and independence to use structures to monitor student understanding and success. Consequently, there is a great necessity for state-level leaders to create and execute such structures (Tsuda et al., 2022). Some individuals might contend a creation of an accountability system decreases the range of student learning in physical education. Nevertheless, the insufficient practice of accountability structures in physical education has developed a circumstance where inquiries remain concerning student understanding (Tsuda et al., 2022). Internal assistance and embracing systems within accountability are crucial to effective change in education. There are benefits to having accountability frameworks in physical education; however, not much is known about the state-level accountability approaches of pupil knowledge and attainment in California physical education. There is an inadequate number of states which have systemized programs of accountability and there is a direct need for continued improvement in this sphere (Tsuda et al., 2022).

More Professional Learning Opportunities

Professional learning is an opportunity for physical education teachers to remain current and aware of their vocation. There is a great need for these junctures with the objective to produce advantageous programs. According to the SHPPS (2012), 54% of districts offered financial means for career training or provided professional training on chronic health conditions for those who teach physical education (CDC, 2013). The latest 2016 SHPPS report stated 56.8% on the same subject, which increased since 2012. The results from the survey spoke of how important physical education is to receive continual professional development for the purpose of efficient instruction and impact on students' health (CDC, 2016). Physical teachers can offer excellent classes through increased opportunities of learned methods from professional development training (Bryan et al., 2013).

Directions for Future Study Follow-Up With Litigated School Districts

Prior to the 2010 lawsuit, very little consequences were given to schools who did not meet the mandated Physical Education law minute. If a school failed to meet the standard, but performed well in other areas of learning, they were given an exemption. If a school was not performing well and was inadequate in compliance with the mandate, then they had to write a plan of improvement. Since the two lawsuits of 2010 and 2013, not much has been shared publicly of any changes, outside of the lawsuit resolutions, in these school districts. Adams (2015) shared Riverside Unified School District made an online platform which allowed educators to put in their physical education instructional minutes, add information such as a field trip disarranged the programming on a specific day, and display the schedule on the school website. Principals were able to check a box specifying when they performed a random check and included a note about what they discovered. In the San Rafael City

Schools Districts, the 2013 lawsuit did not alter the manner of applying physical education, it simply offered more supervision and documentation. The San Francisco Unified District created an accepted district schedule and reporting document for all their elementary and middle schools which has already been applied (Adams, 2015).

In the course of the COVID-19 pandemic, California educators faced tremendous obstacles in offering sufficient physical education. First, they fought with the problem of teaching physical education to online pupils. Upon returning, teachers met a fresh, but common obstacle: in-person budget cuts (Adams, 2015). These reductions meant classroom educators were either arranged to teach physical education or offered physical education teachers extremely larger class sizes. With what transpired from legal proceedings against the 38 school districts, much more research is needed to understand what effective practices are being done in schools adhering to the California Physical Education law. The information will be critical to better figure out what changes need to be made in state-policy language, if necessary.

Administrative Pressure

School administrators disclosed 44% of reducing crucial time from physical education and recess to expand time spent in math and reading since the movement of NCLB (Committee on Physical Activity and Physical Education in the School Environment, 2013). School principals use discretion in creating schedules for teachers and subject matters. The amount of time and effort in making the school programming can be challenging and stressful. These decisions are critical for the sake of student learning and performance as well as providing a well-rounded education according to ESSA. Selections on what to instruct, who will teach it, and what measures of funding are needed are factors administrators face, which is a daunting task (Committee on Physical Activity and Physical Education in the School Environment, 2013). The weight and focus on state-testing and the stress for educational attainment are yearly factors administrators deal with and making difficult decisions on how much time is spent in each subject determines how much funding schools receive based upon students' scores. Continued investigations are required to better comprehend how administrative pressures affect the compliance of California Physical Education law due to much of their influence affects physical education, and how it is perceived and treated by staff and students.

Summary

The need for physical education is essential for all grades, but more specifically for younger pupils. Elementary students in California are not receiving insufficient minutes for physical education and fitness within the school year. Improved awareness and strong advocacy efforts by all stakeholders are key factors which must be applied for schools to adhere to the California Physical Education law. Physical education is the main establishment for developing children to lead active lives and it is the only physical activity curriculum which can attain practically all youth, in spite of race and income-related health differences. Physical education has the capability to enhance physical fitness, ameliorate all-health components, and promote education success in all pupils. Numerous reviews demonstrated active and fit students with activity-engaged physical education are more inclined to have improved academic accomplishment than others. As a result, matters about negatively affecting education performance must never again be received as a basis for deficient physical education. Moreover, the past lawsuits revealed schools and school districts need to be held accountable for ensuring mandated minutes of physical education to students. There is little information on how the state is compelling observance of its Physical Education law, and California elementary schools are insufficient in meeting national and state recommendations for physical education minutes. It is time to address the neglect of physical education and to put our students first for the sake of health, fitness, and being physically educated people.

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The Impact of Student-Teacher Relationships on At-Risk Elementary Students' Behavior Randie Taylor

Abstract

Students with Emotional Behavior Disorders, Adverse Childhood Experiences, and Developmental Disorders are at risk for a negative educational experience compared to their peers. This disadvantage stems from difficulty in establishing and maintaining relationships. Many at-risk students rely on supports outside the classroom for an equitable educational experience, but what if the relationship with their teachers can be one of the most impactful resources available? The purpose of this project is to explore how the student-teacher relationship can be utilized as one of the primary resources to support at-risk students' behavior. The research shows student-teacher relationships high in closeness and low in conflict positively impact at-risk students' behavior, with the exception of students with autism spectrum disorder. Based on the research, teachers can be trained in practices that establish and maintain meaningful relationships with their students such as the Establish, Maintain, Restore Method and using culturally relevant pedagogy. Policies such as integrating student-teacher relationship data with other student data, and state-wide professional development centered on the student-teacher relationship can be performed. Suggestions for further research include more options for measuring the quality of the student-teacher relationship from the student perspective, further study on the student-teacher relationship among students with developmental disabilities, and exploring how using culturally relevant pedagogies can impact all students.

Chapter 1: Introduction to the Project

Background

It is the goal of every teacher to come alongside their students and support them in their learning. Some students need very little support from their teachers to achieve success, while others need more. But what about students that need even more support? What about the students that are atrisk for high truancy rates, discipline problems, low academic performance, and grade repetition? For the purpose of this project, at-risk students include students with Emotional Behavior Disorders (EBDs), Adverse Childhood Experiences (ACEs), and Developmental Disabilities (DDs) which have led to a 50% greater chance of dropping out of high school compared to their peers (Balie & Sayed, 2020). How is a teacher supposed to support students with EBD, ACEs, and DDs? One of the most overlooked resources available to educators is one of the most fundamental aspects of humanity, a relationship.

The relationship between the student and teacher is inescapable in the classroom. It is an integral part of the learning process (Zee et al., 2020a). Research has shown positive student-teacher relationships scoring high in closeness and low in conflict have added to students' social-emotional, behavioral, and academic achievement (Bosman et al., 2018). On the other hand, a student-teacher relationship with high conflict has the potential to hinder student success. With this in mind, how can student-teacher relationships impact atrisk students' behavior?

Students with EBDs, ACEs, and DDs already find it difficult to form and maintain meaningful relationships with peers, which leads to higher levels of anxiety and loneliness. This can trigger many different behavioral problems which negatively impacts the student's learning process and school experience (Bierman & Sanders, 2021). The teacher is the first line of defense in supporting students with EBDs, ACEs and DDs. It is the teacher's responsibility to make sure each student feels included and safe, to provide them with the resources needed to achieve, to address behavior problems, and get to the root of what causes them (Bierman & Sanders, 2021). A teacher, and the relationships they form with their students, has the ability to positively or negatively impact an at-risk students' educational experience.

Statement of the Problem

Students with EBDs, ACEs, and DDs are at risk for negative educational experiences (Balie & Sayed, 2020; Bierman & Sanders, 2021; McKenna et. al, 2019; Robertson et al., 2021; Srivastav et al., 2020; Subramaniam & Wuest, 2022). These negative experiences can include social, behavioral, and academic challenges. Such challenges can lead to students having difficulty in relationships with peers and teachers, low self-regulation, educational inequality, and dropping out of school (McKenna et. al, 2019; Robertson et al., 2021; Subramaniam & Wuest, 2022; Walker & Graham, 2021). Students with EBDs, ACEs and DDs have faced many hurdles in their lives that have resulted in difficulty in areas such as emotional regulation, relationship building and maintaining, trust in relationships, and lack of confidence that has left them at risk of failing in education compared to their peers (Robertson et al., 2020; Subramaniam & Wuest, 2022).

ACEs are the result of negative childhood experiences, and can have a lasting impact, even into adulthood. According to Srivastav et al. (2020), ACEs consist of childhood experiences resulting from social, biological, and environmental factors. These traumatic experiences can include physical and/ or sexual abuse, neglect, and dysfunctional households (witnessing violence, mental health issues, substance abuse, parental incarceration, etc.) among others. Children with ACEs are estimated to be about 46% in the United States. Students with ACEs are more likely than students without ACEs to experience issues with mental health, and have difficulty in school (Robertson et al., 2021). They can lead to difficulty in trusting others and attachment issues with caretakers, such as teachers (Subramaniam & Wuest, 2022).

Students experiencing EBDs, ACEs, and DDs can lead to academic challenges as they have been connected to a decline in ability to hold attention, literacy, and math skills (Robertson et al., 2021). Students with EBDs, ACEs, and DDs are likely to have behavioral issues such as aggression, refusing help, relying too much on others, etc. These behaviors are often misunderstood in the classroom and lead to discipline action from the educator or school (Robertson et al., 2021). Due to children with EBDs, ACEs, and DDs having negative experiences with adults, these students often find it difficult to form meaningful relationships with their peers and trusting relationships with other adults. The student-teacher relationship for students with EBDs, ACEs, and DDs is a barrier before the student ever gets a chance to meet their teacher (Subramaniam & Wuest, 2022).

Students with EBDs, ACEs, and DDs have difficulty adjusting to the expectations brought by education (Bierman & Sanders, 2021; McKenna et. al, 2019). Not only can students with EBDs, ACEs, and DDs struggle academically, but they can also struggle with behavior and with social-emotional wellness (McKenna et. al, 2019). One of the main contributors to social and behavior problems for these students is difficulty in building and maintaining meaningful relationships. This leads to conflict in relationships with their peers, often feeling left out of playground and classroom activates, causing high levels of stress and anxiety (Bierman & Sanders, 2021). Research has shown students with EBDs, ACEs, and DDs are impacted enough to have a 50% more likelihood to drop out of school compared to their peers (Balie & Sayed, 2020). Students with poor social skills often become a target for their peers and become victimized, and it can be difficult for teachers to build a meaningful relationship with them (Bierman & Sanders, 2021).

Purpose of the Project

The purpose of this research is to explore how the student-teacher relationship can be utilized as one of the primary resources to support for students with EBDs, ACEs, and DDs. Although many students benefit from resources outside the classroom, one of the most impactful resources is the teacher (Walker & Graham, 2021). Teachers have the opportunity to be a consistent source of stability in a student's life that might be overall inconsistent and unstable. The intent of this project is not to take away from resources outside of the classroom, but to emphasize the impact student-teacher relationships can have on at-risk students' behavior. More funding and resources can be provided to train teachers on this important aspect of teaching and how to leverage their relationships with at-risk students for the benefit of the student.

There are many supports available for students with EBDs, ACEs,

and DDs outside of the classroom, including (a) behavior aides, (b) school phycologists, (c) after-school programs, (d) Student Study Teams to investigate the necessity of a 504 plan or an Individualized Education Program (IEP) and, (e) academic intervention programs, etc. Many at-risk students need these programs for an equitable chance to succeed and make it through school (Balie and Sayed, 2020). What if one of the most impactful resources is not outside of the classroom at all? Every school year, at-risk students have the opportunity to let a stable, caring adult into their lives that can support them in their academic growth, social-emotional health, and behavior (Walker & Graham, 2021).

Although more research needs to be done on how student-teacher relationships impact at-risk students' behavior specifically, there is much research already done on student-teacher relationships in general, and how they can promote academic, social-emotional, and behavioral progress in all students if developed in a healthy and positive way. A close, low-conflict relationship between a teacher and an at-risk student has the potential to be the most impactful resource a student can receive during their educational experiences (Balie & Sayed, 2020; Bierman & Sanders, 2021; McKenna et. al, 2019). Theoretical Framework of the Project

Albert Bandura's Social Learning Theory (1971) argues against many learning theories of its time. The popular belief was people learned by the consequences of their own behavior. Bandura added that people can also learn from observing others' (called models) behaviors and the consequences or emotional reactions from those behaviors. This allows people to learn from the mistakes or triumphs of models without having to go through the trial-and error process themselves. Because of people's superior cognitive capacity, they can foresee positive or negative consequences of their actions based on what they have observed from models. Bandura concludes people can choose to some degree who they allow to influence their lives, and thus influence their behavior.

Bandura (1971) uses the commonly held view of reinforcement as a way of shaping behavior and applies it through the lens of his Social Learning Theory. Other learning theories, such as B.F. Skinner's (1958) Reinforcement Theory, recognize the influence of positive and negative reinforcement by rewarding the favorable behavior and punishing the unfavorable behavior. The reinforcement is strictly external. Bandura's (1971) Social Learning Theory recognizes the influence of reinforcement as vicarious reinforcement or self-reinforcement. Vicarious reinforcement comes from either observing the consequences of others' actions, or their own experience. Social Learning Theory states someone can learn from others' experiences and the positive or negative consequences they produce. Thus, motivating them to imitate the rewarded behavior, or avoid the punished behavior.

