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IMPACTS OF ART EDUCATION ON STUDENT DEVELOPMENT AND ACHIEVEMENT

A MASTER'S THESIS  
SUBMITTED TO THE FACULTY  
OF BETHEL UNIVERSITY

BY  
SHANNA SLICE

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF  
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IMPACTS OF ART EDUCATION

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APPROVED

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## Abstract

The significance of art education as a part of public education in America has been greatly debated since public education's inception. While the most recently passed education bill includes art as a part of a well-rounded education, there is a simultaneous shift in focus towards standardized test scores. This raises several questions around art education's impact not only on standardized test scores but on the academic and personal development of students. The current relevant research shows compelling evidence that art education does positively impact critical thinking, creativity, and problem solving skills. However, there is inconclusive evidence whether art education positively impacts student performance in math, science, or English. In addition, there is some research that shows art education positively impacts students' self-confidence, empathy, and civic engagement. There is also compelling evidence that shows students from low socioeconomic families are more positively impacted by art education than students from high socioeconomic families. Overall, the present research points to art education enhancing the academic and personal development of students of all ages.

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## CHAPTER I: INTRODUCTION

The arts have been an embedded part of every culture since the dawn of civilization. The same is true for the arts and public education. Horace Mann, who launched the American public education movement in the 1830s and 1840s, included drawing as part of the original curriculum on the grounds that it developed better eye hand coordination (Raber, 2017). However, it took over 150 years for America to include the arts as part of public education on a federal level, until then each individual state got to choose. Massachusetts was the first state to make the arts a part of its general public education in 1860 (The Art of Education, 2015). While most states followed Massachusetts' lead eventually, the arts were not included as a core subject in public education in America under federal law until the passage of the *Goals 2000 Education Reform Act* in 1994 and then the *No Child Left Behind Act* of 2001 which provided states federal funding for the arts in addition to their state funding for the first time. Currently art education is included under the *Every Child Succeeds Act* of 2015 that states that the arts are part of a well-rounded education.

The nation adding art education to public education on a federal level in this 21<sup>st</sup> century matches the value Americans have for the arts. In a national survey done in 2018 by the Americans for the Arts, 72 percent of Americans believe “the arts unify communities regardless of age, race, and ethnicity” and 73 percent agree “the arts help them understand other cultures better.” Along with that, 91 percent of Americans believe that arts are part of a well-rounded education for kindergarten through 12<sup>th</sup> grade students and 93 percent believe it is important for students to receive an



education in the arts whether they are in elementary, middle, or high school (Americans for the Arts, 2018). This same value Americans have is also where their money is spent. In 2016, the arts and culture sector contributed 804.2 billion dollars to the nation's gross domestic product (Hutter, 2019). That same year, the total economic impact of the arts and culture sector in Minnesota alone was over two billion dollars and generated 245 million in state and local revenue (Creative MN, 2019).

With or without the arts, a key purpose of public education is to prepare children to be skilled, productive, and contributing members of society. Therefore, it is critical that effort is made to ensure the skills being taught in schools are what students will need to succeed in the current global economy. The National Association of Colleges and Employers 2018 survey of employers from 172 organizations found the most essential competency that employees need is critical thinking and problem solving skills. In addition, the Partnership for 21<sup>st</sup> Century Skills, a national organization of business, education, and government leaders working together to assist in preparing every child for the 21<sup>st</sup> century, include critical thinking and problem solving, and creativity and innovation in their top four skills that children need to succeed in today's world (Battelle for Kids, 2018).

With these essential skills in mind, the questions arise in regards to whether art education impacts these skills that are needed in today's world and in a more generally how does art education impact students' academic and personal development. In addition, besides the *No Child Left Behind Act* of 2001 and the *Every Child Succeeds Act* of 2015 including art education as a part of a holistic public education they also made a

strong shift towards focusing on state standardized test scores as a measure of individual, district, and state academic performance. This emphasis on state standardized test scores has caused many educators and legislators to question how art education impacts student academic performance on those exams.

Therefore, this literature review will explore the questions: How does art education impact students' educational and personal development? How does art education specifically impact critical thinking, creativity, and problem solving skills? Does art education impact performance in the core subjects? How does art education impact students' self-efficacy and civic engagement?

For the purpose of this literature review, art education includes media arts, dance, music, theater, and visual arts. Critical thinking is a student's reflective processing of their thoughts and incorporates the components of observation, interpretation, evaluation, associations, problem finding, and flexible thinking. While creativity is frequently solely associated with the arts it is in fact much broader than that and is about idea generation, manipulation and use. It also consists of the components of fluency, originality, elaboration, and persistence. Additionally, problem solving is a student's ability to process, confront, and resolve real often cross-disciplinary situations and includes the components of imagining, experimentation, flexibility, resource recognition, connection of ends and aims, and reflection. In the realm of personal development, self-efficacy refers to a student's belief of their ability to make things happen for themselves, their capacity to conceive and carry out actions, and their general sense of agency in life which includes self-confidence and self-esteem. Also, low

socioeconomic families are those that qualify for free and/or reduced lunch in the public school system. Lastly, while standardized tests vary by state they are consistently conducted in the subject areas of math, science, and literacy which generally includes reading and writing.

