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The Impacts of Active Learning

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Abstract

This literature review identifies the impacts that using active learning has on elementary school students and student achievement. Research to seek this information began by identifying different studies using an active learning approach and then verifying that they were elementary students and had a focus on the impacts of using that style of learning. Results indicated different forms of active learning implementation, impacts on students academically, and impacts on students non-academically. In the end, students who are taught and engage with an active learning approach benefit positively in a variety of ways from the use of this approach. Some of these ways include success in learning different content taught, improved language skills for English language learners, achievement gap closure, high student engagement, motivation, attitudes and behaviors, autonomy, critical thinking skills, and efficacy.

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CHAPTER I: INTRODUCTION

Today there are many innovative and trending teaching approaches seen in classrooms. With many modern methods of teaching, it can still pose the wonder of if these up-and-coming trends are seen as effective with our students today. Some even inquire to know more about the research that was conducted to seek knowledge of relevancy to the students they teach. As educators, it is our goal to help students achieve great success in learning, and to make this happen, teachers need to be able to identify the approaches worth taking. This concept led to the idea of wanting to discover if an active learning approach can lead to student achievement and what impacts follow. When comparing some of these new approaches to past theories and other approaches, many similar ideas and components of the constructivist and active learning theory are present. Even though these approaches use new terms their structure remains similar to the past ideas and practices of both Jean Piaget and Lev Vygotsky.

Theoretical Framework

The constructivist theory has been around since the 19th century and was founded by Jean Piaget. The theory itself focuses on cognitive development, which begins to explain how humans understand what they are learning. Piaget studied a variety of topics to draw conclusions about the way we learn to collect qualitative data and analyze the matter. What was found was that through episodes of new acquisitional change, conceptual development can occur (Carey et al., 2015). Since this time, other theorists such as Lev Vygotsky, John Dewey, and Jerome Buner have used this philosophy to make their own theories on how humans learn. In the end, the constructivist theory has led many more to believe that the active construction of knowledge develops learning (Stam et al., 2014). Students need to construct their knowledge when it comes to learning.

This theory led the way for the theory of active learning. The active learning theory was founded in the 20th century by Vygotsky and many of his followers. The theory derived from Russia and the early Soviet Union to be seen as a way that we can organize how humans learn. It is believed that when using active learning humans utilize their "psychological tools" to facilitate and transform learning (Penuel et al., 2014). The tools referred to are attention, construction of memory, and being able to solve problems. Since this theory has come into existence, Vygotsky has been able to derive the long-standing idea of the "zone of proximal development" that is still used today (Penuel et al., 2014). What this theory helps us to understand is that students are the builders in learning new concepts through their experiences.

Using these theories has since created a method of teaching, called the active learning approach. It is an approach that combines the theories of constructivist and active learning to allow learners to build knowledge and understanding through engagement. This engagement is the part that makes up the active learning approach (Teachers, 2018). In the active learning approach, there are many different methods of learning including cooperative learning through constructing a social setting that fosters the acquisition and retention of knowledge learned.

Definition of Terms

In this literature review there are many terms that one should become familiar with to better understand the context of the review. Active Learning is an overall approach taken by teachers that allows the students to be engaged in part of the concept of learning (Teachers, 2008). This approach to teaching and learning has a variety of methods, and for the use of this review, four styles have been identified in groups and analyzed. They are physical movement, technology applications, inquiry based learning and project based learning.

Physical movement refers to the way that students are using their body movement to learn with content being taught. In the research, students would either walk while learning through listening or attaching a movement to a concept or idea to learn. Either way, they both engaged the students through an active learning approach.

A second style of the active learning approach occurred through the use of Technology. In this case, the technology was used to guide and support the students in their learning. From the studies observed, there was a method called Web Based Inquiry Science (WISE) and didactic games. The WISE was a computer program that engaged the students through the design process (Cui et al., 2021). The other was games used to motivate and engage the students to continue throughout the science learning process (Huagert et al., 2020).

Another style of this approach is called Project Based Learning (PBL). With this approach, the teacher has a set end goal (the project) that is described at the beginning of learning. To meet this goal the students conduct learning activities, research, or experiments to learn more about the content taught. At the end of the learning process, the students display what has been learned through the project they created.

The final style of active learning was Inquiry Based Learning (IBL). Using this style allows the students to engage in the process of learning to answer a posed question, challenge, or task. Oftentimes, the style may vary in one of four methods. These methods are guided inquiry, structured inquiry, problem solving inquiry, or open-ended inquiry. Later in the review, each method will be identified and explained before being analyzed.

Research Questions

The rationale for beginning this literature review was to find how approaches today could be also identified as an active learning approach and then analyzed for their effectiveness in

teaching our students with positive outcomes. With the desire to know if particular approaches work with our students, it can allow teachers to approach teaching based on what research has found to make a difference rather than using our judgments. After all, it is our responsibility as educators to seek out the learning methods that have more of a positive impact on student achievement. From knowing which methods have the strongest positive impact, it should be our duty as teachers to make those methods happen regardless of our teaching preference. Through research and discovery of the impacts that an active learning approach would have on student learning, we should be able to find if active learning is seen as effective. From this longing to learn, these questions were posed for research;

What impacts does active learning have on elementary student achievement?

Where and how has active learning been implemented in the classroom?

In what ways has active learning been seen to impact students academically?

In what ways has active learning been seen to impact students non-academically?

CHAPTER II: LITERATURE REVIEW

Implementation of Active Learning

There are various ways that active learning can be implemented into a classroom. Through recent studies we can begin to see the trends in different active learning strategies that are used. A study conducted by Erwin, Weight and Harry (2021) was created for low performing fourth and fifth grade students who were asked to use audio podcast lessons while walking briskly for twenty minutes, preferably outside. The audio included lessons related to the common core standards and was used with an intention to increase their success with learning different subject areas.Another study by Vazou et al. (2021) used the idea of movement to test their theory of increased success of learning with younger students, prekindergarten through second grade. However in their case they used a bit of a different approach to gaining movement from their students. They used a web-based program, called walkabouts, that integrated movement in a more organized fashion. What both studies implemented with their students was following a form of active learning where the students' movement is then paired with academic subjects.

Now while some studies were using student movement to make active learning gains others were using a completely different approach of no student movement. In one study with fifth graders didactic games were being used to help teach science and gain more motivation to learn (Huagert et al., 2020). Meanwhile another study involving fifth and sixth graders used a Web-Based Inquiry Science (WISE) to design a thermos cup that could be used for both hot and cold beverages (Cui et al., 2021). In the end both studies were seen using some form of technology to administer active learning. This is yet another way to deliver learning to students actively while using technology to motivate them.