Albert Bandura's (1971) Social Learning Theory also notes that reinforcement can happen through one's own behavior and the consequences that follow, or self-reinforcement. If someone is only motivated by others' reaction to their behavior, as in vicarious reinforcement, they will be changing their values and morals to please multiple people at once. Their behavior must also be met with their own approval of the action, as in self-reinforcement. If they are met with a sense of satisfaction, this results in a positive reinforcement. If someone is met with a sense of dissatisfaction with their behavior, this results in a negative reinforcement, and they are less likely to repeat the behavior. Social Learning Theory suggests one's behavior is based on the observation of others' actions and the consequences they experience, and one's prediction of the desirable consequences of their own actions.

Definition of Key Terms

The following are key terms and definitions used in this paper to help pinpoint the meaning of words or phrases which need some explanation.

Adverse Childhood Experience (ACE): tramatic childhood experiences resulting from social, biological, and environmental factors ranging from abuse and neglect to dysfunction in the household (Srivastav et al., 2020).

At-Risk Students: students at risk of challenges in school such as dropping out, behavior problems, social-emotional struggles, and academic failure due to adverse childhood experiences, emtional behavior disorder, or developmental disabilities.

Developmental Disabilities (DD): Physical, learning, language and behavior impairments that last a lifetime (Zablotsky et. al, 2019).

Emotional Behaveior Disorder (EBD): students with unmet phycological, moral, social, and emotional developmental needs resulting in behavior and emotional challenges which can include aggression, uncooperation, and disrespect for those in authority (Balie & Sayed, 2020).

Relationship Dependancy: A negative aspect of the student-teacher relationship in which the student has over-reliance on the teacher (Bosman et al., 2018).

Relationship Closeness: A positive aspect of the student-tecaher relationship including warmth, trust, and open communication between student and teacher (Bosman et al., 2018).

Relationship Conflict: A negative aspect of the student-teacher relationship resulting in disunity and resistance often characterized by negative and disruptive interactions (Bosman et al., 2018).

Summary

Students with EBDs, ACEs, and DDs are at-risk of dropping out of school, experiencing behavioral, social emotional, and academic challenges throughout their education. One way humans can learn is by observing others' actions and the consequences or emotional reactions that follow. Since elementary students are with their teachers for many hours every school day, the student-teacher relationship will either have a positive or negative impact on at-risk students.

The following literature review in Chapter 2 will explore the student-teacher relationship and how it is measured, the impact it has on at-risk elementary students' behavior, and what strategies have impacted the studuent-teacher relationship. Chapter three will bring the research together and answer the question, "What now?" Based on the research, conclusions will be drawn. From the conclusions, changes and additions in practice and policy will be proposed. Lastly, after gaps in research have been identified, future research will be suggested.

Chapter 2: Review of Related Literature

Introduction

Students with Emotional Behavior Disorder (EBD), Adverse Childhood Experiences (ACEs), and Developmental Disabilities (DDs) are more likely to have negative educational experiences and have a higher rate of dropping out before high school (Balie & Sayed, 2020; McKenna et. al, 2019). These at-risk students often find it difficult to form meaningful relationships with others, including adults (Subramaniam & Wuest, 2022). Before stepping foot in the classroom, at-risk students begin the year at a disadvantage compared to other students.

The purpose of this literature review is to explore how the student-teacher relationship impacts at-risk students' behavior. Many resources are available for at-risk students outside the classroom such as (a) behavior aides, (b) school phycologists, (c) after-school programs, (d) Student Study Teams to investigate the necessity of a 504 plan or an Individualized Education Program (IEP) and, (e) academic intervention programs, etc. Since the teacher is the first line of defense, however, what impact could the student-teacher relationship have on at-risk students' behavior? According to Albert Bandura's Social Learning Theory (1971), people can observe the actions and consequences of others and determine if those actions and consequences would be favorable or disadvantageous for them to imitate. Could the student-teacher relationship be leveraged, then, to lower the chances of at-risk students having a negative educational experience, overcome the odds already stacked against them, and increase the chances of a positive educational experience?

This literature review will begin with the how a student-teacher relationship is measured and characteristics of the three categories most scholars use to evaluate the student teacher relationship. These three categories are termed closeness, conflict, and dependent. The review will narrow to how the student-teacher relationship specifically impacts at-risk students' behavior. These students are at-risk for a negative educational experience due to EBDs, ACEs, or DDs. The review will conclude with strategies on how student-teacher relationships can improve through the methods: Establish-Maintain-Restore (EMR), Positive Behavioral Interventions and Supports (PBIS), and Culturally Relevant Pedagogies (CRP).

The Student-Teacher Relationship

The argument of who determines the quality of the student-teacher relationship is mixed. According to Pakarinen et al. (2018), there are three different theories on how student-teacher relationships interact. The first is the teacher's warmth and disposition creates an environment where the student flourishes and leads to less behavior problems. Some studies such as Kennedy & Haydon (2021), and Cook et al. (2018) support this theory and put the emphasis on the teacher's actions. The second theory is student-driven and puts the emphasis on student behavior being the factor that determines if the student-teacher relationship is positive or negative. Studies done by many, such as Pianta (2001) and Pakarinen et al. (2018), conclude the students' externalizing and internalizing behavior problems impact` the students-teacher relationship in that if there were more externalizing and internalizing behavior problems, the relationship was negative. The third theory is transactional and states the relationship is reciprocal, both student and teacher feeding off each other to determine the quality of the student-teacher relationship. Despite whom impacts the student-teacher relationship more, teachers can attempt to build a positive relationship with their students, knowing the quality of the relationship is a determining factor in the students' educational experiences.

Student-Teacher Relationship Scale

There have been many ways scholars have attempted to take an intangible relationship and produce quantitative data to determine the quality. For example, Prewett et al. (2019) used inventories for teachers and students to fill out to report on their perspective of the quality of their relationships. Zee et al. (2020b) measured the student-teacher relationship from the student perspective by having students draw pictures that represent their relationship with their teacher and scored the picture on an 8-teir scoring system. This was a unique way to measure the student-teacher relationship from the students' perspective and could be a useful way to prevent some students that have internalized symptoms from going unnoticed by their teacher. For example, a drawing that depicts isolation could let the teacher know a student is suffering from depression and may be the only way a teacher can visibly see they are suffering. This could be used to intervene when detected to provide supports for the student as soon as possible. There are many ways the student-teacher relationship could be measured.

The most commonly used metric to measure the quality of the student-teacher relationship is the Student-Teacher Relationship Scale (STRS). This metric was first developed by Pianta (2001) in which teachers were asked about their perception of their relationships with students. They were scored in three categories: secure, improved, and dependent. This scale was later adapted by Pianta (2001) and the three categories which describe the characteristics

Closeness

A student-teacher relationship that scores high in closeness on the STRS include teacher perceived relationship characteristics such as warmth, affection, and the ability to openly communicate. The teacher believes the student feels safe and confident with them, and are able to use them as an effective resource (Pianta, 2001). The relationship described as close, or with closeness, can be interpreted as positive.

Some scholars believe the student will determine if they have a close relationship with their teacher. In a study that looked at the trajectory of a student's view of their relationship with their teachers, kindergarten through 6th grade, Bosman et al. (2018) found most elementary students have a high closeness and low conflict view of their relationship with their teachers. The groups that had a slightly negative view of their relationship were boys, students displaying externalizing behavior problems, and students with lower verbal abilities. These groups are more likely to have conflict in their relationships with their teachers. Others say student-driven relationship quality is proven through a study that concludes students self-reporting as being "shy" more in conflictual relationships, and less in close relationships (Chen et al. 2021). This concludes the shyness of the student determines if they have a close relationship with their teachers. Yet, Pakarinen et al. (2018) determined the student decides if the teacher-student relationship qualifies as close or conflict, which later impacts both externalizing and internalizing behavior. For example, if the relationship was full of conflict, there were more externalizing and internalizing behavior problems.

Perhaps the student-teacher relationship is reciprocal, and both the teacher and the student determine the quality. Prewett et al. (2019) determined the teachers' perception of their teacher-student relationship predicted the students' perception of their relationship, and the students' view of academics and self-efficacy predicted a teacher's perception of their relationship. Human relationships naturally have ups and downs. Why would a student-teacher relationship be any different?

A close student-teacher relationship will have countless benefits. The student-teacher relationships defined as closeness scored higher in the supportive relationship category (Bosman et. al, 2022). Teachers' prosocial behaviors and social-emotional support were connected to students' positive view of the student-teacher relationship (Prewett et al, 2019). The student-teacher relationship that is high in closeness and low in conflict support teachers' well-being (Haldimann et. al, 2023). Higher closeness reported by the student

Despite whom contributes to making the student-teacher relationship close, scholars agree that a close relationship usually leads to a better educational outcome for students. Zee et. al (2020b) found close student relationships are among the most important factors in keeping students' long-term engagement. This is particularly true with upper elementary students about to make a transition into secondary school. Students look to their teachers to help with peer relationships and social emotional developmental changes, which leads to higher levels of engagement, and in turn, academic achievement. A close student-teacher relationship will not only help equip a student with the ability to add fractions and write using proper grammar, but can empower a student to excel in many aspects of life.

Conflict

Student-teacher relationships that score high in conflict on the STRS include teacher perceived relationship characteristics such as negativity and conflict. This indicates the teacher continually struggles with the student, the student is often angry, and the teacher is not able to predict the student's behavior. This leads to the teacher often being drained and having a low self-efficacy (Pianta, 2001). Bosman et al. (2018) categorized conflictual student-teacher relationships as dysfunctional. Conflict in this relationship has the potential to create many difficulties for students and teachers alike.

Conflict in student-teacher relationships may lead to more student victimizations. Demol et al. (2020) concluded a conflictual student-teacher relationship along with peer rejection leads to higher rates of victimization. In other words, if a student has a high conflict relationship with their teacher and is rejected by their peers through overt action or verbal rejection, they are more likely to be victimized by their peers. There is a connection between victimizations and peer rejection alone, but not between victimization and student-teacher conflict alone. Conflict in a student-teacher relationship, therefore, increases the chances of unhealthy peer relationships.

Along with potentially unhealthy peer relationships, conflict in student-teacher relationships may be a factor in student behavior issues. Hendrickx et al. (2022) concluded that student-teacher interactions are transactional and take place moment-to-moment. There is a direct connection between students having externalizing behavior problems and conflicting with teachers. The cause is theorized to be students' externalized behavior problems are treated harsher by teachers, especially with boys. Students that are in more conflict with teachers are in a social emotional, and academic disadvantage.

Pakarinen et. al (2018) points out the student determines if the student-teacher relationship qualifies as close or conflict, which later impacts both externalizing and internalizing behavior, saving if the relationship was full of conflict, there were more externalizing and internalizing behavior problems. In agreement, de Jong et al. (2018) added that students and teachers alike report conflict in their relationship when the student has externalized and internalized behavior problems. The continual reinforcement between a conflict filled student-teacher relationship and externalized/internalized behavior problems have a spiral effect where more behavior problems add to more conflict in the student-teacher relationship, which leads to more behavior issues and the spiral continues. A conflictual relationship can be (a) predicted as higher conflict reported by the teacher at the beginning of the year (b) predicted as higher conflict reported by the student and the teacher at the end of the year and, (c) displayed as externalized behavior problems, such as aggression, and academic struggles (Rucinski et al. 2018). Conflict in the student-teacher relationship has an overall negative impact on students' educational experience.

Dependency

Students scoring high in dependency are by far a minority of students. A student scoring a high dependency on the STRS include characteristics the teacher perceived as overly dependent, having a strong reaction to separation, and constantly asking for help even when it is not needed. The teacher is usually concerned about the student relying on them too much (Pianta, 2001). Researchers have tried to find the root cause of students' dependence on their teachers. One conclusion is that dependency usually reveals insecurities in the student resulting in their desire for affection from the teacher. A student's display of clingy behavior leads to them being constantly concerned about the teacher's availability (Zee et al. 2020a). Yet, Verschueren & Spilt (2021) found students with a less secure attachment to their mothers displayed dependency on their teachers, according to outside observers. Despite the reason why a student shows dependence, the question remains if this is a positive or a negative.

Most scholars agree dependence in a student-teacher relationship is negative because students scoring high in dependency show little signs of engagement, achievement, and prosocial behavior, and show signs of externalizing and internalizing behavior problems (Roorda et al. 2021). Although, according to Bosman et al. (2018), a student-teacher relationship high in dependency does not automatically mean the relationship is negative. It is important to look at the conflict and closeness aspect of the relationship in connection with the dependency score to determine how to best support the student.

One finding that must be pointed out is a study by Verschueren & Spilt (2021) in which outside observers determined a student-teacher relationship displayed dependency, but interestingly the teacher did not perceive these students as dependent. This challenges the reliability of the STRS and brings up the question if outside observers of student-teacher relationships would be more reliable. Nonetheless, the STRS continues to be the popular metric used by researchers.