## **CHAPTER II: LITERATURE REVIEW**

### **Literature Search Procedures**

To locate the literature for this thesis, searches of Education Journals, ERIC, Academic Search Premier, JSTOR, and EBSCO MegaFILE were conducted for publications from 2000-2019. An extensive investigation of relevant empirical studies' reference lists was also conducted to locate additional literature. This is was narrowed by only reviewing published empirical studies from peer-reviewed sources that focused on art education and its effects and impacts that addressed the guiding questions. The key words that were used in these searches included "art education and critical thinking", "art education and creativity", "art education and academic achievement", "art education and skill transfer", and "learning in the arts and divergent thinking". The structure of this chapter is to review the literature on the effects and impacts of arts education in five sections in this order: Art Education and Critical Thinking, Art Education and Problem Solving, Art Education and Creativity, Art Education and Achievement in Core Subjects, and Art Education and Personal Development.

### **Art Education and Critical Thinking**

Several studies have provided evidence that instruction and experiences in the arts increase students' abilities to think critically (Adams, 2006; Bowen, 2013; Housen, 2002; Huye, 2015; Lampert, 2006, 2012). To help give greater validity to these studies, in 2007, Luke, Stein, Foutz, and Adams conducted a study to examine if critical thinking could be measured through an assessment tool. Thirteen art museum educators at six art museum used an observational critical thinking assessment in their existing art

education programs with children and youth. Through the analysis of the critical thinking assessments along with interviews of the art museum educators, all thirteen of the art museum educators were able to observe participants in their programs using and demonstrating critical thinking with the critical thinking assessment tool. This study showed that critical thinking could be observed, identified, and measured in art programs by art museum educators.

Bowen (2013) conducted a study of 3,811 students in grades third through twelfth, about half of the students attended a guided field trip to an art museum. Two weeks post the museum visits all students including those that did not visit the art museum completed a critical thinking survey. An analysis of the surveys showed that students who went on the art museum tour overall performed nine percent higher on the critical thinking measure than those who did not go on the tour. Breaking the surveys down by grade level, students in grades third through eighth outperformed their similar peers by 11 percent on the critical thinking measure. Demographically, students who visited the art museum and were from low socioeconomic families and/or were non-white performed eighteen percent higher on the critical thinking measure than their similar peers who did not visit. Additionally, students who visited the art museum who were living in rural areas (less than 10,000 people) performed 33 percent higher on the critical thinking measure than their similar peers who did not visit.

While the Bowen study analyzed the impact of a single art museum visit on the critical thinking skills of students, the same researchers that investigated the capability of measuring critical thinking skills conducted a study on the impact of a year-long

multiple visit art museum education program on third to fifth grades students' critical thinking skills (Adams, Foutz, Luke, & Stein, 2006). For this study, students who participated in the multiple visit art museum education program and similarly academically and demographically matched students were individually interviewed by researchers and completed a unguided art museum tour where they audio recorded during their visit. Both were then transcribed, coded, and analyzed using a critical thinking measurement rubric (Housen, 2002). This study found that students who participated in the multiple visit art museum education program generated significantly more instances of critical thinking skills and were able to provide significantly more evidence to support their critical thinking than their peers who did not participate. More specifically, the art program students had significantly higher frequency in the critical thinking skills of observation, interpretation, association, comparison, and flexible thinking than their peers. However, there was no differences found in the frequency of the evaluation and problem finding critical thinking skills between the art program students and the non-art program students.

The relationship between learning through the arts and critical thinking skills have been studied outside of art museums settings as well. In 2011, Lampert conducted a very small study of the improvement of critical thinking skills in ten elementary children aged eight to ten who participated in a twelve week after school art education program. Through a pre and post critical thinking test, on average the children increased their critical thinking scores by 20 percent. A year after that study, Holdren (2012) conducted a study with 21 high school juniors who elected to create a visual arts

project in their English class to evaluate their level of reading comprehension and their engagement with critical thinking skills. Based on observations and interviews, the researcher found the students repeatedly demonstrating the critical thinking skills of metaphoric connections, synthesizing details, and problem solving. Additionally, of the 21 high school students in the study, 14 produced visual artworks that demonstrated critical thinking by making connections beyond the illustrative and ten produced artworks that demonstrated critical thinking by establishing metaphorical connections or synthesized details related to the thematic concepts in the texts. Most interestingly, it was observed that when the students had an in-depth understanding of the text, their art reflected critical thinking sometimes despite the lack of artistic ability or training. Likewise, when students struggled to comprehend the text, their artwork tended to show far less critical thinking in their artwork despite artistic ability or training. However, a qualitative study of high school students in the United Kingdom done by Harland in 2000 found that only 15% of the 79 students interviewed over three years made statements of increased critical thinking skills being an outcome of their participation in the arts.