Project Based Learning (PBL) is more widely recognized, used and seen in many of the studies to have found great impacts on student learning. Some of these impacts occur within a variety of subject areas as well. Camasso and Jagannathan (2018) used PBL in a four year study that focused on nurturing students through nature. In their time they focused on teaching third grade students about science and math through a natural science curriculum. In a rather smaller study Sisman et al. (2022) tasked a group of eighteen students to create an educational robot. Huang and Schideler (2021) challenged their sixth graders to create a project that followed the components of PBL in learning about the science of snowflakes. In yet another study a project based learning unit for fourth graders situated a learning environment and allowed the students to learn about environmental science for four weeks (Cheng et al., 2019). In two other studies (Kilic et al., 2022 ; Merritt et al., 2017) project based learning was also used to teach science to students in elementary schools. These studies showed that a good amount of the PBL can be implemented with science standards to teach students the subject of science.

In a couple of other studies like with Lazic, Kneževic and Maricic (2021) they focused on using PBL over the course of three months to raise third graders' student achievement in math. Much like Lazic's study, Larsen and Jang (2021) carried out a larger scale study where they had focused on 30,386 students in many schools to improve math instruction via the use of PBL. Which brings us to see that project based learning is being used in other subjects like math.

Lastly in our project based learning approach four recent studies (Brooks et al., 2018; Duke et al., 2021; Pinto et al., 2020; Saleh et al., 2022) focused their time on using this approach to create successful social studies learning opportunities for their students. Brooks and Rock (2018) did this by creating a multidisciplinary unit around teaching the new world to their students. Similarly the second study did so by creating their own four multidisciplinary units to

be taught throughout the course of a year (Duke et al., 2021). A different study focused on learning multiple concepts by following Luko's Journey (Pinto et al., 2020). And the last study weaved together a project called the Eco Journey through having their students plan a trip to the Buglas, Philippines (Saleh et al., 2022).

Through much of these research studies it is clear that active learning is being implemented through a variety of subjects. In all of these subject areas the PBL approach remains to keep its focus on identifying a project or a task that challenges the students to learn throughout carrying out the task and putting together a final product. Using the active learning approach puts the students as the drivers in their active learning journey to meet the task being asked of them, creating the opportunity for the teacher to become the facilitator within the learning.

The last approach observed in a majority of the active learning studies was the approach of inquiry. There are four approaches to inquiry based learning and they are guided, structured, problem-based and open-ended. The first commonly found form of the inquiry approach was guided inquiry. Hand et al. (2016) used this approach when they were studying to see if the inquiry approach could be replicated with younger students. Using the Science Writing Heuristic (SWH) curriculum, teachers were to guide their students through the process of inquiry to get the students to answer a question through written explanation. A different study by Feyzioglu and Demirci (2021) followed the approach a bit differently and had fifteen activities in fourteen weeks to teach to fourth graders about energy. By the end of their unit the students were guided through the activities and through different stages of inquiry which would lead them through their learning (Feyzioglu & Demirci, 2021). A third study with Rubio and Conesa (2022) also fit this inquiry approach because they had a goal to teach students about the water cycle through

four weeks of inquiry investigations and activities. Having a teacher guide their students through the learning is the same logic that Duran and Dökme (2016) decided to use with their sixth grade students who were taught the particulate structure of matter. It is also similar to how Lai et al. (2018) set up their study with fourth graders and began guiding their students through science inquiry learning via the support of technology (nearpod). And the last example was a two year study that took place with prekindergarten through first graders who implemented a similar approach using choice activities to learn about physics related topics to science (Kallery et al., 2022). Together these six studies used the same idea of providing guidance to students through the inquiry process. However the way they carried out that guidance in the active learning process was just done differently.

A second commonly found form of the inquiry approach was the structured approach. This approach looks at following either a format, curriculum, steps, or process to conduct the learning with the students. Olsen and Rule (2016) used this approach when they led a study with sixth grade students who were learning about simple machines in science. They needed to follow the inquiry model through the use of a FOSS curriculum and kit. Close to this study you can find that Lachapelle et al. (2017) also followed a curriculum to structure their inquiry although they used the EiE Curriculum, which is a curriculum that incorporates the engineering framework of the Next Generation of Science Standards. A third study, not led by a curriculum, by McElvain and Smith (2016) tried to teach fifth graders about social studies and history. To do this they had the students follow a structured teacher modeled inquiry process that was then replicated later in the next two trimesters of that school year (McElvain et al., 2016). A fourth study of this approach was structured with the following of six stages of inquiry. The six stages were inquisition, acquisition, supposition, implementation, summation and exhibition and were used to

teach fifth graders science in a new way at their school (Margunayasa et al., 2019). Similar yet different to this study, Adam's (2021) set out to use structured steps in different science activities to teach his class of twenty-four second graders about a variety of multiple subjects through a theme. Different from all the other studies mentioned using the structured inquiry approach was a study by Liu et al. (2022) who taught fifth graders using a Discuss-Do or Do-Discuss Inquiry model to teach science. After much comparison of all these studies mentioned we can begin to see that structured inquiry approach was another strong form of inquiry that implemented active learning.

A third found form of the inquiry approach was problem-based inquiry. This approach poses a problem and through the process of active learning and critical thinking it can be investigated. A perfect example of this was a six week study of fifth graders who were part of the inquiry based learning approach classroom and they were posed with a problem and then given time to investigate for a solution. The problem was related to physical science (Maxwell et al., 2015). This approach feels quite closely related to a Project Based Learning approach if you are being tasked with something. However the difference between PBL and problem-based inquiry is that the outcome is different. For problem-based inquiry one is to investigate and seek out the solution, there is typically no end product requirement like in PBL. Wu, et al. (2021) conducted a study where fifth grade students were posed a question to a problem and then given only 90 minutes of time to find the solution. To support their investigation they were given virtual reality (VR) technology to explore and learn before finding their solutions (Wu et al., 2021). In both of these studies the purpose was to find a solution to the problem. While investigating to find the solution they were given materials, time and resources to support them through the inquiry and

learning. These examples of implementation explain how a problem-based inquiry approach works.

After reviewing the many recent studies for inquiry approaches one can begin to see that there are three main inquiry based approaches that were implemented by many of the researchers. They were structured inquiry, guided inquiry and problem-based inquiry. And they were all used as methods to teach students new concepts by the way of active learning.

In all we can come to understand that active learning has a variety of approaches taken when implemented into the classroom. Some happen to be more commonly used than others. However, do these implementations of active learning have any impacts on our elementary students?