The positive outlook of student-teacher closeness, and negative outlook of student-teacher conflict is not surprising, according to Albert Bandura's Social Learning Theory (1971). Bandura theorizes that people can observe others' consequences to their actions and determine if the outcome would be favorable to them if they were to imitate the same action. Students are observing teachers a large part of the day, and student-teacher relationships that score high in closeness have a teacher modeling positive behavior, while a student-teacher relationship scoring high in conflict could have a teacher modeling negative behavior. The results have a reciprocal impact of either contributing to the educational experience for the student, or hindering it. Whether a student-teacher relationship scores as closeness, conflict, or dependency, it is important to note the relationship has a profound impact on the students' educational experience.

Impact of the Student-Teacher Relationship with At-Risk Students' Behavior

It is clear the student-teacher relationship has an impact on all students, whether the relationship could be categorized as closeness, conflict, or dependency. The areas impacted include academic, social-emotional intelligence, behavior, and many others (Zee et. al, 2021). What impact can the student-teacher relationship have on at-risk students? For the purpose of this literature review, at-risk students are those with EBDs, ACEs, and DDs. Atrisk students have a higher chance of having a negative educational experience (Balie & Saved, 2020; Bierman & Sanders, 2021; McKenna et. al, 2019; Robertson et al., 2021; Srivastav et al., 2020; Subramaniam & Wuest, 2022). Factors these students are at-risk of experiencing may include externalized and internalized behavior problems, which can lead to students having difficulty in relationships with peers and teachers, low self-regulation, educational inequality, and dropping out of school (McKenna et. al, 2019; Robertson et al., 2021; Subramaniam & Wuest, 2022; Walker & Graham, 2021). Along with the supports outside of the classroom, the student-teacher relationship could be one of the most impactful determining factors in deciding if at-risk students have a positive or negative educational experience.

Students with Emotional Behavior Disorder

Students face many challenges during their years of education. Students with Emotional Behavior Disorder (EBD) face some of the most difficult challenges to overcome. Ogundele (2018) explains that EBDs include a wide variety of disorders. EBD may include mental disorders such as obsessive-compulsive disorder, anxiety and, depression. They may also include behavioral disorders such as oppositional defiance disorder. EBDs may include some developmental disorders such as speech/language delay, and intellectual disabilities.

Students with EBDs find it difficult to build and maintain healthy, positive relationships with their teachers, but the student-teacher relationship has the potential to greatly impact these students (Van Loan & Garwood, 2020b). These students are generally less engaged in school compared to students without EBDs, and consequently struggle with behavior problems. These students usually cause classroom disruptions and have a higher suspension and expulsion rate. The consequences continue outside of educational years as students with EBDs have a higher unemployment and incarceration rate (Smith et. al, 2018). Students with EBDs experience social and emotional factors combined with behavior problems that lead to social difficulties. The way teachers respond to these students can either help solve or help grow the issues students with EBDs face (Bierman & Sanders, 2021). With so many odds stacked against students with EBDs, how can a teacher come alongside them?

One of the most powerful tools a teacher can use to support students with EBDs is a close relationship. Balie & Sayed (2020) found teachers are foundational in the educational experience for students with EBDs. Students with EBDs need teachers to believe in them and serve as a positive adult role-model. Another part of their primary role is to provide support by identifying behavior problems and their causes, and resourcing interventions. This takes a teacher that is warm, loving, and requires a listening-first approach. It is essential for teachers to collaborate with family members and paraprofessionals to provide the needed support. Van Loan & Garwood (2020a) determined any interaction with a student suffering from EBDs that adds to a genuine, meaningful, warm relationship from the student's perspective will result in a better likelihood the student will be open to feedback from the teacher, which leads to higher social, emotional, and behavioral success.

Not only does a close relationship help students with EBD, placing priority on a high-quality relationship with students suffering from EBD prevents some challenges teachers face. This results in a more positive educational experience for both parties when this is achieved (Van Loan & Garwood, 2020a). An emotionally healthy teacher is critical in a sustainable, close student-teacher relationship.

A close student-teacher relationship for students with EBDs positively impacts behavior. Positive relationship building with students suffering from EBD is a preventative measure to decrease episodes of crisis behavior (Balie & Sayed, 2020; Van Loan & Garwood, 2020a). Relying on the established relationship is critical during times of conflict and requires strategies which enable the teacher to maintain their emotional health and maintain awareness of formed habits as well as ways to support the student working through their emotions (Van Loan & Garwood, 2020a). These strategies will be discussed in Chapter 3. Students suffering from EBDs experience higher levels of engagement as higher levels of praise-to-reprimand ratios are implemented. Caldarella et. al (2019) found Students with EBDs showed the same levels of engagement as their peers without EBDs when a 9-1 praise-to-reprimand ratio was used. Downs et. al (2019) found the engagement and disruptions of students with EBDs were more sensitive in their response to teacher praise and reprimands compare to their typical peers. When a teacher is invested, students with EBD respond to them.

This literature determines a close student-teacher relationship is a critical factor in determining the educational experience for students with EBDs. Building a positive relationship with students suffering from EBDs (a) allows the student to be supported, (b) have a heighted self-efficacy, (c) understand areas they can improve and, (d) allow them to realize that their dreams can come to fruition (Van Loan & Garwood, 2020a). The student-teacher relationship proves powerful among students with EBDs.

Students with Adverse Childhood Experiences

Adverse Childhood Experiences (ACEs) are the result of negative childhood experiences, and can have a lasting impact, even into adulthood. ACEs were first studied by the Kaiser Permanente Medical Group in 1997. According to Srivastav et al. (2020), ACEs consist of childhood experiences resulting from social, biological, and environmental factors. These traumatic experiences can include physical and/or sexual abuse, neglect, and dysfunctional households (witnessing violence, mental health issues, substance abuse, parental incarceration, etc.) among others. An estimated 46% of children in the United States have experienced ACEs, with over 20% experiencing multiple ACEs (Srivastav et. al, 2020; Keane & Evans, 2022). Subramaniam & Wuest (2022) found the neurobiological impact of trauma and the lack of a safe relationship with caregivers leads to attachment issues. Through relationships with caregivers, children learn (a) how to appropriately regulate their emotions, (b) establish and maintain meaningful relationships, (c) place trust in others and, (d) have a healthy sense of self-worth. If a child grew up in an abusive home, it was learned that (a) life is unpredictable, (b) trust will be broken, (c) relationships will fall apart and, (d) they must constantly be on guard to protect themselves against it.

Students that have experienced ACEs are likely part of a generational chain of ACEs. Vaughan-Jensen (2020) found students who are victims of physical abuse as a child are more likely to be victims in adolescence, and have an abusive or violent romantic relationship in adulthood. They also found an effective intervention to break this cycle is a meaningful relationship with a stable adult. This is consistent with Bandura's Social Learning Theory (1971). Bandura concludes people are a product of their environment (Bandura, 2000). Students experiencing ACEs typically have adult models in their life whom they observe and replicate behavior. Teachers have the unique opportunity to break the cycle of destructive behavior by becoming a positive model students can use to replicate behavior and interaction with others (Endedijk et.

al, 2022).

Early educators can step into the life of a student with ACEs and allow them to experience safety while they explore the world around them. This enables the student's brain development to change from survival mode to being able to build the student's self-efficacy and self-regulation and thus, behavior (Sciaraffa et. al, 2018). Long-term negative effects of ACEs can be prevented by the child having a safe, loving, nurturing adult relationship and environment (Srivastav et. al, 2020). Students with ACEs are even less likely to participate in substance abuse or risky behavior if they have a positive adult role model in their life (Breedlove et. al, 2021). Sciaraffa et. al (2018) concluded the most important factor in supporting students that have faced adversity is a caring, meaningful relationship with a stable adult. It is clear supportive student-teacher relationships are one of the best protective measures against ACEs (Keane & Evans, 2022).

Students who have experienced trauma can easily notice if someone is being genuine or not. This often leads students to criticize their teacher's words and actions, assessing if they are genuine. It is vital for teachers to show students who have experienced ACEs they care for them through their actions, and not just tell them (Subramaniam & Wuest, 2022). When students with ACEs know the teacher is genuine and cares for them, they are more open to trusting and letting them have a voice in their life. Stoppelbein et. al (2021) conducted a study in which they found student-teacher relationships high in conflict and low in closeness have a connection between students with ACEs and callousness. On the contrary, low levels of conflict and high levels of closeness resulted in a low connection between students with ACEs and callousness. This implies student-teacher relationships either enhances or remedies calloused behavior among students with ACEs.

Educational institutes are attempting to leverage the student-teacher relationship for students with ACEs. One way education is supporting students with ACEs is by providing trauma-informed school practices. One aspect of these practices is having a safe, predictable learning environment focusing on predictability and teachers building positive relationships with students (Robertson et. al, 2021). Institutions have also provided interventions in student-teacher relationships for students with ACEs, which have improved student-teacher relationships (Keane & Evans, 2022). Although more research is needed to prove the student-teacher relationship as an effective, protective factor among students with ACEs (Keane & Evans, 2022), there is growing evidence that supports this claim.

Students with Developmental Disabilities

The student-teacher relationship is rooted in social interaction. Students with certain developmental disabilities are often behind in social development compared to their peers. Developmental disabilities can include but are not limited to (a) Attention Deficit Hyperactivity Disorder (ADHD), (b) Autism Spectrum Disorder (ASD), (c) Cerebral Palsy, (d) hearing loss, (e) intellectual disabilities and (f) learning disabilities (Case et. al, 2020; Zablotsky et. al, 2019). Developmental disabilities last a lifetime and include impairments in the domains of physical, learning, language, and behavior (Zablotsky et. al, 2019).

Behavior problems and academic struggle are common for elementary students, and even more so for students with developmental disabilities (Desrochers & Fallon, 2014, as cited in Hansen et. al, 2019). Students with ADHD and ASD, in particular, encounter more behavior issues compared to their peers (Desrochers & Fallon, 2014, as cited in Hansen et. al, 2019). This literature review will examine the student-teacher relationship and the impact on behavior among students with the two most common developmental disabilities, ADHD and ASD.

Attention Deficit Hyperactivity Disorder

The American Psychiatric Association (2013) includes ADHD on the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and classifies it as a mental disorder which leads to an inability to keep focus, involves excessive movement for the setting, and acting upon impulses in the moment without thinking of consequences. It is a common mental disorder which impacts 8.4% of children and 2.5% of adults (American Psychiatric Association, 2013). A typical learning environment requires students focusing on one concept at a time, containing their body movements, and not acting upon their impulses. For these reasons, students with ADHD typically have a negative educational experience compared to their peers (Berchiatti et. al, 2022).

Teachers typically have difficulty establishing a close relationship with students with ADHD and have more conflict in their relationship compared to relationships with typical developing students (Berchiatti et. al, 2022; Ewe, 2019). Students with ADHD have less emotional engagement in school, and a high-conflict student-teacher relationship contributes to this problem. Thus, a student-teacher relationship with higher closeness results in higher levels of student engagement (Rushton et. al, 2020).

In regard to behavior, Students with ADHD have more emotional symptoms and behavior problems compared to their peers and are often rejected and unpopular (Berchiatti et. al, 2022). The student-teacher relationship proves to give students a better chance in closing the social developmental gap among students with ADHD. Jia et. al (2021) found positive student-teacher relationships reduced a child's connection between internalizing behavior problems and poor social skills. This study also found student-teacher relationships high in closeness and low in conflict among students with ADHD combined with self-reported high social competence among students' parents resulted in better social skills among students with ADHD (Jia et. al, 2021). Zendarski et. al (2020) found the more years of experience a teacher had gave students with ADHD an even better chance at a positive learning experience as teachers'

years of experience, student prosocial behavior, and a close student-teacher relationship were all positively connected. These supports are possible because effective teachers can give clear instructions to students on how to react to social situations and regulate emotions (Jia et. al, 2021). The literature reveals the student-teacher relationship can impact students with ADHD in a positive way.

Autism Spectrum Disorder

Autism Spectrum Disorder (ASD) typically has an onset in the preschool years and can be one or many disorders that may involve difficulties in social situations, repetitive or restrictive interactions with behaviors, interests, and activities (American Psychiatric Association, 2013). Worldwide, about 1/100 people have been diagnosed with ASD, although in higher-income countries estimate a higher rate (Lord et. al, 2020). Students with ASD can find several barriers that can impact their educational experience.

The wide range of supports potentially needed for students with ASD often leaves teachers frustrated. Students with ASD typically do not have a high-quality relationship with their teacher compared to their peers without ASD (Blacher et. al, 2014, as cited by Feldman et. al, 2019; Eisenhower et. al, 2015, as cited by Bolourian et. al, 2019). The student-teacher relationship among male students with ASD in a special education setting had more conflict and less closeness compared to male students with ASD in mainstream classroom settings (Roorda et. al, 2021).

Even though close student-teacher relationships show some benefit such as higher language skills among students with ASD (Feldman et. al, 2019), teachers typically require more support for students with ASD. This could be why Azad et. al (2018) found students with ASD experienced a higher rate of positive behavior change when a program was implemented to allow teachers and parents to have a more collaborative approach to the student's educational experience. The literature shows student-teacher relationships can have an impact on the behavior of students with ASD, but often students with ASD need more support than a student-teacher relationship can offer.

Strategies to Improve Student-Teacher Relationships

Knowing a close student-teacher relationship positively impacts all students' educational experience and most at-risk students' behavior, how can a teacher go about improving relationships with students? (Balie & Sayed, 2020; Bosman et. al, 2018; McKenna et. al, 2019; Robertson et al., 2021; Srivastav et al., 2020; Subramaniam & Wuest, 2022; Zee et. al, 2021). There are many things a teacher can do to establish and maintain genuine relationships with students. The next part of this literature review will cover how the Establish, Maintain, Restore (EMR) method, Positive Behavioral Interventions and Supports (PBIS), and using Culturally Relevant Pedagogy (CRP) can help improve the student-teacher relationship.