In none of the above studies were students taught about their critical thinking before they were evaluated in it. Goldberg (2005) conducted a study with 40 third grade students where all the students over a year received art instruction but only half were taught about critical thinking through metacognition. All students in the study were given pre and post art tasks that were then analyzed which showed the third grade students who received instruction on critical thinking through metacognition scored

significantly higher on the critical thinking skills of understanding the problem, strategies for solutions, and solving the problem in the development of their artworks than their peers who did not receive the instruction. In fact, the third grade students who were taught about critical thinking through metacognition averaged three times the number of critical thinking statements when working on their post art tasks than their peers. This study suggests that collaboration between elementary classroom teachers and art teachers to teach about critical thinking could increase students' overall use of critical thinking skills.

So far the studies presented have been with students in grades K-12, however, Lampert (2006) and Huye (2015) conducted studies with undergraduate students and how the arts relate to their critical thinking skills. With 77 undergraduates enrolled in fine arts courses and 64 in non-art courses, Lampert had all students complete the *California Critical Thinking Disposition Inventory* that tests the internal motivation to approach problem solving by using thinking and reasoning. The results of this survey showed that all students in art courses scored higher in the critical thinking subscales of truth-seeking, critical thinking maturity, and open-mindedness. However, there was no significant difference between the students in art courses and not on the subscales of analyticity, inquisitiveness, and critical thinking confidence. In fact, students in non-art courses scored significantly higher than students in art courses in the subscale of systematicity. Lampert concluded that since students in art courses scored higher in their dispositions for truth-seeking, critical thinking maturity, and open-mindedness this suggests that visual arts curriculum and instruction may significantly enhance critical



thinking dispositions. Along with that, this study shows early indications that immersion in a discipline such as art may condition the mind to approach experiences with a disposition for accepting that there are many possible solutions to complex problems thus causing the mind to think critically. Related, Huye (2015) did a small study with twelve undergraduate nursing students on whether the use of art analysis could invoke their critical thinking. Through a survey the students trended toward agreement that the analysis of art helped them with their critical thinking skills with mean score of 3.9 out of 4 on the critical thinking survey questions.

Critical thinking skills in art are important but more important are if those skills can be transferred across domains. Therefore, not only has the relationship between critical thinking skills and arts education been studied but also the ability to transfer critical thinking skills used in art to other contents and subject areas has also been studied (Holdren, 2012; Housen, 2002; Huye, 2015). Using the same critical thinking skills rubric as used in the Adams et al. study (2006), prior to that in 2002, Housen conducted a five year study to investigate the relationship between visual art instruction and the development and transfer of critical thinking skills. With 52 elementary and middle school students who received visual arts instruction and 47 who did not, all students completed a pre and post survey, individual interviews, written essays, and observed by teachers and researchers over a five year period. The data was compiled, coded and found that students who received and didn't receive the art visual instruction increased their critical thinking transfer across social contexts, however, the students who received the art visual instruction showed significantly more critical thinking

context transfer than their peers who did not receive the arts instruction. The significant differences in the critical thinking context transfer scores between the students who received the arts visual thinking strategies instruction and those who did not began one and half years into the study and remained consistent through year five of the study. Besides transferring across social context, this study found that students who received the art visual instruction had a mean critical thinking transferring across content score that was twice that of the students who did not receive the art strategies instruction. Also, an important finding was that all students showed transfer of their critical thinking across social contexts before the content and the more artistic ability students had the greater they were able to demonstrate their critical thinking transferring social contexts and content. Lastly, Adams et al. found that students who received art visual instruction used significantly more supported observations and speculations both evidence of critical thinking than their peers who did not receive the instruction. Similarly, the Huye (2015) study and the Holdren (2002) studies already discussed, both showed the transfer of critical thinking skills across content with the Huye study transferring to nutrition curriculum in an undergraduate nursing course and the Holdren study transferring to reading comprehension in a high school English class. Overall, these studies done have shown critical thinking skills to be impacted by arts education and can be transferred across context and content.