Active Learning Academic Impacts

Choosing any teaching method can have positive or negative impacts on students' academic achievement. Many researchers have found that their intended academic achievement was possible in part to following an active learning method such as project based learning (PBL), inquiry based learning (IBL), physical movement and/or technology. Which is why it is important to see exactly where researchers have found the impacts take place and how. From that knowledge teachers then know the impact their approach has on students academically.

Impacts with Different Subject Areas

One way that active learning has been seen to have impacts is through using the approach within different subject areas. Studies have shown that there can be academic success found in social studies, english language arts, math and science.

For Duke et al. (2021) the study was focused on teachers implementing four units of PBL that covered the standards needed to be taught for both social studies and language arts for a

year. Providing the teachers with training and continued support most of the teachers were able to complete close to their agreed number of lessons. While on the other hand the teachers not using PBL approach were unable to complete many of their lessons for the year. After letting the study run on for the length of the school year they then compared the students' achievement from all the teachers in the study. The result was an increased score of 63% in social studies and a 23% gain in reading language of the arts (Duke et al., 2021). Indicating that active learning can see an increase in academic achievement in multiple subject areas such as social studies and english language arts.

More recent findings by Saleh et al. (2022) worked to find out if PBL supports content learning for students in sixth grade. Their study put together forty-five students who would work in groups of four to five students during fifty-five minute class for nine sessions. In that time the students were to collaboratively take on the idea of adventuring together on a cultural exchange trip to Buglas as middle school students. Their learning took place with game based learning as they created their projects. To measure the academic achievement of the students there was a pretest and posttest measure to find the analysis of covariance. Overall the improvements measured by the posttest of the students was an average of 2.2 point increase by the end of the study (Saleh et al., 2022). Allowing us to see that with the use of active learning the subject of social studies has been seen to create academic improvement for students.

In a much smaller study, a classroom of fifth graders, where project based learning (PBL) was still being used, a teacher who had two years of experience in using PBL had taught a group of students an interdisciplinary unit about the new world (Brooks, 2018). After their time of learning with that same teacher the students were able to be measured on their growth at the end of grade. The result from following this approach saw an 8% growth in reading, 14% growth in

math and 40 % growth in science (Brooks, 2018). With results in multiple subject areas it is clear that this approach taken for this particular group of students worked well. However limitations occur with it being such a small sample size and without following much of an experimental design. Which is why we take these results into consideration with room for questioning. Although they do make a similar comparison to how active learning can see success in teaching multiple subjects like the last study (Saleh et al., 2022).

A study by Lazic et al. (2021) used the PBL approach as well but aimed to examine the student achievement in lower elementary mathematics. Their study had 77 third grade students who were placed randomly into either a class being taught traditionally or with the PBL approach. After three months of instruction the students were measured through a test at the end that was made up of ten tasks. When the results came in there was a clear correlation that the students who learned using the experimental PBL approach scored higher than the control group. The student math scores in the PBL group had an average of 69.34 while the control group averaged 63.14. To be sure of their results they calculated an analysis of covariance which proved that the results were valid and reliable (Lazic et al., 2021). All of these studies so far show that using active learning can increase the intended student's academic achievement. However, what subject area has the most implementation of active learning?

What was found was that the majority of the total active learning research studies ended up being implemented within the subject of science. Here are a few of the studies; for Margunayasa et al. (2019) they analyzed and compared the achievements of their 239 fifth grade students in science who were learning from either a guided inquiry based learning model or conventional learning. The results of their study overall showed that when students learn from an IBL approach they scored 23.93 in comparison to their control group at 22.35 (Margunayasa et

al., 2019). With the IBL approach being a higher score of the two it is clear to correlate that the students actively learning gained more science knowledge than their counterparts learning from a conventional approach.

A second study used inquiry based learning to follow a structure of either Discuss-Do or Do-Discuss model to learn about light reflection in a fifth grade science class (Liu et al., 2022). The seventy-nine fifth graders were able to be split into one of the two groups to learn about similar content but to be taught the content in different structured IBL models. They discovered that no matter the IBL approach they modeled that the difference between the two scores was insignificant to report that changing the model had an effect on their learning. However when comparing the posttest to the pretests both groups of students made significant gains in learning about science light reflection (Liu et al., 2022). Confirming that the use of active learning has seen success in increasing science knowledge.

Another study used inquiry based learning by implementing a web-based inquiry science environment where the project was to design a thermos cup to be used for hot and cold drinks (Cui et al., 2022). In this experiment the researchers had two groups of participants (one with 74 fifth graders and the second with 144 sixth graders) that went through five weeks of learning in three different phases. The results specified that both groups had greater science performance and were able to generate, integrate and carry out ideas in science (Cui et al., 2022). Yet again informing us that academic achievement occurs within the subject area of science.

These studies, along with more mentioned later, have conveyed that academic success can occur within multiple subject areas. Even though the subject of science has been seen to have majority of the success with this approach. There were also a few studies that showed an increase

in multiple subject areas and depended on how their active learning approach was being implemented.

Impacts on English Language Learners

Another area where research has shown impacts is in an increase in student achievement with English Language Learners (ELL). Two studies in particular searched for the negative or positive impacts that active learning would have on EL students. One study used an inquiry based learning model that was put forward to measure cognitive and bilingual learning in social studies and language (McElvain & Smith, 2016). What they noticed was that 12 out of the 16 groups of students found that IBL allowed them the chance to go deeper in learning, comprehend their reading and increase their learning in both languages (McElvain & Smith, 2016). In the other study, researchers Huang and Shideler (2021) found that when using a project based learning model with students it increased their science learning by 10.15% in overall grades compared to non-PBL students. Which included growth in science for six out of the eight ELL students. In both studies the researchers ran tests to measure the impacts that active learning had on ELL growth and both resulted in a positive increase in their academic achievements.

Two other studies used active learning methods as well to measure all impacts from the use of this approach. Pinto et al. (2020) research indicated that through using a PBL three stage approach to learn about the refugee crisis it encouraged their forty-two students, ages eight-ten, to use their language skills to acquire new knowledge. After collection of their new knowledge the students were to then create a picture book to share their learning. Using their approach to learning supported their success to learn about other countries, cultures, improve their writing skills and achieve more learning of the English language. While their research was not set out to measure only one form of an outcome they were able to find achievements in many areas and

one of which included improvements in the students' English language learning. Close to this study was another study conducted by Adam's (2021) who used an IBL approach to teach his students at a bilingual school in Shanghai, China about the seven continents in the world. Over the course of eleven weeks, in a class of twenty-four second grade students, they all followed a multi-disciplinary learning unit that taught the students about some of the history, geography, English, technology and natural sciences of the seven continents. Results from this study concluded that 100% of the students were able to meet the lesson objectives set forth by the teacher (Adam, 2021). Which shows that the active learning approach taken in this study was able to achieve success in not only learning about multiple subjects but also improving the English language for the students at this bilingual school. In both of these studies they began to recognize the beneficial effects that their approaches had on learning content as well as learning the English language.