Establish, Maintain, and Restore Method

The EMR method is a popular strategy currently being studied. The pioneers of EMR are Cook et. al (2018) in which they highlighted three integral phases of a close student-teacher relationship. The first phase is Establish. In this phase, a teacher is building a strong connection with the student though actions such as greetings at the door, carrying conversation about the student's interests, etc. By investing this time at the beginning of the student-teacher relationship, the teacher will find less behavior problems during the school year (Kennedy and Haydon, 2021).

The second phase of EMR is Maintain. For a positive relationship to continue, the teacher will need to positively reinforce the student time and time again. A common ratio of positive to negative interactions is 5-1 in this phase. Balie and Sayed (2020) noted students need a genuine relationship with their teacher, and to give positive reinforcement to build student resiliency.

The third phase is Restore. There will be times when a teacher will have a negative interaction with a student such as behavior redirection or constructive criticism. The student will usually give cues when restoration needs to happen, and if left ignored, could be damaging (Myung et. al 2021). To effectively follow up, the teacher initiates a conversation in which restoration takes place.

The EMR method has proved to have positive results on the student teacher-relationship and with student behavior. Student-teacher relationships that implement EMR are typically categorized as close, and often improve student behavior (Collins and Landrum, 2023). Kincade et. al (2020) conducted a meta-analysis on strategies that improve student-teacher relationships and found EMR had the largest effect because it, "included numerous direct relational practices such as expressing care, getting to know the student, conducting home visits, giving praise, and using restorative relational practices if there is a negative interaction" (p. 733). Although more research needs to be done on the EMR method and its impact on the student-teacher relationship, and specifically behavior, this method shows promise to prove a positive connection.

Positive Behavioral Interventions and Supports

Positive Behavioral Interventions and Supports (PBIS) first came to the educational scene in 1997 when the Individuals with Disabilities Education Act was reintroduced (Sugai & Horner, 2020). Over the years, it has developed into a multi-tiered system of support (MTSS) framework in an educational setting to set behavioral expectations for all students (Keller-Bell & Short, 2019; Sugai & Horner, 2020). In a school-wide PBIS system, the first tier meets the needs of about 80% of the student population and consists of (a) overall rules, (b) procedures, (c) physical arrangements implemented and, (d) enforced by all school staff to prevent behavioral problems (Simonsen et al., 2015, as cited by Keller-Bell & Short, 2019; Walker et. al, 2005). The second tier consists of approximately 15% of the student population and offers interventions for students that have been identified through data review and are considered at-risk of developing higher level behavior problems (Simonsen et al., 2015, as cited by Keller-Bell & Short, 2019). The third tier supports about 1-5% of the student population and offers support for students with repeating behavior problems that need individual, specialized support (Walker et al., 2005). A crucial dimension of PBIS is positive reinforcement, which this system of intervention and support holds as the backbone (Bambara and Kern, 2021).

With the implementation of PBIS, student-teacher relationships improve. Barret et. al (2018) concluded PBIS as the ideal framework for teaching social competencies rather than a standalone social-emotional curriculum. This, in turn, makes the student feel valued and improves the student-teacher relationship (Balie & Sayed, 2020). Walker and Graham (2021) found that positive emotional support leads to a close student-teacher relationship overall.

PBIS has a chain effect from improving student-teacher relationships which then in turn improves student behavior. When it is implemented, students perceive their teacher and peers as emotionally supportive which results in having more prosocial and responsible behaviors (Wentzel et. al, 2018). Petrasek et. al (2022) found PBIS promotes a reciprocating, close student-teacher relationship because under this framework the teacher is characterized as warm, encouraging, and positive. The student reacts by being more engaged in school-related academics and activities, which makes it easier for the teacher to remain warm, encouraging, and positive. In short, the positive student-teacher relationships produced through the use of PBIS help improve student behavior (Kennedy and Haydon, 2021). The literature proves the implementation of PBIS as an effective way to increase the quality of student-teacher relationships and student behavior.

The impact of PBIS is another example of Bandura's Social Learning Theory (1971). With the connection between positive reinforcement and student behavior (Kennedy & Haydon, 2021), we see students observing their teachers (models) and the outcomes of their positive interactions and implementing the same posture in their interactions. This is one reason why a high positive to low negative interaction ratio sets a safe, effective learning environment (Wentzel et. al, 2018).

Culturally Relevant Pedagogy

It has generally been found that minority students have been marginalized from education because teachers do not have the tools to build a close relationship with students of a different culture (Gay, 2018). Minority students have often suffered behavior and academic problems in education due to an inability to access curriculum that is not relevant to lived experiences (Gay, 2018; Ladson-Billings, 1995; Milner, 2011). How does an educator reach every student, even if they do not have shared experiences, common culture, or a way to easily relate to one another? One answer is teaching through a culturally relevant pedagogy (CRP).

Teachers that utilize CRP do not see cultural or racial differences as a barrier but use the students' culture and lived experiences to relate to students, open access to connect prior knowledge with constructing new knowledge. This is not just for success in the classroom, but also to bring justice to social inequities (Milner, 2011). Ladson-Billings (1992), who is credited for pioneering CRP, describes it as a pedagogy which empowers the student to use educational content to identify their role in the world.

CRP can enable teachers to build a genuine relationship with students they would initially have a difficult time connecting with due to cultural and linguistic barriers, but it does not come without some difficulty. Cruz et. al (2020) found a connection between CRP and teacher's confidence in building trust and individual relationships, but lacking confidence in connecting with students based on their culture and linguistics. CRP takes strong empathy and time to truly understand cultural constructs and have enough cultural competency to build a positive relationship. Other educators found the time and energy it takes to establish and maintain a strong student-teacher relationship became too much of a focus compared to providing meaningful education. Berryman et. al (2018) concludes although CRP is rooted in relationships, educators sometimes make relationships a singular priority, and do not strive for a holistic approach in prioritizing the spiritual, cultural, and physical wellbeing of students.

CRP, when implemented correctly, can have powerful results on the student-teacher relationship and student behavior. Samuels (2018) collected data from teachers' perspectives after implementing CRP. It was found that CRP helped students feel like they were a worthy part of something and felt empowered to positively view others and themselves. It served to create a positive classroom environment where peer and student-teacher relationships were boosted resulting in increased confidence and sense of safety. It allowed students to be vulnerable and take risks, opening the doors for them to access education in way they had not before. CRP was seen as a bridge connecting students, teachers, schools, and society. Gay (2018) sums up how student-teacher relationships and CRP work hand in hand when she concludes teachers can build meaningful relationships with students not only to enable them to access academic content, but to take their influence outside of the classroom and make a difference in society.

Summary

The student-teacher relationship has been measured in many ways, but the most widely used method is the Student Teacher Relationship Scale (Pianta, 2001; Bosman et. al, 2018). This scale uses three categories to characterize the student-teacher relationship. These categories include closeness, conflict, and dependency. The student-teacher relationship with high closeness, low dependency, and low conflict has the greatest impact on a student having a positive educational experience (Rucinski et. al, 2018; Zee et al, 2020a). A close student teacher relationship positively impacts the behavior of at-risk students with EBDs, ACEs, and most DDs (Jia et. al, 2021; Robertson et. al, 2021; Van Loan & Garwood, 2020a), but typically students with ASD need supports beyond the classroom and a close student-teacher relationship does not have as much of an impact on their behavior (Feldman et. al, 2019). There have been many practices attempted to improve student-teacher relationships The EMR method, correct implementation of PBIS, and using CRP have all shown to do so (Cook et. al, 2018; Gay, 2018; Petrasek et. al 2022). Chapter three will bring the research together and answer the question, "What now?" Based on the research, conclusions will be drawn. From the conclusions, changes and additions to practice and policy will be proposed. Lastly, after gaps in research have been identified, future research will be suggested.

Chapter 3: Implications

Introduction

Students with Emotional Behavior Disorders (EBDs), Adverse Childhood Experiences (ACEs), and Developmental Disabilities (DDs) face many obstacles to having a positive educational experience (Balie & Sayed, 2020). A major factor in determining the educational experience for these at-risk students include the ability to establish and maintain healthy relationships. Many at-risk students have difficulty establishing and maintaining relationships with others, which leads to behavior problems (McKenna et. al, 2019; Robertson et al., 2021). Understanding the impact the student-teacher relationship has on at-risk students' behavior could lead to many implications including practices teachers can apply in the classroom, as well as policies districts or states could implement. The student-teacher relationship could be an underused resource that could be studied further and leveraged to contribute to a positive educational experience for at-risk students.

Conclusions

The results of this literature review call for further research along with practical implications in the classroom and state-wide policy additions. As this review proves, the first finding is that a student-teacher relationship high in closeness and low in conflict generally result in a positive educational experience for both the teacher and the student (Bosman et. al, 2022; Haldimann et. al, 2023; Prewett et al, 2019). Students feel cared for, safe, and empowered to grow in their education while in a positive student-teacher relationship. Students are not wondering if they are accepted, not afraid to mess up, not intimidated to approach the teacher with a question or concern. Since their main concerns of safety and comfort are met, they are able to move into higher-order thinking and constructing knowledge. Therefore, establishing and maintaining a positive student-teacher relationship with all students is essential for

all teachers.

A student-teacher relationship marked high in closeness and low in conflict could positively impact students' behavior according to Albert Bandura's Social Learning Theory (1971). In his theory, Bandura suggests people can observe others' actions along with the consequence of their actions to determine if the same action would lead to a favorable outcome for themselves. Therefore, students can observe the teacher and the characteristics that mark a close relationship such as kindness, patience, humbleness, and selflessness and replicate the actions themselves in all their relationships.

Students with EBDs, ACEs, and DDs typically find it difficult to establish and maintain positive relationships with others (McKenna et. al, 2019; Robertson et al., 2021; Subramaniam & Wuest, 2022; Walker & Graham, 2021). Along with mainstream students, a student-teacher relationship high in closeness and low in conflict positively impacts most at-risk elementary students' behavior (Balie & Saved, 2020; Van Loan & Garwood, 2020a). On the other hand, a second finding is that a student-teacher relationship marked with high conflict and low closeness negatively impacts at-risk elementary students' behavior (Jia et. al, 2021). Students with EBDs, ACEs, and DDs often require resources outside of the classroom to give them an equitable opportunity for a positive educational experience, but the review of this literature proves one of the most impactful resources at-risk students could benefit from is a positive student-teacher relationship. Teachers need to get to know their students to have a genuine connection with them. While getting to know students, teachers need to know which students have EBDs, ACEs, or DDs and make it a point to learn about what triggers that student toward behavior problems, what motivates them to positive behaviors, and how they can leverage that in the classroom.

These results did reveal a positive student-teacher relationship may not be enough support to impact some at-risk students. Typically, students with autism spectrum disorder (ASD) needed supports outside the classroom to improve behavior (Azad et. al, 2018). Most mainstream teachers do not have the specialized training needed to support students with ASD while also focusing on other students in the classroom. The student-teacher relationship between mainstream teachers and students with ASD need more research to determine how impactful the relationship can be on the behavior of students with ASD. Concluding from this literature review, a positive student-teacher relationship between mainstream teachers and students with ASD could be a great place for the students to feel accepted and cared for in the school and create momentum for the student utilizing other professionals to provide the support needed.

This literature revealed how impactful student-teacher relationships are for all students, and especially for at-risk students. This could be a positive or negative impact. To establish and maintain a positive relationship with students, teachers must take the initiative in getting to know their students on an individual level so they can connect, encourage, set an example, and motivate all students toward improving behavior.

Practice Implications

Since a student-teacher relationship high in closeness and low in conflict leads to improved student behavior and an overall positive educational experience, what can educators do in the classroom to promote positive student-teacher relationships? Providing teachers with the tools to execute proven practices such as the Establish, Maintain, Restore (EMR) method and using Culturally Relevant Pedagogies (CRP) will yield high-impact results (Balie & Sayed, 2020; Cook et. al, 2018; Gay, 2018). The following explains how each can be practically applied to the classroom.

Cook et. al (2018) first introduced the Establish, Maintain, Restore (EMR) method in which the teacher established a genuine connection with each student, maintains the relationship through positive interactions, and restores the relationship when necessary, negative interactions occur. For a teacher to establish a genuine relationship with a student, the student must experience the teacher caring for them. These interactions could include a positive greeting by name at the door, encouraging statements, engaging conversation about topics that interest the student, a polite farewell, etc. Please see Table 1 for more examples on positive interactions while establishing a relationship with a student.