Bringing together the findings from these four studies (Adam, 2021; Huang et al., 2021; McElvain et al., 2016; Pinto et al., 2020) has assisted in showing that the use of active learning has a positive impact on learning the English language for students.

Impacts on Closing the Achievement Gap

Continuing this positive increase in academic achievement has allowed for speculation on if active learning also aids in the closure of the achievement gap. An achievement gap is created when there is a group of students who are outperformed by another group of students and the difference in scores are significant statistically speaking. Lachapelle et al. (2017) investigated this when they had teachers implement an active learning model called the 4 EiE which is an engineering design intervention curriculum. After comparing 7,963, third through fifth grade, students who were taught using this curriculum to students who were taught not using this

curriculum they were able to compare the achievement. In their results they found that their interventions were improving the achievement outcomes for students who were initially disadvantaged. They found this by comparing the achievement of students racially and by performance (Lachapelle et al., 2017). Similarly Camasso and Jagannathan (2018) conducted their active learning model study using a Nurture through Nature (NtN) curriculum that was taught to twenty-four third grade students. This study took place over a four year period and was tested against a control group where students were taught science traditionally. The results of the study came back suggesting that small successes were seen in both science and math when employed to close the educational gap for privileged and disadvantaged students (Camasso et al., 2018).

Another study by Hand et al. (2016) aimed to find a similar outcome by seeing the impact an IBL approach would have on kindergarten through sixth grade students with a low-socio-economic status. Their study lasted a length of three years and included 32 schools with 700 students across five districts. The idea was that by using an inquiry based learning approach called Science Writing Heuristic (SWH) the students would improve their learning around science, remain more engaged with the learning and begin to close the achievement gap. What they saw from their research was that the lowest socio-economic students had academic growth in areas of science and language arts, measured by the Iowa Test of Basic Skills (Hand et al., 2016). Again correlating that active learning can be seen to raise academic achievement and for some of the lower performing students.

In these three studies (Camasso et al., 2018; Hand et al., 2016; Lachapelle et al., 2017) they correlated that their academic achievement was found with students also supported in the closure of the achievement gap.

Now even though we have much research that goes to show that there can be positive and increased academic impacts with using active learning there must also be other impacts that take place. What are the non-academic impacts that take place?

Active Learning Non-Academic Impacts

More and more research has begun to show the correlation of strong association of choosing a teaching method, such as active learning, and its non-academic impacts on elementary students. A non-academic impact refers to the outcomes that occur while undergoing learning. This could be seen as anywhere from student engagement to the measure of efficacy within students.

Impacts on Student Engagement

Student engagement refers to the involvment that the students have within the learning. For Vazo et al. (2021) they put together a study that used active learning in the form of walkabouts (an organized form of learning through movement) and looked at 245 pre kindergarten through second grade students which were in twelve classrooms. Using six of the the teacher logs, various observations and different forms of assessments from the students they were able to collect a result of how engaging the learning was. From the teachers reports the results suggested that a positive increase in engagement and focus occurred while learning. From these observations it was reported that 88% of the time students were engaged in light physical activities while learning (Vazou et al., 2021). With the use of this form of active learning it was seen to have success with engaging their students the majority of the time.

Different from this form of active learning was a study that used inquiry based learning (IBL) to teach their students and gain understanding at what level student engagement was occurring during learning (Maxwell et al., 2015). Through six weeks of instruction with two

classrooms of fifth graders they aimed to measure the level of student engagement in two different approaches to learning. One classroom was being taught science through the approach of IBL while the other classroom was taught in a traditional (passive) approach. Using three different kinds of assessments; Physical science knowledge assessment (PSKA), Science Attitudes Survey (SAS) and Georgia Performance Standards (GPS) they were able to form results on the student engagement with the learning. Maxwell, Lambeth and Cox's (2015) research in Northeast Georgia at a Title 1 school indicates that engagement of the IBL approach at 79% was high in comparison to the traditional approach at 63%. Some limitations do occur with this study as it has a smaller sample size and the length of time was short. Regardless of these limitations the data still shows that student engagement with active learning can be associated as relatively high.

However, can the level of engagement differ within students' cognitive types? Kallery et al. (2022) in their study with 92 students in kindergarten who were being taught science with an IBL approach searched to find this answer. In their study they were trying to accomplish an understanding on if the level of engagement can be different for different cognition (brain types). To measure this they had parents fill out questionnaires for their children that would help identify the students brain type. After a full year of implementing physic topics related to science in the form of different activities they observed the level of engagement. Using the Leuven scale of active engagement they measured what level of engagement each activity had for the students. From this point on they would make note of the students that engaged with the different activities to record their level of engagement. Only having achieved three of the levels of engagement throughout the year, the highest of these levels were observed the greatest amount of times for all cognitive types (Kallery et al., 2022). This means that there was not a significant difference

between a student's cognitive type and level of engagement. Indicating yet again that the level of engagement can be relatively high for all students who are using the approach of active learning.

Although the engagement can be at a high level, can the form of engagement differ between students and where does it occur? This question is what Saleh et al. (2022) was set to figure out with their study on setting up a project called the EcoJourney. This project based learning gave 45 sixth grade students the opportunity to complete an exchange trip headed to the Buglas, Philippines. While working in collaboration with groups the students were being observed on their level of engagement and how it could differ throughout the course of the project. To collect data on the students the researchers created a pretest/posttest, had video footage and written artifacts to draw their results. Using a combination of their collective data they were able to form the conclusion that the groups that had higher improvement in their learning and were collaborating more responsibly in productive discourse with each other. In comparison the less improved groups were collaborating more with support of the facilitator verbally. They also found that 56% of engagement was spent on collaborative sense making and 17% was self-directed actions (Saleh et al., 2022). Even though we can draw conclusions that say student engagement levels, forms and areas differ within active learning the engagement is still present for all learners when using this approach to learning.

Impacts on Motivation

Some research has begun to measure the impact that actively learning has on student motivation. The motivation that is measured by most was in the willingness to learn about the content being taught. In a study with kindergarten students they sought to measure the student engagement levels paired with the cognitive type, however what they also found was the impact that science inquiry based learning had on also motivating the child to learn (Kallery et al.,

2022). Through the analysis of student engagement with the learning environment, student interest and design of the science activities it may have also impacted the motivation to learn science. From this study we can begin to make an association between the active learning approach and a more motivated student learner.

A different study decided to explicitly seek out the motivation impacts from actively learning (Hugerat et al., 2020). Their research did this by putting together a study that looked at the motivational impacts on a group of 188 fifth grade students using science pedagogical games as a form of active learning. In the time that they held the study they were able to compare these students to a control group who were being taught science without pedagogical games. Data that was collected from this study was done through 20 student interviews and a pretest/posttest. What they found was that the students who were using pedagogical gaming were positively impacted in ways of intrinsic motivation, career motivation, and grade motivation. Having this effect on students not only improved their academic achievement and motivation in different ways but also saw other impacts (Hugerat et al., 2020). Seeking to find if active learning has a clear impact on student motivation was no challenge for this group of researchers. Their research clearly indicates that there is a positive correlation between how students learn and the willingness to do so.

Another study by Olsen and Rule (2016) also wanted to see if their style of learning would increase student motivation as well. However this study included 38 sixth grade students to learn science via an inquiry model taught from the FOSS kits or traditional model. Data was then collected from both a posttest and a student attitude survey. Finally once the learning was completed the researchers were able to compare the impacts on the two groups of students sorted by each of the lessons taught throughout the unit. Using the surveyed results it was concluded

that four out of the six lessons the student found interesting and had success in accomplishing the solving of the mystery which led students to be motivated with the learning (Olsen et al., 2016). As a result, using yet another form of active learning correlates to having a positive impact on student motivation.

In total three studies (Hugerat et al., 2020; Kallery et al., 2022; Olsen et al., 2016) have conducted research that measures the impact that active learning has on student motivation. What was found were strong associations and correlations between using an active learning approach to spark student motivation.

Impacts on the Mindset

A mindset is usually an established way of thinking and feeling about something or someone. In this case a mindset can affect one's attitudes and behaviors associated with their thinking. Research has worked hard to show how active learning impacts the behaviors and attitudes that make up our mindsets. Sisman et al. (2022) had a study with 18 students that used a project based learning approach to design an educational robot over the course of four weeks in order to examine students' behavioral patterns while learning. Their collaborative robotic project let the students pull science knowledge together to construct their robot for the competition. While the study took place the researchers focused on tracking the behavioral patterns by calculating sequential transfer matrices that the students possessed. To do this they first examined the behaviors of the cohort altogether and then sequential patterns were taken based on how successful the groups were in their achievement. Patterns that occurred most frequently were corresponding to contribution (36.1%) and planning (27.3%) (Sisman et al., 2022). There were more categories of behavioral patterns nonetheless they appeared to happen less often when in comparison. They were seeking input, reflecting and social interaction. While exhibiting the

behavior patterns from this study one can begin to see that positive behaviors to the mindset are present within active learning. Some areas of behaviors come about greater than others be that as it may they are still a positive presence for the students.

According to Vazou et al. (2021) they also observed an impact in the students' overall control of behavior and enjoyment of learning. Even though their main research was intended to look at how active movement while learning (walkabout approach) could create academic achievement in math and language arts they also found associations to students' attitude and control of behavior. Their study used 245 prekindergarten through second grade students in a volunteer based quasi experiment to incorporate the use of walkabouts while teaching their students. To assess their success of learning they used teacher logs, System for Observing Student Movement in Academic Routines and Transitions (SOSMART) and a Strengths and Weaknesses of ADHD-symptoms and Normal behavior (SWAN) questionnaire. Before and after the study the questionnaire was administered to the teachers to collect a comparison in what behaviors were observed by the teachers of their classrooms. A multivariate analysis of variance (ANOVAs) showed some significant differences with behavior control and either the attention time or grade level attention. For the students in the walkabouts classrooms they saw increased improvement in attention and more of a control on the behaviors with their students. The classrooms not in the walkabouts witnessed a decline of attention and less control over the behaviors in their class (Vazou et al., 2021). With the use of an active teaching approach it is seen that this environment can stimulate the students to have greater attention and more of a control on behavior of students. Allowing opportunities for positive behavior which overtime allows for a healthy learning mindset.

A different study took a look at the way that levels of student-centered learning affect student performance, attitudes, motivation, understanding of science and creativity (Olsen et al., 2016). With a focus on finding the correlation that teaching with a science inquiry unit (student centered approach) has an impact on student performance and attitudes. To make their findings they put together research with 38 sixth grade students to learn the concepts of simple machines and then needed them to apply it to a toy design. Before the learning began the participants were given a pretest and an attitude survey. Learning in this study was held by the same teacher who taught two classes of students where they both started with a more teacher centered approach and transitioned towards a student centered approach. The teacher had 13 years of teaching experience. The hope was to measure the impacts at different levels of applying the learning approaches in the different modules of the unit. Modules increased in this order; highly teacher directed, teacher directed, teacher directed with student choices and input for two modules, mostly student directed and student centered. At the end of the learning a posttest and attitude survey were administered a second time to assemble a pair t-test calculation. The attitude survey, which was on a 10-point scale, was used to measure the impact that the learning had on the student attitude as well as a few other areas. From the results they discovered that student attitude (enjoyment of different components within each module) averaged between a 7.8-9.2 in all modules that applied student-centered science inquiry learning (Olsen et al., 2016). By the fact that the effect was large for favoring the approach being tested in the study. Their research will help to show how an active learning approach can increase the amount of enjoyment and attitude while learning science. Again impacting the students mindset around learning.

Referring to the views of Rubio and Conesa (2022) they too saw an increase in positive student attitude (enjoyment) when using an active learning approach. However in their study

they compared two different approaches of learning (inquiry based learning and traditional) to compare and then find the results. They also had a smaller study of 33 students who were taught a unit on the water cycle. Their activities asked the students to think, to do and comment on how to solve the problem (Rubio et al., 2022). Collecting data occurred through a pretest, posttest, self-reflection as well as another delayed posttest. Although this study was done during the COVID-19 pandemic they retested later to find that a significant difference was found. Using the self-reflection survey, Rubio and Conesa (2022) discovered that the learning had an impact on creating positive students' attitudes about collaboration, how to use time efficiently and classroom expectations as well as a major amount, 11 out of 16, of the students in the study enjoyed the learning. This study helps to show that using different learning approaches have different impacts on students. When carrying out an active learning approach it may make for more positive attitudes and enjoyment. In return, it helps to build a healthy mindset around student learning.