Maintaining a close relationship with students takes effort. A common practice during the maintain stage of EMR, and teachers using Positive Behavioral Interventions and Supports (PBIS) agree on a 5-1 positive interaction to negative interaction ratio with each student (Bambara and Kern, 2021; Balie and Sayed, 2020). The positive reinforcement promotes the student self-efficacy and decrease in behavior problems (Balie and Sayed, 2020). Another common practice during this phase is a regular student check-in so the teacher has a pulse on how the student is doing overall. Table 1. Examples and Descriptions of Establish-Maintain-Restore (EMR) Strategies

EMR practice name	Practice description			
Establish				
Banking time	Find individual time to spend with a student to engage in relational conversation.			
Gather, review, acknowledge	Learn information about students. Review that information to combat forgetfulness. Find natural opportunities to acknowledge or reference that information.			
Positive greetings	Use the student's name. Welcome students and show that you value their presence.			
Positive farewells	Offer words of encouragement. Thank students for participating. Wish students a good rest of the day.			
Wise feedback	Communicate high expectations and reasons for feedback explicitly. Express care for student learning. Assure students that they are capable of meeting expectations. Allow students to advocate for help or provide feedback.			
2 by 10	Spend 2 minutes per day for 10 days connecting with a student.			
Objective observations	Conduct specific observations for students with whom you are struggling. Focus on objectively describing the student's behavior, putting aside your interpretations or judgments.			
Maintain				
5:1 ratio	Maintain a ratio of 5 positive interactions to 1 negative interaction with each student including: effective use of praise, relationship check-ins, and being mindful in the moment. 			
Restore				
Letting go	Make a fresh start after a negative interaction.			
Taking ownership	Acknowledge your own mistake or missed opportunity.			
Empathy statement	Show effort to understand the student's perspective.			
Statement of care	Separate the deed from the doer.			
Collaborative problem-solving	Work together to find win–win solutions.			

Note. Adapted from (Gaias et al., 2020)

There will be times when a teacher will have a negative interaction with a student, such as a behavior redirect or discipline experience. Teachers will have to learn how to understand cues from students when a restorative conversation needs to take place. This is when a teacher has a private conversation with the student, affirms the student as a person, addresses the behavior in question and concludes together how to move forward. This allows the student to know the teacher still cares for them, will hold to a boundary or rule, and wants to move forward in a healthy way. See Table 1 for more examples of restorative conversations.

Another practice that teachers can implement in the classroom is the use of Culturally Relevant Pedagogy (CRP). There are many barriers that can stand between teacher and student to prevent a close relationship. Differences in culture, lived experiences, and linguistics can be some of them. This is especially true for minority students who may not have any of the above mentioned with a single teacher throughout their academic careers. As Ladson-Bill-
ings (1992) introduced the use of CRP, these barriers became gateways for teachers to connect with students and allow them to connect prior knowledge to new knowledge in a meaningful way. CRP essentially is relating educational content in a way students can relate to so they understand their place in the world and the change they can bring to society.

CRP in rooted in teachers knowing students. Teachers will not be able to relate content to students if they do not know their interests, culture, and lived experiences. Since each student is unique, it takes time for a teacher to understand these foundational blocks about their students. A teacher using CRP will take a lot of time during the beginning of the year understand their students. This could be through conversations during breaks, student assignments that have to do with their family history or culture, regular student check-ins, class activities, etc. Once the teacher establishes a genuine relationship with students, understands their interests, culture, and lived experiences, the teacher can begin to relate educational material in a way that interests the students and makes education meaningful for them.

Consider the follow an example of how a teacher can use CRP. While students were walking in from recess at the beginning of the year, they were talking about a basketball team and their favorite players on that team. The teacher overheard and made a mental note. While teaching converting fractions to percentages the teacher used an example of one of the student's favorite players making nine of twelve shots in the game the night before and went through the steps to find the player's shooting percentage. The students were engaged because the teacher was talking about something that interested them, and the educational content was grasped.

Using CRP not only makes educational content accessible to all students, it also enhances the student-teacher relationship. The student feels the teacher cares for them because they get to know the student as a human and validate their interests and background. The close relationship, in turn, improves student behavior (Samuels, 2018). It is a lot of work for the teacher up front, but pays dividends as the year goes on.

Policy Implications

Armed with the knowledge of how impactful the student-teacher relationship can be, there are policy changes that can be made to maximize this relationship and utilize it to its full potential. The first policy change could be at a state level and require the student-teacher relationship to be measured from the teacher and student perspective, and use this data to compare against behavioral issues and standardized testing. The second policy change could made be at the state or district level in providing professional development for educators on practices to improve the student-teacher relationship. The following is a deeper look on these suggestions for improvement.

There are many data points being collected by the Department of Education in California to determine the current state of education. Two ex-

amples of this are schools giving standardized tests to measure if students are meeting the learning standards, and the statistics on behavioral consequences such as office referrals, suspensions, and expulsions. The student-teacher relationship can also be measured to determine if there are any connections between the quality of the student-teacher relationship and standardized tests scores, or behavioral consequences.

For this to happen, the student-teacher relationship would need to be measured in an equitable way across the state. All teachers could use the Student-Teacher Relationship Scale (STRS), first developed by Pianta (2001). The problem with this scale is that it does not measure the quality of the relationship from the perspective of the student, only from the perspective of the teacher. A solution to this problem is to allow the students a voice in determining the quality of the student-teacher relationship.

Since all students express their knowledge in different ways and students in elementary school have a wide age and development range, providing options for students to report on their relationship with their teacher would provide a more accurate picture compared to a singular way of student reporting. Some options could be filling out a form similar to the STRS but from the student perspective, allowing students to write a paragraph describing their relationship with their teacher, or allowing students to draw a picture of them and their teacher (Zee et. al, 2020b). For the last two options, trained professionals would need to decipher the written or drawn portion and translate it into quantifiable data.

This data can then be compared to other data collection points to determine state-wide how the student teacher relationship could impact behavior and grades if there are connections between the student-teacher relationship quality (closeness, conflict, dependent) and behavioral incidents or standardized test scores. The data on the student-teacher relationship could then be zoomed in on each school district, school, or teacher themselves to determine the quality of the student-teacher relationship. Districts or schools could use this information to determine if they need more professional development on the student-teacher relationship.

A second change in policy this study suggests is widespread training on the student-teacher relationship. This could be executed at a state or district level. After concluding the quality student-teacher relationships are directly linked to the overall educational experience, why not put resources toward training teachers on the importance of student-teacher relationships and practices that best establish and maintain them? A large majority of teachers enter the education field because they have a passion to connect with students and build up the next generation, but a minority receive the frameworks on how to do this effectively.

One strategy could be professional development and training for teachers on the EMR method. As covered in the practice implications, this training would give practical examples that could be implemented right away. The training would cover how to establish a relationship such as a meaningful greeting each day, and banking time with the student through conversation that interests them. It would also cover how to use the 5:1 ration of positive interaction to negative interaction to maintain the close relationship with a student. Practical examples and role playing would provide a clear vision on how this could be implemented in the classroom. The final step for this training would be on restoring the relationship when needed. The teacher would be able to recognize when a restorative conversation needs to take place, and some ways it could be carried out. The EMR method has proven to be effective in improving student-teacher relationship, so it makes sense to encourage teachers to use it.

A second strategy that could be covered in professional development for teachers is the use of CRP. It is nearly impossible for a classroom to be full of individuals with the same culture, shared experiences, and common linguistics. The teacher will always have students that are difficult to relate to, and these students may be at a disadvantage in accessing the curriculum because they have no way of making meaningful connections to it. Providing training on how to identify differences in students, and being able to celebrate the differences rather than ignoring them through the use of CRP would provide a powerful learning experience for all students.

Directions for Future Study

In the review of literature, there were three areas which revealed a need for further research. One area is determining an accurate method for measuring the student-teacher relationship from the student perspective. A second area is further research on how the student-teacher relationship impacts students with DDs. A third area that could use further reach is how CRP impacts all student behavior, not just minority students. Further research in these areas will provide a more well-rounded understanding on the student-teacher relationship.

The research showed various ways of evaluating the student-teacher relationship from the perspective of the teacher, with the most dominant being the use of the STRS. Very few studies considered the perspective of the student. Yes, students are not nearly on the same level as adults developmentally, but their perspective on the quality of the relationship is still important. When a marriage therapist is counseling a couple, he or she would want to hear from both parties to get a full picture of the quality of their relationship. A teacher might be under the impression they have a close relationship with a student, when in reality the student may be too scared or intimidated to let the teacher know they have certain points of conflict. To get a full picture of the quality of the student-teacher relationship, the student perspective is important and must always be considered.

The literature review revealed a gap in the research on how the student-teacher relationship impacts students with ASD. Many students with ASD require supports beyond what the mainstream classroom teacher can provide. In an inclusive classroom the mainstream teacher will either be co-teaching with a special education teacher in the classroom fulltime, or will be the one, constant teacher in the classroom with the special education teacher and other paraprofessionals entering and exiting the classroom. For this reason, the relationship that students with ASD have with the mainstream teacher has major implications on determining the overall educational experience for students with ASD and warrants further research so the mainstream teachers can be equipped for these scenarios.

The literature review on the impact of using CRP revealed many studies on how using CRP impacts education for minority students. This has been a breakthrough in connecting students to learning that historically have not been able to relate to curriculum. There were not many studies done on how using CRP can impact all students. Since every student comes from a different background, the teacher using CRP would need to differentiate how to relate the educational content to each student in a meaningful way. CRP is rooted in relationships and could prove to be a powerful approach in improving the student-teacher relationship. If positive connections are found through research, teachers could be trained in CRP and provide an impactful educational experience for all students.

Summary

Students with EBDs, ACEs, and DDs are at a higher risk for having a negative educational experience compared to their peers. There are many supports available in education to give these students an equitable chance to succeed in their academic careers. Almost all these supports are outside of the classroom. One major support that every student has the opportunity to benefit from is the relationship with their teacher.

Most researchers use the STRS to determine the quality of the student-teacher and assign them the category of closeness, conflict, or dependency. The quality of the student-teacher relationship has many implications. The research shows a student-teacher relationship in the category of closeness is connected to an overall positive educational experience for all students. For elementary students with EBDs, ACEs, and DDs, a close student-teacher relationship positively impacts student behavior. The only exception is among students with ASD as these students often require more support outside of the classroom, and the relationship with the teacher doesn't have a chance to develop.

The connection between a close student-teacher relationship among all students, and especially among at-risk students, has many implications. Are teachers using methods in the classroom that allow the student-teacher relationship to grow deeper and be a positive factor in the students' success? The research shows the EMR method and using CRP utilize the student-teacher relationship as vehicle that leads students to learning and behavior growth. Are teachers aware that the quality of their relationships with their students could have such an impact, or aware of the methods that enhance their relationships? Having professional development at the state and district levels could equip teachers with the ability to leverage the relationships with their students toward a positive educational experience. The state collects data to determine how effective education currently is, why not add a way to measure the quality of the student-teacher relationships to understand the connections with other data points such as standardized test scores or behavior incidences?

All teachers have an opportunity to make a lasting impact on each of their students. This project shows the connections between a close student-teacher relationship and positive behavior changes among elementary students with EBDs, ACEs, and DDs. The core of an effective educator is to "build bridges of love strong enough to support the weight of truth" (P. Vaughn, personal communication, February 17, 2010).

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How Play Impacts the Social-Emotional Development of Students in the Early Childhood Classroom Jeffrey Urbanik

Abstract

Due to shifting standards and policy trends, the early childhood classroom has seen a reduction of playtime in favor of direct instruction for the sake of academic achievement. This project examined how the presence and absence of play affected the social-emotional development of students in the early childhood classroom. The purpose of this examination was to assess the validity of the pedagogical trend occurring, assess the implications of this trend, and suggest measures that may be taken. This examination was done through reviewing literature pertaining to the history of educational policy, the social-emotional impact of play, and the effects of the absence of play in the early childhood classroom. Through a careful review of the pertinent literature, this project concluded that the trend prioritizing direct instruction over play has occurred. The benefits of play on students' social-emotional needs were demonstrated through multiple studies and the negative effects of its absence were analyzed through studies. The coronavirus pandemic of 2019 was used as an example of how students would respond when deprived of face-to-face social-emotional stimulation. The implications of these conclusions affect both educational practices and policies. Regarding practices, teacher and principal training needs to be expanded to include instruction on the importance of play and how to incorporate it into the classroom. Regarding policy, pre-service teacher requirements need to be expanded to include hands-on training, and play-based learning strategies and resources need to be implemented into both curriculum and standards.

Chapter 1: Introduction to the Project

Background

School is the primary way that students will interact with peers their age. Because of this, school is not only a source of academic growth, but a source of emotional and social growth, especially for young students between the ages of 5 and 8. German pedagogist Friedrich Froebel saw play as "the highest expression of human development in childhood" (Froebel, 1912, p. 50). Having crafted and named the first kindergarten environment, Froebel believed that young students were inquisitive and explorative learners whose interaction with the natural world helped to integrate their learning and development (Froebel, 1895). Hence the name "kindergarten", or translated as

"children's garden" (Bruce, 2021). In Froebel's early childhood classroom, the role of teacher did not exist to drill the students, but rather to encourage intrinsically motivated self-activity and discovery through play (Froebel, 1895). For a Froebelian classroom, play was the primary way young students constructed understanding and assigned meaning to the world around them (Froebel, 1895). The Waldorf schools later founded by Steiner would also place importance on play as a necessary developmental tool for young students (Suggate, 2019). Due to the historical context, play may be considered foundational to the early childhood classroom.

For the early childhood classroom, play may have an impact on students' social-emotional development. Multiple studies indicate that free time for the students to play allows them to interact with each other and acquire social-emotional skills (Kinkead-Clark, 2019; Taylor & Boyer, 2020; Alam, 2022). Kinkead-Clark (2019) states that young students reveal much about their own social-emotional development through play as they acquire these skills. The students share stories about themselves, learn to motivate each other, and develop leadership skills. By working together in play, students learned how to collaborate with each other (Taylor & Boyer, 2020). In addition, because most young students are naturally inclined to play, incorporating learning into the activity helps them to become motivated learners (Alam, 2022). These are a few examples of play's potential social-emotional impact on students.

Play may be incorporated into the early childhood classroom by using certain strategies. By scaffolding play, teachers can create diverse and rich opportunities for students to interact with each other in new ways and support the social-emotional development of their students (Pui-Wah, 2010; Kinkead-Clark, 2019). Incorporating play into the classroom as a part of learning and development is what is known as play-based learning (PBL) (Taylor & Boyer, 2020). Successful PBL involves both teacher and students, in which teachers can scaffold and support the play to encourage social-emotional development and incorporation of newly acquired academic knowledge (Pui-Wah, 2010). Despite knowing the benefits of PBL, teachers in Kinkead-Clark's (2019) study found participating in young students' play to be bothersome, rather than something within the scope of their profession. There has been a trend of reducing in-classroom play in favor of direct instruction to meet curriculum standards (Lynch, 2015; Resnick & Johnson, 2020; Alam, 2022). This trend may have an impact on the social-emotional development of students in the early childhood classroom.

Statement of the Problem

The ongoing trend of reduced classroom play may have long-term social-emotional implications for students in the early childhood classroom. In a classroom that prioritizes academic needs over social-emotional needs, kindergarteners tend to experience social and emotional stress which can lead to misbehavior and social maladjustment (Allen & Barber, 2015). Allen and Bar-

ber's (2015) reported that meeting the social-emotional needs of these kindergarteners through play interventions reduced disruptive behavior, increased academic achievement, and led to acquisition of social skills and improved social adjustment. Because of this, Allen and Barber (2015) have recommended that educators create a social curriculum that incorporates play. Play in the classroom allows students to show leadership skills and develop cognitively, but has not been considered a legitimate way to learn by teachers and administrators (Kinkead-Clark, 2019). Lynch (2015) states teachers were split on the idea of play in the classroom. While some teachers welcomed the idea and thought it important for social-emotional growth, others were much more negative (Lynch, 2015). Common thoughts of teachers were that academics took precedence over play and that pressure from principals and subordinates reinforced this idea (Lynch, 2015). Other teachers called play-based pedagogy ineffective and a sign of a lazy teacher (Lynch, 2015). There were also those who wanted to include play but found that there was not enough time in the day, given rising academic standards and curriculum (Lynch, 2015). These perceptions are reflected in how pre-service teachers are underprepared on how to incorporate play in their classrooms as a social-emotional development tool (Resnick & Johnson, 2020). The perceived trend of play in the classroom being deprioritized in favor of direct instruction to meet academic standards needs to be examined.

The social-emotional impact of the potential absence of play in the early-childhood classroom must also be examined. The coronavirus pandemic of 2019 (COVID-19) caused mass quarantines across the world and schools went from in-person to primarily online via programs such as Zoom (Hossein et al., 2023). Face-to-face interaction became rare for more than a year and children were unable to directly play with others their own age and develop social skills in a classroom setting (Hossein et al., 2023). As a result, the so-cial-emotional effects of these quarantines are still being studied today. Levitt et al. (2022) stated that children aged 5-11 receiving remote instruction exhibited more hyperactivity, peer problems, and total behavioral difficulties. They were also less likely to show academic motivation and social engagement and were more likely to show schoolwork defiance (Levitt et al., 2022). Because of this, it is more important than ever to examine the social-emotional effects and implications of play in a post COVID-19 world.

Three research questions guided this project's review of the literature. The first of these research questions asked how the implementation of play in the early-childhood classroom has changed over the years. The second research question regarded how cooperative play, or play with peers rather than play in isolation, affected students' behavior. The third research question asked how cooperative play affected students' acquisition and development of social-emotional skills. These research questions emerged to understand the context and validity of the problem statement and assess what possible measures could be suggested to address the problem on both the levels of educational practice and policy.

Purpose of the Project

The purpose of this project is to examine the social-emotional impact and implications of play in the early childhood classroom, determine the social-emotional effects that the reduction of play may have for the social-emotional development of students, and suggest methods to address the problem. The COVID-19 pandemic is recent as of the writing of this project and presents a case in which students went into quarantine for over a year, severely limiting face-to-face interactions (Hossein et al., 2023). The COVID-19 pandemic has thus increased how relevant and important this topic is due to the observable social-emotional effects created when students who did not have opportunities to play with peers in the classroom returned to class. No research regarding the long-term social-emotional effects of COVID-19 on young students exists at the time of writing. The reduction of play in the early-childhood classroom may have similar effects over a long period of time. The research will focus on the gap in literature that is the importance and relevance of play in the context of a post-COVID-19 world. Another goal of this project is to aid in confirming the validity of the trend of reduced play in the early childhood classroom in favor of direct instruction. Due to a lack of documentation regarding how playtime in the early childhood classroom has changed as well as a lack of unified standards that address playtime as a social-emotional development that can be assessed, it is possible that this trend has been allowed to happen slowly over a long period of time without interruption. Multiple researchers mentioned or discussed this pedagogical trend in their articles (Allen & Barber, 2015; Bassok et al., 2016; Taylor & Boyer, 2020). Bassok et al. (2016) directly compared the classrooms of 1988 and 2010 and found a reduction in creative activities and activity centers in favor of increased time spent instructing students on math and literacy. No research regarding the long term effects of these changes was discovered during the research process for this project.

There is more to consider in regard to the trend of reducing play in favor of direct instruction. On a broader level, Twenge and Park (2019) compared the children of 1994 to those of 2016, reporting that 10% less adolescents are participating in adult activities such as working for pay, driving, going on dates, and going out without their parents. Twenge and Park (2019) reported that this could indicate that children are developing slower and remaining dependent on parents for longer than previous generations. Twenge and Park (2019), after ruling out factors of increased homework and extracurricular time, hypothesized that this may or may not be due to increased internet use. Increased internet use may lead to decreased face-to-face interactions which may affect social-emotional development. This project will address the potential effects of both technology and COVID-19 on the social-emotional development of students. In addition, multiple researchers reported that teachers were not prepared to incorporate or assess play as a social-emotional development tool in the classroom (Pyle & DeLuca, 2017; Resnick & Johnson, 2020). To address this problem trend of reducing play in favor of direct instruction, this project proposes additional training for educators as well as the concept of utilizing play-based learning strategies to incorporate the social-emotional benefits of play while retaining academic achievement.

Theoretical Framework of the Project

The theoretical framework for this research project is Vygotsky's Sociocultural Theory of Cognitive Development. Vygotsky stated that "learning is a necessary and universal aspect of the process of developing culturally organized, specifically human, psychological functions" (1978, p. 90). Vygotsky theorized that social learning is part of the process that would lead to a child's development. People are both cultural and social creatures that develop and learn within cultural and social contexts. In other words, children cannot be presumed to learn their academics without first socially appropriately developing their cognitive functions. Vygotsky recognized that there was this gap between learning speed and development speed, in that development was slower, and that this gap would create what he called the zone of proximal development. The zone of proximal development is "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem-solving under adult guidance, or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). Per this theory, human development is not done in isolation or through academics alone, but through interaction with more knowledgeable individuals. Moreover, the potential for development in collaboration is higher than that of an individual's development independently. This can be done in the classroom, such as teachers interacting with students and scaffolding their learning or through students working collaboratively with each other.

This theoretical framework also directly addresses play's effect on a child's development. Vygotsky (1978) believed that play had a major effect on a child's cognitive development. Vygotsky stated that children's play allows them to break free of the constraints of reality by entering the imaginary, where the rules are illusionary cognitive constructs. Through working with their imaginations, children are able to develop cognitively and, by obeying the invisible rules of whatever game they are playing, they are able to practice and develop self-restraint (Vygotsky, 1978). Vygotsky wrote that children in play are able to separate and reattach the meanings of both things and actions, leading to abstract thought and the development of will, respectively. Through play, children are able to learn about social and cognitive constructs that affords them better understanding of the world around them (Vygotsky, 1978). In this way, play allows them to form the foundation for social-emotional development and social skills while also serving as a form of cognitive study hall. The intersection of the developmental value of play and the role of social interaction

in childhood development are not only relevant to the topic being discussed but are the crucial lens through which play in a post COVID-19 world will be examined.

Definition of Key Terms

COVID-19: A virus that caused a worldwide pandemic beginning in late 2019. It originated from China and was lethal to many at-risk individuals, claiming the lives of more than 6.9 million people worldwide (Sheposh, 2023).

Play-Based Learning: A unification of play and pedagogy that focuses on the "children's development, interests and abilities through engaging and developmentally appropriate structuring of academic learning experiences" (Taylor & Boyer, 2020, p. 127).

Social-Emotional Development: The gradual, integrative process through which children acquire the capacity to understand, experience, express, and manage emotions and to develop meaningful relationships with others (Cohen et. al., 2005).

Social-Emotional Skills: The abilities to regulate one's own thoughts, emotions, and behavior as well as to relate to others and maintain healthy relationships (Schleicher, 2016).

Summary

This chapter introduced the background context of play in the early childhood classroom. The first kindergarten environment created by Froebel saw play as vital to the early childhood classroom and to the development of young students (Froebel, 1895). Play allows young students to learn how to collaborate with each other, develop leadership skills, and become motivated learners (Kinkead-Clark, 2019; Taylor & Boyer, 2020; Alam, 2022). Play can be incorporated into the classroom in a way that supports social-emotional development and usage of newly acquired academic knowledge (Pui-Wah, 2010; Alam, 2022) There may be a trend of play being reduced in the early childhood classroom in favor of direct instruction.

The trend of reduced play in the early childhood classroom may have an impact on the social-emotional development of students in the early childhood classroom. Young students that do not have their social needs met may misbehave or have trouble with their peers (Allen & Barber, 2015; Alam, 2022). The COVID-19 pandemic created a situation in which most students were unable to meet their social needs for over a year due to quarantine and provided an example of what may occur if students are deprived of opportunities to interact with their peers and social-emotionally develop (Levitt et al., 2022; Hossein et al., 2023). This project examines the social-emotional impact and implications of play in the early childhood classroom in this post-COVID-19 context. This project proposes the use of additional training and play-based learning strategies as methods to potentially address the problem of the pedagogical trend causing a reduction of play in the early-childhood classroom. This project uses Vygotsky's Sociocultural Theory of Cognitive Development as its theoretical framework through which it examines the social-emotional effects of play. Vygotsky (1978) believed that learning is not just a purely academic process, but also a social and cultural one as well. Using the zone of proximal development, a student could increase their learning due to the scaffolding of a more experienced learner. This scaffolding is seen as one of the pivotal elements of play-based learning in which teachers can scaffold or guide play to incorporate effective learning (Pui-wah, 2010; Alam 2022). As an advocate of the power of play in the classroom, Vygotsky spoke of how it was central to the young child's ability to understand the world around them, echoing Froebel (Vygotsky, 1978; Bruce, 2021). This theoretical framework is important due to how it frames the young student as needing to learn not just in a purely academic context, but also a sociocultural context.

Chapter 2 of this project is a literature review focused on the history of play in the childhood classroom, the aspects of social-emotional development from play, and how face-to-face interactions affect social-emotional development. Chapter 2 is an in-depth examination of those topics and their subcategories. Afterwards, Chapter 3 is where this project draws conclusions from analyzing the pertinent literature and proposes educational practice and policy changes. In addition, Chapter 3 will discuss the limitations of this project and recommendation for future study.

Chapter 2: Review of Related Literature

Introduction

The problem being addressed in this project is the ongoing trend of reduced playtime in the classroom in favor of direct instruction and the unknown social-emotional impact it will have on students. The purpose of this project is to examine the social-emotional impact and implications of play in the early childhood classroom, assess the effects that the removal of play may have for the social-emotional development of students, and then propose strategies to address the problem.

The following literature review provides an examination of the history of play in the early childhood classroom and compares the past to the present in regard to the availability and perceived importance of play. Then, an examination of the literature surrounding the social-emotional development from play and how it might be integrated into the classroom. Finally, this literature review will provide an examination on how a reduction of face-to-face interactions affects social-emotional development.

History of Play in the Early Childhood Classroom

This section focuses primarily on literature around the history of play in the early childhood classroom. To understand how the implementation of play has changed, the following literature relevant literature was closely examined. Specifically, this section of the literature review establishes the different types of relevant play, the beginnings and current states of play in the early childhood classroom, and educator perceptions of the role of play in the early childhood classroom.

Types of Play

Play is a multi-faceted construct that researchers have debated on and struggled to define (Buldu & Buldu, 2023, Pui-Wah, 2010; Pyle & Alaca, 2018; Taylor & Boyer, 2020). Because of this, several different types of play exist. On a broad level, play can be divided into either guided or free form. Buldu and Buldu (2023) defined guided play as play that is scaffolded or structured by an adult, such as a teacher, while free play was when children were able to direct their own play without the structure of an adult. The types of play relevant to this project are physical play and imaginary play. Lundy and Trawick-Smith (2021) defined physical play, or active motor play, as play in which the student engages in physical activity such as a game or a sport. Meanwhile, imaginary play was defined by Vygotsky (1978) as play in which children can enter the cognitive realm and attach and detach meaning to things and play with the nonexistent. These are the definitions of play relevant to this project.