A different approach was taken with active learning by Erwin et al. (2021) as they put together a study that concentrated on learning common core subjects through listening to podcasts while briskly walking 20 minutes a day, three times a week. The study was located in North Carolina with one hundred fourth and fifth grader students in 10 separate focus groups with schools that were made up of low-income families. Along with the common core standards, the podcasts also had a healthy message to the students about health literacy or character values. Towards the end of the study interviews were conducted with the students that posed three key questions about what they experienced while learning through this new approach. Questions were asked about their feelings while learning, feelings after learning and to describe their feelings on days without the tested style of learning. One main emerging theme that was

mentioned by 33% of the students was that they felt happy, excited, and enthusiastic about learning. The second highest emerging feedback received was that 22% of the students felt smart, intelligent, educated, and knowledgeable. The third highest feeling felt by the students was being healthy and that was reported by 18% (Erwin et al., 2021). Overall the three highest forms of thinking and feeling while learning through an active approach were all positive. Positive in the ways that their attitudes showed growth and capacity to enjoy learning.

Furthermore, a study by Wu et al. (2021) decided to see if combining a science inquiry approach with virtual reality technology would also impact students' attitudes on top of their testing for motivation and problem solving skills. Their study took place in China and had 54 fifth grade students who created a moon and sun lamp to learn about the science behind light sources. After their learning was completed the students were given a questionnaire that was used to measure their learning attitude and problem solving from the unit. The questionnaire included 23 questions and was scored by two assessors. Their results from the questionnaire showed that students with lower attitudes can be impacted by using their problem solving skills to learn from a science inquiry approach. In this case their learning attitude grew at a greater amount if their attitudes were lower coming into the study (Wu et al., 2021). This means that their study proves that active learning can not only see a capacity to grow but it can grow increasingly so for those that begin at lower attitudes than others at higher levels.

The last study to mention attitudes focused on promoting a particular type of thinking about the environment. Cheng et al. (2019) used project based learning to test out the idea that students' environmental attitudes will increase when focusing on teaching environmental science through a project based approach to learning. They had four weeks to teach their 50 fourth grade students about environmental science. In their study they constructed a quasi experiment that

used two approaches to learning; problem based learning and a traditional learning approach. With twenty five students in each classroom the students were to collaboratively work together to construct their project. Using a pre- and post-questionnaire to evaluate their environmental attitude growth they were able to find their answer. The questionnaire had 15 questions and was scored on a 5-point Likert scale. When comparing the environmental attitude to the two different approaches this was what was found; a score of 4.0 with the problem based learning approach and a 3.71 with a traditional approach (Cheng et al., 2019). This signifies that the problem based learning approach was able to promote a higher environmental attitude on students. Explaining that when using active learning it can promote a particular type of attitude and frame a student mindset.

Seven different current researchers have all shared their impacts found on using a method of active learning and how it impacts students' attitudes. These attitudes over time are what can establish a students mindset whether it be a mindset towards learning, concepts learned or growth in positivity.

Impacts on Self-Regulation

When one has self-regulation they are given the opportunity to understand and begin to control their learning environment. Not all learning in a classroom can seem to give this form of control to their students. However, a few researchers have begun to measure the impacts that active learning has on students' self-regulation. Lai et al. (2018) created a study to look at how learning styles can improve student regulation. In Taiwan two classes of fourth graders, 56 participants in total, were taught natural science using two different approaches. Both approaches included a science inquiry approach however one was student centered and the other was conventionally led by the teacher. To measure the students' achievement they had used a variety

of tests and questionnaires that indicated their learning achievement, self-efficacy, self-regulation and science inquiry. The self-regulation questionnaire consisted of 24 items and was scored on a 5-point Likert scheme. On the questionnaire it had five themes; goal setting, environment structuring, task strategy, time management, help seeking and self-evaluation (Lai et al., 2018). These themes were used to help determine the regulation that occurred within the learning. A result from the study was that the data was not significant to show that either of the two groups of students had a difference in self-regulation. Since both groups were using the same approach to learning, science inquiry, this means that self-regulation was found present while students were actively learning.

Furthermore Feyzioglu and Demirci (2021) analyzed how an inquiry based learning (IBL) approach can affect learner autonomy and their students' conceptions of learning change. Prior to beginning the study seventy students in fourth grade, in Turkey, were given a science process skills test to measure their achievement. Students were then randomly assigned to either be taught a science unit on energy using student centered experiments or taught by direct instruction from a teacher. This learning took place over the course of fourteen weeks where they were taught three times a week for 40 minutes each lesson. At the end of the study the students were given the posttest to show the level of self-regulation carried out by the learning. Findings showed that the group of students learning from the IBL approach saw themselves as scientists (Feyzioglu et al., 2021). Over time the IBL approach began to aid students in constructing their learning rather than taking it in directly. What this study conveys is the understanding that active learning has an impact on how students construct knowledge and that they are capable of self-regulation while given the opportunity to actively learn.

In addition to the two studies thus far a study by Cui et al. (2022) explored the effectiveness of applying a structured-supportive instructional strategy in web-based science inquiry learning. The idea here was to have a two quasi experimental study that looked at solving two different questions around the same approach and subject of learning. Study one was set up with 74 fifth grade students who were at a school in Wuhan, Hubei Province and came from a medium-level socioeconomic status. Participants in study one were then randomly assigned to two different learning supportive environments. One class was a "low structure supportive instruction with an autonomous platform" and the second was a "high structure-supportive instructional strategies with an autonomous platform" (Cui et al., 2022, p.1055). In those groups the students were taught in three phases; phase 1 focused on pretesting and training, phase 2 spent time on creating and intervening and phase 3 was the end cognitive test. While building their learning they had a goal to design a thermos cup to be used for hot and cold drinks. By the end of learning phases it had been a total of five weeks. Results from the study signified that both classes showed an increase in academic achievement nonetheless there was no significant interaction between the two groups being tested (Cui et al., 2022). This implies that learning is achievable while taking an active learning approach however the levels of support and structure do not have a significant effect on the learning achieved. Telling us that self-regulation can still take place while learning through this approach.

An alternative study was held to measure if students were able to learn by themselves through project based learning (a form of active learning) or by whom they received help and what academic achievement existed for these students (Kilic et al., 2022). The project was based around a life science course in Turkey that had the students put a project together about life in their country. Participants were 41 students in second grade who volunteered to take on the

project as a form of learning. Before the project was to begin the students were given a pretest to measure their knowledge on the content. While the learning was underway the students were given the opportunity to work alone, use teacher support or have their family aid them in their project. After the unit was completed the students were then given the posttest that measured the achievement of the students in the study. From this posttest and being able to compare the tests they found that 27.46% of the students made significant success and 97.56% of the students in the study needed help from either a teacher or family member (Kilic et al., 2022). With this association of student academic achievement and support for learning it is likely that to increase student academic achievement there needs to be some level of support. In the end this study was not able to see their students undergo a large quantity of self-regulation to construct their own learning while learning from an active learning approach. Only a small percentage of students used self-regulation while learning with this approach.