Implementation of Play in the Classroom

In 1837, pedagogist Froebel created the first kindergarten environment in southern Germany and designed them with the intention of play being the core curriculum (Froebel, 1915). Froebel wrote that play "is the purest and most spiritual creation of the child, and at the same time it is a copy of human life at all stages and in all relations" (Froebel, 1912, p. 50). The Froebelian classroom focused on the child in the context of the world around them and their relationship to themselves, peers, and environment (Froebel, 1891, 1895). Froebel's play-orientated pedagogy saw adults scaffolding children's play so that the children could have a wide variety of exploratory experiences, and featured emphasis on development of a child's autonomy and intrinsic motivation (Froebel, 1895). Building upon the ideals of Froebel, philosopher and teacher Steiner designed Waldorf education and opened the first Waldorf school based upon the concept of education suiting the children in a way that both met their needs and was comprehensible (Suggate, 2019). In particular, Steiner viewed play as an integral part of the emotional, physical, and mental development of children (Steiner, 2003). When it came to play in the classroom, Steiner's kindergartens focused on providing sufficient space, time, and natural materials to make self-motivated play as non-restrictive as possible (Suggate, 2019). Pedagogist Maria Montessori further contributed by placing emphasis on the experiences of children in the natural world, focusing on granting children the freedom of choice and the opportunity to grow outside the constraints of a civilized classroom that engenders conformity (Bertolini & Filippa, 2021). Thus, there is a foundation of play and interactivity in the development of the early childhood classroom.

The Modernization of Early Elementary

While kindergarten may have started with a focus on play and interaction with the world, the 21st century's early childhood classroom featured a much higher focus on academic achievement and curriculum (Allen & Barber, 2015; Bassok et al., 2016; Taylor & Boyer, 2020). Starting in the 1980s with the publication of an article titled "A Nation at Risk", the United States education system underwent a period of dramatic federal reforms based on fears of an ongoing educational crisis (Vinovskis, 2015). Increased federal involvement in the education system and reform would eventually lead to the No Child Left Behind Act of 2001 that introduced annual standardized tests, higher academic standards, and consequences for schools that failed to close the achievement gap (Vinovskis, 2015). Bassok et al. (2016) conducted the first study to compare the changes in beliefs and practices in public school kindergartens between 1988 and 2010 using nationally representative data sets and reported substantial differences. Despite there being no changes to time spent in physical education, social studies, and recess, classrooms of 2010 featured substantial reductions in time spent on art, music and science (Bassok et al., 2016). In addition, Bassok et al. (2016) also found a reduction in activity centers, a marked increase in teacher expectations, and an increase in standardized tests in early elementary classrooms in a trend that implies a heightened focus on literacy and math over other subjects. These results demonstrated a shift in pedagogical focus towards a specific standard of academic achievement.

Perceptions of Play

Given the implications of a shift in pedagogical focus in the 21st Century's early elementary classroom, it is important to closely examine the current perceptions of play in the classroom. Kinkead-Clark's (2019) observations and interviews with early elementary teachers revealed that the teachers viewed play as a reward for the children or something to fill time rather than a part of their learning. Pyle and DeLuca (2017) reported a misalignment between teacher perceptions and assessments of play-based learning. While 42% of teachers agreed that the primary purpose of play-based learning was social and personal development, far fewer were assessing the play on a social or personal level and instead were using academic assessments (Pyle & DeLuca, 2017). A discussion case analysis by Resnick and Johnson (2020) concluded that, while pre-service teachers had limited opportunities to observe play in the classroom, raising awareness about the importance of play through teacher education programs could change an ongoing trend of play disappearing from classrooms in favor of direct instruction. According to multiple sources, teachers were not prepared on the importance of play in the classroom and how to integrate it (Pyle & DeLuca, 2017; Resnick & Johnson, 2020). The literature reviewed reported that the play was not being implemented in the

classroom at the teacher level, due to either a lack of training or an incorrect perception of play.

Counterargument of Perceptions of Play

Lynch (2015) conducted a study on teacher perceptions that somewhat contradicted what other researchers reported in their own studies. While Lynch (2015) did report that some teachers communicated an internal need to achieve academic goals at the expense of play-based learning, many teachers also reported being pressured by other teachers and administrators to meet academic standards at the expense of play. Lynch's (2015) study also revealed that teachers reported feeling pressured by increasing mandated activities, assessments, and curriculum and being forced to give up play to meet the demands of administrators. Some teachers in the study directly blamed No Child Left Behind as one of the causes for these pressures. Thus, the discussion on the trend of reduced play in the classroom is not focused on just the teacher practice level but also the policy level.

Social-Emotional Development from Play

The following section is focused on literature relevant to the effect of play on both student behavior and acquisition of social-emotional skills. In addition, this section includes literature relevant to the incorporation of play in the early childhood classroom through the pedagogy of play-based learning. The literature reviewed provides an understanding of the core concepts and effectiveness of play-based learning.

Effects of Play on Student Behavior

Student behaviors and classroom management of off-task, interruptive, and defiant behaviors are core elements of the teaching process. Levine and Ducharme (2013) discussed how reactive and repeated negative teacher action against students in the classroom may lead to a higher chance of task avoidance, non-compliance, and other escape-focused behaviors. Their study focused on testing the effectiveness of play-based interventions in which teachers engaged with play and positive interactions rather than negative interactions. Levine and Ducharme (2013) studied eight children in the age range of three to five years old and five early childhood teachers across five different educational centers. Levine and Ducharme (2013) reported that the usage of short playtime with teachers led to a substantial increase in student compliance and positive student behavior, but withdrawal of the playtime led to a decrease in student compliance and positive behaviors. Alam (2022) conducted a similar study on a larger scale with seventeen teachers and seventy-one preschool aged children across six different educational centers. All teachers in this study received 30 minutes of training and conducted five-minute individualized play sessions with their students. Alam (2022) reported similar results to Levine and Ducharme (2013) in which students demonstrated an increase in compliance with the play sessions and a decrease in compliance with the withdrawal of the sessions. Allen and Barber (2015) also conducted a similar study in which they observed an intervention for five groups of kindergarten boys who demonstrated off-task behaviors and interactions with each other during play activities over the course of six weeks. The kindergarten students were provided with ten small lessons on social skills as part of this play-based intervention. The intent of the intervention was to address the social needs of the students and teach them play-based social skills. Allen and Barber (2015) reported a significant decrease in verbal, motor, and passive off-task behaviors among the kindergarten boys due to the additional play time meeting their social needs. Likewise, a study by Lundy and Trawick-Smith (2021) reported that an hour of outdoor physical play for preschool children before learning led to a significant increase of on-task motor behavior for boys and children of low-socioeconomic status. In these ways, play has a positive effect on student behavior.

Play and Social-Emotional Skills

Social-emotional skills allow students to better understand and manage their own emotions as well as form and maintain relationships with others (Kinkead-Clark, 2019; Taylor & Boyer, 2020; Resnick & Johnson, 2020). Multiple studies have reported that the medium of play allowed students to practice and master the necessary social-emotional skills they need to successfully collaborate with others (Taylor & Boyer, 2020). Kinkead-Clark (2019) studied three different early childhood classrooms through observations over the course of twelve weeks and the factors that affect play. They reported that play afforded these children the opportunity to have revealing conversations in which they shared information about their lives with each other and with their teacher. Kinkead-Clark (2019) reported that play allowed these children to learn about themselves and each other. Kinkead-Clark (2019) also reported that play allowed students to rise to leadership roles and practice leadership skills as well as other social skills such as sharing, motivating each other and working with each other. Taylor and Boyer (2020) reported that children, through play, developed communication skills, oral vocabulary, and routines of conversation. Play enhanced a child's ability to self-regulate their emotions and behavior as well as their ability to express themselves through language (Taylor & Boyer, 2020; Alam, 2022). The social-emotional benefits of play have a basis in pedagogical theory.

Vygotsky's (1978) Sociocultural Theory of Cognitive Development viewed social learning such as play as incredibly important to the development of the child. Through play, students were able to interact with peers that were at differing levels of mastery for their social-emotional skills and thus could develop within their zone of proximal development (1978). Vygotsky (1978) also illustrated how imaginary play allowed children to develop cognitive skills such as abstract thought and will, as well as how the imaginary rules of various games would allow children to develop self-restraint (1978). This concept of the child as one that develops through socio-cultural interaction and play may have led to the development of practices that emphasize play, such as playbased learning.

Play-Based Learning in the Classroom

Play-based learning (PBL) in the classroom viewed play as a structured activity in which teachers scaffold play and participate in an active role in facilitating learning through play (Pui-Wah, 2010; Yoon, 2014; Taylor & Boyer, 2020; Alam, 2022). Also, PBL engaged students and built intrinsic motivation to learn in students by incorporating their learning with play (Alam, 2022). Beyond social-emotional skills, PBL also integrated literacy and computational thinking into play. Yoon (2014) reported that, when given the space to play and the proper scaffolds, students used what they learned about writing to play with each other and would even use their writing to include or exclude others. Yoon's (2014) study supported the idea that PBL can integrate literacy. Lee et al. (2022) analyzed existing literature and devised methods in which computational thinking skills such decomposition, abstraction, pattern recognition, and algorithm could be integrated into a PBL classroom. Through the careful usage of common games and activities, such as "Simon Says", puzzles and blocks, and treasure hunts, PBL could theoretically teach children key computational skills that would develop their ability to solve problems (Lee et al., 2022).

Play-based learning (PBL) classrooms relied on the existence of an active adult that is facilitating and scaffolding play to achieve learning (Pui-Wah, 2010; Taylor & Boyer, 2020; Alam, 2022). Pui-Wah (2010) claimed that a "flow state" existed in PBL in which students were able to take charge of their learning and experience deep enjoyment with play. According to Pui-Wah (2010), this "flow state" could only be achieved by careful teacher scaffolding. The role of the teacher in PBL was paramount as the teacher needed to take an active part in the play for substantial academic and social-emotional learning to take place (Pui-Wah, 2010; Stanton-Chaptam, 2015; Taylor & Boyer, 2020; Alam, 2022). PBL is a form of pedagogy that may meet the social developmental needs of students while also facilitating learning.

How Face-to-Face Interactions Affect Social-Emotional Development

In the context of the proliferation of technology in the 21st century and the COVID-19 pandemic affecting face-to-face interactions, this project features literature reviewed for the purpose of analyzing the effects of the absence of social-emotional development opportunities. This section focuses on the effects on social-emotional development that the absence of play in the early childhood classroom may produce. In particular, the literature reviewed discusses the social-emotional effects of the reduced opportunities for faceto-face interactions created by the COVID-19 pandemic.

Technology Effects

In the 21st century, nearly everyone has access to the internet and social media. According to a recent United States Census (2019), 94.6% of households with at least one child between the ages of three and eighteen in the United States had access to the internet through a computer, laptop, smartphone, or other smart device. Examining the ramifications that the technological future may have on social-emotional learning, Walker and Venker Weidenbenner (2019) conducted a study on how virtual play affected formation of empathy and social-emotional skills. Walker and Venker Weidenbenner (2019) reported that, with the aid of some human interaction, empathy could be learned in a virtual setting, but other social-emotional skills and language development had to be learned through human interaction in the sociocultural context of the real world rather than the virtual one. Carson and Kuzik (2021) studied the effects of electronic devices on parent-child relationships and the developmental effects on preschool aged children. Carson and Kuzin (2021) reported that, on average, an electronic device disrupted a conversation between a parent and their child 12-16 times a day. The parent's usage of electronic devices such as a cellphone would result in the parent either not responding to their child's need for attention or being slow to respond (Carson & Kuzin, 2021). Meanwhile, the child displayed an increase in behavior problems, a lowered ability to self-regulate their emotions, and a lower ability to control themselves (Carson & Kuzin, 2021). The frequent usage of technology may affect how people interact with one another and how they develop social-emotional skills.

Medical Effects

The recent COVID-19 pandemic led to students losing opportunities for face-to-face play and interaction with each other. Because of the isolation brought on by prolonged quarantine, students had to rely on technology for interactions with the outside world and social media became crucial for keeping in contact with people (Hossein et al., 2023). Many schools transitioned to remote instruction during the quarantine, using programs such as Zoom for teachers to instruct through the computer screen. Levitt et al. (2022) described the effects of this remote interaction; children aged 5-11 receiving remote instruction exhibited increased hyperactivity, peer problems, and behavioral difficulties. Students were also less likely to show academic motivation and social engagement and more likely to demonstrate schoolwork defiance (Levitt et al., 2022). Eveleigh et al. (2022) reported during the pandemic, educators of students with learning differences emphasized that teaching social-emotional learning was critical to understanding the pains of students and families as well "mitigating the ongoing challenges of the pandemic, distance learning, and lost physical connection" (p. 35). Hossein et al. (2023) conducted a survey in which they reported that the isolation caused by the pandemic and the very nature of remote learning served as significant sources of stress for high school

students. In addition to the psychological burden brought on by the pandemic, the sudden decrease of face-to-face interaction and increase in excessive use of technology to compensate led students to suffer from stress, lack of sleep, and a host of other negative emotions including depression, boredom, and anger (Hossein et al., 2023). Hossein et al. (2023) also studied the effects of Unplugged Day, a voluntary day in which the focus was on restoring mental and physical health through the use of games and other self-paced activities. They reported that the activities of Unplugged Day had a positive effect on the students' mental well-being. The COVID-19 pandemic and the quarantine that resulted from it provided an example of a more isolated world in which face-to-face interaction was not feasible. Relative to this project's creation, the COVID-19 pandemic is still recent and the long-term effects it will have on the development of social-emotional skills are yet to be seen.