These four studies (Cui et al., 2022; Feyzioglu et al., 2021; Kilic et al., 2022; Lai et al., 2018) have taken the time to research the impacts that active learning has on student self-regulation. Even though their research does not all point to the same answer we can still make associations that self-regulation is present, some students are capable of constructing their own learning, learning is not dependent on any specific level of support and sometimes very little self-regulation takes place.

Impacts on Problem Solving Skills

Problem solving skills is the ability of possessing many skills and using them in a complex way to solve a problem. When solving a problem one may need to be able to process information, think critically and make decisions. What recent researchers have begun to recognize is that using different styles of teaching may have an impact on teaching these

necessary skills to students who are learning in such ways. One of these researchers organized a study that aimed to measure many things but one of them focused on whether or not students learning through project based learning would display a higher degree of problem solving skills. While leading a smaller study of fifty students they were able to teach these students using two different methods and then compare them using an independent sample T test. Using their data from the sample T test they saw a difference of 2.22 in scores with the PBL approach being of higher competency (Cheng et al., 2019). To be sure that this data was valid they ran a correlation analysis to investigate the level of association between students' learning achievements, collective efficacy and environmental attitudes and problem solving skill competency (Cheng et al., 2019). They found that there was a strong positive relation between all measures which allows us to stipulate that the method of learning has an effect on students' problem solving skills.

Moreover Wu et al. (2022) integrated an inquiry based learning model with virtual reality (VR) support that had a goal to measure the impacts this form of learning had on student problem solving skills. Their study took place with fifth grade students with one group of twenty-nine students learning via an IBL approach with VR and the other 25 students taught IBL without VR. The goal of the learning was for the students to learn about the sun and the moon through the creation of a lamp. The tool of measuring the problem solving skills was two types of questionnaires. One questionnaire focused on problem solving ability and the other was on learning attitude. The questionnaires had 23 questions and produced a 5-point scale to indicate if the skills were gained during their learning process. Using a sample T test ($t = 2.050$, $p < .05$) to compare the scores prior to and after the learning it was discovered that the students learning in the PBL approach with the VR scored significantly higher than the students learning without VR

(Wu et al., 2021). Wu et al. (2019) also found that the students' learning attitudes also had significant influences on their problem solving skills. Which informs us that a second study has been carried out to signify that active learning can impact the students ability to gain problem solving skills while learning with this approach.

In addition to these two studies yet slightly different, Duran and Dökme (2016) led a study that sought to find out if an inquiry based approach could improve students critical thinking skills. Which happens to be a component of problem solving skills. Their study was located in Turkey and included ninety participants in sixth grade who were then put into four random unbiased groups where they were either taught in one of two learning approaches. Before the learning began the students were given a 56 item critical thinking test that they had forty minutes to respond to. Then the learning began, the first group was taught using inquiry based learning where the teacher would pose questions, give hands on resources and lead students to produce the learning. The second group was taught traditionally where students were lectured and would need to take notes. Both groups were given four weeks of time to learn about particulate structure of matter, a concept within science. After the end of the four weeks the students were given the same test as the beginning to measure how the students critically thought and then another test, a unit assessment, to measure the learning from the unit. Results from the assessments produced a score that showed growth for all students however the students learning through the inquiry based approach had a much higher growth than the students learning traditionally. The scores reported a 9.08 growth for the inquiry based approach and a 4.36 growth for the traditional approach (Duran et al., 2016). In the end the IBL approach had a more positive effect on critical thinking levels and this can be associated with the fact that these students were able to discuss their thinking within the class. This study along with the other two can aid us in

associating that problem solving skills and or components of problem solving skills are present and have the ability to grow while implementing an active learning approach.

Impacts on Efficacy

Efficacy is the ability to be able to get to an outcome. There are two different forms of efficacy, collective and self, which researchers have begun to measure their impacts while students are being taught through active learning. With students this efficacy can be measured in the amount of achieved content learning, through interviews, surveys or observation. Larsen and Jang (2021) was one of the studies that focused on measuring self efficacy while teaching students math with an inquiry based learning model. For their study they had 30,386 students from 4,816 classes in sixth grade who were taught in one of the two different styles of learning. One group of students were tasked to learn math through direct instruction while the other group was given the chance to learn math through inquiry learning. They then organized their study to identify students who were both on and off individual education plans (IEP) and were still able to separate and find the effects that learning styles had on all the students in the study. To collect data on the students' learning and achievement along with a way to measure their efficacy they used 6th grade math assessment scores with student and teacher questionnaires. When comparing the assessments and questionaires of the participants there was a strong positive association that self-efficacy had increased when the math achievement was higher for the individual (Larsen et al. 2021). These results show a correlation with the use of active learning and an increase in creating self-efficacy within students.

Another study by Cheng et al. (2019) was determined to measure the impacts that active learning has on collective efficacy as well as other areas. To perform their research they used one teacher who taught two classes of environmental science in two different methods for a total of

four week time span. With one of the classes being taught in a project based learning (PBL) called the aquaponics-based learning approach and the other not in PBL. This study included 50 fifth grade participants with a split division of twenty-five students in each class. To gather their data they used pretests, posttests and interviews. The results from the post questionnaire were based on a 5 point scale, the students who were taught using PBL scored a 4.57 and the students taught without PBL scored a 4.26 this indicates an increase in collective efficacy (Cheng et al., 2019). From this we can begin to piece together the idea that the learning approach taken can promote students' collective efficacy.

What both of these studies suggest is that while using an active learning approach there also can be positive impacts on both the individual and collective belief that students can achieve the outcome set forth. Otherwise can be put as they both have a positive impact on student efficacy.

CHAPTER III: DISCUSSION AND CONCLUSION

Summary

This review aimed to identify the impacts that active learning has on elementary student achievement. Through defining what active learning is, how active learning has been implemented and discovering the impacts it has academically and non-academically we were able to identify some trends in the research.

When defining active learning most researchers would describe a type of learning approach that would actively engage the students through the learning process. Active learning approaches identified and implemented within the research were physical movement while learning (Erwin et al., 2021; Vazou et al., 2021), web based learning (Cui et al., 2022; Hugerat et al., 2020), Project Based Learning (PBL) and Inquiry Based Learning (IBL). Research studies implemented their forms of active learning from around the United States and in foreign countries such as China, Turkey and Europe. With their implementation of active learning lasting anywhere from a unit of instruction to a couple of years, researchers were able to find different forms of success with their students.