Summary

This chapter reviewed the history of play in the classroom and how it has changed from being emphasized towards being deprioritized in favor of academic achievement. This chapter also reviewed how play provided a positive effect on the development of students' social-emotional skills and development. The literature reviewed portrayed negative effects on the effects of a reduction of face-to-face interaction on social-emotional development. The trend of reducing play in favor of academic achievement may then lead to a decrease in the positive effects of play and an increase in the negative effects caused by a lack of social interaction. In the next chapter, the implications of what this may mean will be discussed, and measures to address the problem at both a practice and policy level will be suggested.

Chapter 3: Implications

Introduction

The research conducted for this project focused on the literature surrounding how play impacts the social-emotional development of students in the early childhood classroom. The purpose of this project included an examination of the implications of the potential social-emotional impact that may result from the loss of play in favor of direct instruction in the classroom. In Chapter 3, a description of conclusions drawn from the literature review is provided. The conclusions drawn relate to the nature and validity of an educational policy shift that has taken place over the past few decades, the positive impact of play on the social-emotional development of students, and how the loss of that positive impact might influence the social-emotional development of students. In addition, this chapter discusses the implications of those conclusions on educational policy and suggests measures that could be taken. Finally, an overview of the areas for future study as well as address the limitations of this project.

Conclusions

After reviewing and analyzing the literature, several conclusions may be drawn. These conclusions arose as answers to the guiding research questions of this project. How did the implementation of play in the early-childhood classroom change over the years? How did cooperative play, or play with peers rather than play in isolation, affected students' behavior? How did cooperative play affect students' acquisition and development of social-emotional skills? First, there has been a shift in pedagogical focus in the early childhood classroom to emphasize academic achievement through direct instruction of math and literacy. Second, the concept of play in the early childhood classroom can have a positive impact on the social-emotional development and behavior of students. Finally, the loss of play or face-to-face interaction can result in stunted social-emotional growth in young students. In the early childhood classroom, policies and practices have changed over the years. Kindergarten started as the Froebelian "children's garden" that focused on allowing children to play and interact with the natural world in a way that built intrinsic motivation (Bruce, 2021). However, the 21st century saw rapid changes in schools across the United States of America as the focus began to change to standardized tests and closing the achievement gap (Vinovskis, 2015). Comparing the classroom of 2010 to 1988 reveals that classroom instruction spent on the arts, creativity, and play was reduced in favor of specifically achievement in literacy and math (Bassok et al., 2016). There is little research documenting the pedagogical shift from more equal inclusion of creativity and play to a priority in math and literacy and the effects it will have on students long-term. However, this shift is reflected in how teachers perceive play in the early childhood classroom. Although teachers recognized the need to implement play due to the social-emotional benefits, a large portion of teachers in Pyle and DeLuca's (2017) study assessed the concept of play using academic standards. Resnick and Johnson's (2020) discussion on the analysis revealed that pre-service teachers were not adequately prepared to incorporate play in their classroom. In addition, Lynch (2015) revealed that teachers felt pressured by superiors and peers to diminish play in favor of direct instruction to meet academic achievement goals. Based on the research, it can be concluded that this shift happened on the policy level that includes federal standards and has affected the practice level to include the perceptions of teachers and principals on the value of play.

In the early childhood classroom, play can have a positive impact on both student behavior and social-emotional skill acquisition. This positive impact on behavior has been observed in play-based intervention programs in which student behavior has improved after short but regular play sessions (Levine and Ducharme, 2013; Allen and Barber, 2015; Alam, 2022). Multiple studies indicated that play has a connection to positive social-emotional development and acquisition of social-emotional skills (Kinkead-Clark, 2019; Taylor & Boyer, 2020; Alam 2022). These studies are supported by this research project's theoretical framework, which is Vygostky's 1978 sociocultural theory of cognitive development. Since research indicates that play has a positive impact on students, then it should not be weighed on a graded scale against academic achievement. The strategies associated with play-based learning integrate play and learning in a manner that engages students and helps to build intrinsic motivation, so there is no need to view play as time taken away against learning (Pui-Wah, 2010; Yoon, 2014; Taylor & Boyer, 2020; Alam, 2022). In other words, the positive impact of play activities may still be present in the 21st Century classroom, but it would require a pedagogical shift.

Given the impact of play in the classroom, there was a necessity to examine how the absence of play might impact students. The research for this project indicated that the absence of play had a negative impact on students' social emotional development. The proliferation of technology that reduced face-to-face interaction was made evident by a United States Census (2019) that found 94.6% of households with at least one child between the ages of 3 and 18 in the United States had access to the internet. Walker and Venker Weidenbenner (2019) reported that the concept of play through more advanced technology such as virtual reality (VR) could not result in social-emotional skill acquisition or language development due to a lack of sociocultural context. This research has a connection to Vygotsky's 1978 sociocultural theory of cognitive development, which proposed that children were social learners who needed that sociocultural context to develop academically and cognitively. In other words, these children would not develop properly without in-person interaction. This idea was supported by Carson and Kuzik's (2021) study that illustrated how technology interferes with interaction between a child and their parent could result in the child having both behavioral and social-emotional problems as a result. In the context of the COVID-19 pandemic, studies indicated that a severe deprivation of social interaction contributed to numerous behavioral issues, negative emotions, and social-emotional problems in students (Levitt et al., 2022; Hossein et al., 2023). The solution to mitigating these negative effects include taking steps such as teaching social-emotional learning and connecting students to each other with games and other self-paced activities (Eveleigh et al., 2022; Hossein et al., 2023). The COVID-19 pandemic can serve as a window into what the future of education could become, one in which technology could create a distance between students, peers, and teachers. With face-to-face interaction on the decline due to the proliferation of technology and the concept of play in the classroom on the decline due to the current pedagogical trend, the social-emotional development of students may be negatively impacted.

Practice Implications

The conclusions of this project have implications on educational practices in the classroom. Since pre-service teachers are not receiving specific . . .

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training on the value of play and how to incorporate play into the classroom, then the school should consider expanding the training for new teachers that includes additional information on teaching strategies that incorporate play and even provide environments in which new teachers can observe those strategies in practice (Resnick & Johnson, 2020). Allowing teachers to acquire the in-class play experience that is lacking may allow for better incorporation of play as a social-development tool for students. There are a few ways this may be done, such as allowing teachers to practice in a mock classroom of volunteer students or by allowing them to observe or assist another teacher in specifically play-based learning activities.

A secondary implication, however, is that teaching the value of play and how to incorporate it into the classroom may not be enough. Given the reports of teachers being under pressure due to their peers and administrators to exclude play in favor of direction instruction, then schools need to make changes (Lynch, 2015). Lynch (2015) wrote that while the approach of just instructing teachers on how to incorporate play in the classroom is valuable, teachers need to be supported by their principal, other administrators, and peers. In that regard, changes at the practice level must affect at least the principal, if not the administrators at the district level. Given this information, including the principals in training that focuses on the value of play and how to incorporate it may help to create practices that make full use of the social-emotional benefits of play in the early childhood classroom.

Policy Implications

The conclusions of this project have implications in current and future educational policies. The shifts in policy that have occurred over the last few decades have resulted in less time for play and creative work and more time for math and literacy (Bassok et al., 2016). Classroom teachers need additional training on how to incorporate play into their classroom. Multiple studies found that teachers were not prepared to incorporate and assess play in the classroom (Pyle & DeLuca, 2017; Resnick & Johnson, 2020). Resnick and Johnson (2020) specifically reported on how pre-service teachers were underprepared to implement play in the classroom due to the hands-on experience it required. In other words, additional training is needed for pre-service teachers that takes place inside classroom settings where they can both observe how play is incorporated into lessons and practice how to incorporate play or even scaffolding play into the classroom to create a play-based learning environment. Moreover, the policy trend impacted both teacher and administrator perceptions and priorities and caused play to be deemed worthy of eliminating in favor of more direct instruction time (Lynch, 2015). Pyle and Deluca's (2017) study described how teachers attempted to assess play by using academic assessments instead of social assessments, which illustrated how the policy trend has impacted perceptions and priorities. When teachers defaulted to content assessments for a subject widely acknowledged as a social subject,

this indicated either a lack of training, as suggested by Pyle and Deluca (2017) or it could be evidence of the shift of perceptions and priorities in teachers due to the shift in academic priorities as reported by Lynch (2015). Policies and standards for pre-service teachers may need to shift so that future teachers may graduate from university programs prepared not just to develop their students academically, but socially and emotionally as well through play.

If cooperative and creative play is to be preserved in the early childhood classroom, then the policy trend needs to shift to incorporating more aspects of play-based learning in the classroom. When incorporating additional teacher training, specific training can be included that is targeted towards instructing teachers on how to be present during play and scaffold play-based learning (Alam, 2022). Pui-Wah (2010) described that the most effective playbased learning required careful and attentive teacher-scaffolding and had parallels to Vygotsky's (1978) zones of proximal development. Effective strategies that incorporate play-based learning into classroom instruction are being researched by Lee et al. (2022) who described how play might improve students' computational thinking skills. While continued research on play-based learning is required, school districts can still improve teacher training that includes additional social-emotional development activities that involve play. For example, teachers who received 30 minutes of training for play-based interventions could conduct five-minute play sessions with students and see improvements in student behavior (Alam, 2022). In other words, it is feasible to incorporate additional training that can aid in the social-emotional development of students. If changes to policy are made to include instructional strategies that present play as a subject that teachers must take an active role in, then it may simultaneously alter teacher and administrator perceptions. Over time this may result in additional time allotted for play in the early childhood classroom. Lynch (2015) recommended incorporation a social curriculum that involved play as a social-emotional development. By incorporating play-based learning into curriculum sent to teachers may shift perceptions and improve play-based learning into the classroom.

Directions for Future Study

In considering future studies, emphasis should be placed on the longterm effects of the COVID-19 pandemic on the social-emotional development of students. The pandemic is a recent event and its full effects have yet to be fully explored. It is important to understand the effects of the pandemic on student learning because this will help provide further evidence as to how social-emotional development is affected by a lack of social-interaction or collaborative, face-to-face play. In addition, future studies should closely examine how the policy changes made at the turn of the 21st century affected playtime in class as well as social-emotional development in comparison to the classrooms of today. The relative lack of research in that regard has resulted in a limited amount of documentation of how exactly classrooms have changed and when the more specific changes have occurred. In addition, the recency of the COVID-19 pandemic has also been a limitation of this project due to a lack of studies regarding long term effects. Play-based learning is also still being researched and new ways of incorporating it are still being proposed and explored, so this project has also been limited in that regard.

During the literature review process for this project, a gap in the literature was discovered in which the amount of time students play was not documented. Due to the current state of play in the childhood classroom, there do not appear to be any unified standards of time given for play activities as social-emotional development tools. Future studies may gather national playtime information that can be used to illustrate consistencies, inconsistencies, and trends over time. Although this project includes one study that reported the difference between classrooms from the years 1988 and 2010, the research did not discover reports more recent or reports that specifically focused on documentation of the time allotted for social-emotional development activities.

Summary

This project examined how play impacted the social-emotional development of students in the early childhood classroom. Through a careful review of literature, the research indicated that play has always been closely associated with the early childhood classroom since the conception of the kindergarten classroom. However, trends in policy shifted to focus primarily on closing the achievement gap and incentivizing academic achievement (Vinovskis, 2015; Bassok et al., 2016). This had the side effect of causing play to be replaced by direct instruction despite the benefits of play on social-emotional development, intrinsic motivation, and cognitive development. The modernization of the early childhood classroom affected teachers and administrators' perceptions and priorities regarding play. Perceptions of play varied among teachers, with a portion of teachers being underprepared to incorporate play as a social-emotional development tool (Pyle & DeLuca, 2017). Other groups of teachers admitted to being pressured by administrators to focus on academic achievement through direct instruction instead of implementing play in the classroom (Lynch, 2015).

An examination of the literature focused on the potential social-emotional benefits of play. The research indicated that play has a positive effect on correcting inappropriate student behavior (Alam, 2022). In addition, multiple studies reported that play aided students in acquiring important social-emotional skills (Taylor & Boyer, 2020). Multiple studies reported that play-based learning strategies allowed for both academic achievement and social-emotional benefits of play to exist in the same classroom setting (Yoon, 2014; Alam, 2022).

Literature reviewed also included literature connected to the effects of face-to-face interaction on social-emotional development. The research in-

dicated that the reduction of face-to-face interaction replaced by technology may stunt social-emotional growth (Walker & Venker Weidenbenner, 2019; Carson & Kuzik, 2021). This project also examined research regarding the effects of the COVID-19 pandemic on the social-emotional development of students. The research indicated that the COVID-19 pandemic created multiple problems for the social-emotional health of students and that students who returned to school after the COVID-19 pandemic displayed behavioral issues as well as social-emotional issues regarding how they interacted with their peers and teachers (Levitt et al., 2022; Hossein et al., 2023).

After having completed an extensive review of the literature, this project drew several conclusions. There has been a shift in pedagogical policy that resulted in academic achievement through direct instruction being prioritized. The project also concluded that play in the early childhood classroom can have a positive impact on the social-emotional development of students. Finally, a review of the literature demonstrated that the absence of play or face-to-face interaction may result in stunted social-emotional growth in young students. The project discussed the practice implications, such as how new teachers may require more specialized training in their new schools and how principal-preparation training may require similar specialized training. Regarding policy implications, such as how pre-service training programs may need to shift focus to allow teachers to start better prepared to incorporate play into their classrooms. In addition, another policy implication is that training on play-based learning for experienced teachers and curriculum that utilizes that pedagogy of play-based learning may aid in keeping play in the classroom as a social-emotional development tool

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