Impacts that were measured academically were found in different subject areas, with English Language learners and closure of the achievement gap. The outcomes from using active learning in either a single subject (science, math, social studies or language arts) or with more than one subject all saw increased academic success occur when instructing students. A couple of studies (Brooks et al., 2018; Duke et al., 2021) even showed results that increased achievement in many subject areas when teaching multidisciplinary units. A handful of studies (Adam, 2021; Huang et al., 2021; McElvain et al., 2016; Pinto et al., 2020) observed that there was a correlation between using an active learning approach and supporting English language

learners (ELL) to excel in either language learning or a higher academic achievement. The final impact noticed by researchers was when correlating the academic achievement to different demographics of students. When doing so they saw that it aided in the closing of different achievement gaps. Overall academic achievement was gained by students when being taught by an active learning approach.

Impacts that were established non-academically were found in areas like student engagement, motivation, mindset, self-regulation, problem solving skills and efficacy. Some researchers desired to know if active learning has an impact on the student engagement. What they found was that student engagement is very present with this approach to learning however it may differ in levels and in form. Three studies (Hugerat et al., 2020; Kallery et al., 2022; Olsen et al., 2016) took a look at measuring student motivation within active learning. They all found strong associations or correlations to using this approach and students possessing motivation. The greatest amount of research sought a way to use active learning to evaluate if students' mindsets (attitudes and behaviors)were impacted in any way. These studies displayed that students could possess components for a positive mindset toward learning and showed enjoyment in learning. Another area measured by researchers was an impact in students' self regulation while learning. This research did not all point to the same answer and made it quite unclear if self regulation was achieved by students. However, we can sum it up by saying that self regulation may be present for some students while actively learning. It really depends on many variables as to what support is needed when using this approach. The second to last impact observed within research was on if students were using and gaining problem solving skills. Three studies were able to associate that problem solving skills and/or components of these skills were used or grew throughout the course of learning this way. And lastly, impacts on students' efficacy

were noted by two researchers (Cheng et al., 2019; Larsen et al., 2021). In both studies they found that students can have positive impacts in either their collective or self efficacy with active learning. In the end non-academic outcomes were observed, measured, and then proven to either benefit or support a student in their active learning experience.

Professional Application

Finding the most effective ways of teaching and learning is a goal for most educators as it correlates to a great effect on increasing student achievement. What history has shown is that research around the approaches we use can signify if an approach benefits students in many areas of success. Typically in education, either the teacher or their administration has control to make decisions on implementing approaches that have been seen to create that success. Knowing that this ultimately boils down to a choice can create room for bias rather than using research to make the best decisions for our students. This is why it is important to find the effects and impacts that choosing the one approach can have on students' learning. The information that we collect from research about the use of different approaches gives valuable insight into the world of educators. It is valuable in the way that it can eliminate bias and ensure that what we are using is the best practice and approach.

After conducting this literature review we can see that active learning has many benefits for students. Applications of active learning that were seen with success have been through the use of project based learning, physical movement, web based learning or inquiry based learning. These learning approaches have been used to teach multiple subject areas, foster a positive learning environment, and have even been found to increase students' well being. Having reviewed different literature about the active learning approach can now inform other educators that using these styles of teaching has research to support that the practice works. This creates

fewer opportunities for making biased decisions with the teaching choices we make and, at the same time, opens a path to creating more successful learning for students. Successful learning opportunities will engage the student in a new approach to learning from a variety of subjects. With this information, administrators and teachers can begin implementing more active learning approaches with students.

Proceeding this literature review I plan to use more active learning approaches throughout my teaching and learning with students. To do this I will focus on implementing more of the Project Based Learning (PBL) method to engage my students towards becoming lifelong learners. Right now, I would like to put this method into action through the content areas of science, social studies, art, and health. Using a similar systematic approach with the projects, I will aim to display chances for student choice in ways that allow me to be able to measure their success in learning. I will also use self-reflection from each project to create changes to the systematic approach that we take as a group of learners. This way, we can continue to see how to continue bettering the effects of the active learning approach in a school year.

Limitations of the Research

When conducting this research I began by identifying a question with sub questions that could be answered and would benefit my students after learning more about it. From here I used an organized research engine called EBSOhost and ERIC to look for current, 2015-2023, academic journals that were conducted within the United States and had been peer reviewed. Using boolean operators and advanced searches I used these keywords to search “Active learning or Inquiry or project based learning (TX all text) AND Achievement or outcomes NOT Secondary NOT Foreign countries.” This search gave me more than enough articles to begin excluding studies from the total articles found. Excluded studies happened because of the grade

level of the participants not matching elementary students, studies that have insignificant results, studies that were focused on impacts of the elementary teachers and not the students as well as some studies not being able to complete their studies. After the exclusion of studies from the original search it left me with twenty solid articles and the need to review more articles. While I was aiming to answer the same questions I brought my search out a bit wider to include foreign countries. Again I used EBSCOhost and ERIC to use boolean operators and advanced my search to use these keywords “Active learning or Inquiry or project based learning (TX all text) AND Achievement or outcomes NOT Secondary.” This opened the search up a bit more without needing to change too much of the already found research. In the end I was able to find enough research to show the impacts that active learning has on elementary students' achievement.

Implications for Future Research

Future research for this topic could be around a couple of different things. To begin there is limited studies around using active learning with the subjects of math and language arts. If more curriculum and implementation was done with these common core subject areas, I believe we could measure its impacts and student achievement stronger in these subjects. Another area that had limited research was in measuring the impacts that active learning has on self and collective efficacy. Efficacy being an important factor for how students are able to accomplish their learning goals. From these two areas of limited research I would like to pose these questions for future research. Can more educators use active learning to teach language arts and math? And can active learning be adjusted to measure more student efficacy?

Conclusion

Questions that were asked in this literature review were: What impacts does active learning have on elementary student achievement? What defines active learning? Where and how

has active learning been implemented in the classroom? In what ways has active learning been seen to impact students academically? And finally, In what ways has active learning been seen to impact students non-academically? What we have come to learn is that active learning can take place in a variety of ways and in many different subject areas. Based on the studies found with applying active learning to a classroom of students it will have increasingly positive outcomes on students in various ways. Some of these impacts include academic achievements, English language learner achievements, closure of the achievement gap, increase in student engagement, motivation, problem solving skills as well as having a presence of components of a healthy mindset, efficacy with learning and little self regulation.

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