### **Art Education and Creativity**

While critical thinking is viewed as an important 21<sup>st</sup> century skills, in our ever advancing technological age, creativity is also viewed as a vital skill needed for today's

world (Battelle for Kids, 2018). In 2011, Kim conducted a study to examine the current levels of creative thinking and possible changes that have occurred in it over the past forty years. Quantitative data was taken from the *Torrance Test of Creative Thinking – figural* scores from 272,599 students in kindergarten through twelfth grade geographically located across the United States from 1966-2008. *The Torrance Test of Creative Thinking* breaks creativity down into the five components of fluency, originality, elaboration, abstractness of titles, and resistance to premature closure. An analysis of the scores indicated that creative thinking in all five of its components individually and collectively are declining over time among Americans of all ages and is particularly significant in kindergarten through third grade students where the decline was shown to be steady and persistent since 1990.

Four other studies have used the same *Torrance Test of Creative Thinking* that Kim analyzed, in their investigations of the relationship between art education and creativity (Burton, Horowitz, & Abeles, 2000; Catterall & Peppler, 2007; Luftig, 2000; Schlegel et al., 2014). In 2000, 2,406 students in grades, 4<sup>th</sup>, 5<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> from twelve public schools with varied to no art programs in the eastern part of the United States, completed the *Torrance Test of Creativity* in order to evaluate the effects of art education on students (Burton et al.). In addition to the *Torrance Test of Creativity*, the students also completed a *Self-Description Questionnaire* and a *Student Arts Background* questionnaire. On top of that, five of the twelve schools were chosen for additional qualitative research through interviews, observations, and examinations of students' artworks, performances, and writings. An analysis of the student data found students

who had a greater number of years of in-school and/or private art lessons consistently scored higher on the *Torrance Test of Creative Thinking – figural* than their peers who had a smaller number of years of in-school and/or private art lessons in almost every component of creativity. The creative thinking component of elaboration had the widest score gap between the students with more years of arts lessons scoring high and the student with fewer years of arts lessons scoring low. This quantitative data was consistent in correlation with the qualitative data gathered and analyzed.

That same year Luftig (2000) used the same creativity measurement tool with 615 elementary students in Southwest Ohio in grades two, four, and five. In this study a third of the total number of participating students received comprehensive arts educational programming, a third received new curriculum but not in the arts, and a third did not receive new curriculum or arts based instruction. An analysis of the pre and post *Torrance Test of Creative Thinking – figural* scores of all the students found the students who received the arts education programming scored significantly higher in their total creativity scores than the students who did not receive the arts programming by a mean score difference of 11 percent. Breaking down the scores by each creative component found the students who received the arts instruction scored significantly higher on the creative component of originality than the students who did not receive the arts programming by a mean difference score of 14 percent. In addition, the students with the arts education scored significantly higher on the creative component of elaboration than the students who did not receive the arts programming but not higher than the students who received the new non-arts curriculum. The second and

fifth grade students in the study with the arts instruction made large gains on the creative component of resistance to closure scores between the pre and posttests, whereas the students in those same grades who did not receive the arts programming had minimal gains or losses in their elaboration scores. However, all the fourth grade students regardless of receiving arts instruction, new curriculum, or nothing had losses on resistance to closure scores between their pre and posttests. The creative components of fluency and abstractness of titles component scores showed no difference between the students who received the arts programming, new curriculum, or neither of those two.

Schlegel and colleagues found similar results with undergraduate students in their 2014 study. Thirty-five college students participated in this study with 17 of them taking a three month drawing or painting course and 18 of them not. The *Torrance Test of Creative Thinking – figural* was given to all participating students at before the three month course and at the end of it. The scores showed the undergraduate students with the visual arts course improved their creative thinking over their peer who did not take an art course.

These results differ from those of Catterall and Peppler's 2007 study of a 179 students in the third grade attending urban public schools in California and Missouri who completed pre and post surveys based on the *Torrance Test of Creative Thinking*. In this study, 72 percent of the participants received 20-30 weeks of art education instruction and the rest did not. The analysis of the pre and post creativity scores showed that between one-third and one-half of all the students made gains in the

creative thinking components of fluency, flexibility, and elaboration. However, there was no significant differences in the scores of those three creative thinking components between the students who received the arts instruction and those who did not.

Conversely, the students who received arts instruction scored significantly higher on the creative thinking component of originality than their peers without arts instruction by 33-55 percent. This particular finding is similar to what Burton et al. found in 2000.

Beside the *Torrance Test of Creative Thinking*, the *Wallach-Kogan Creativity Test* has been used in three research studies that investigate the relationship between art education and creativity (Chan & Zhao, 2010; Chishti & Jehangir, 2014; Han & Marvin, 2002). In 2002, Han and Marvin examined whether creativity is domain specific or is transferrable across domains. One hundred and nine second grade students aged seven to eight from five urban elementary schools participated in this study by not only completing the *Wallach-Kogan Creativity Test* but also completed the *Real-World Divergent Thinking Test* and three performance based assessments each in the domains of art, math, and literacy. Han and Marvin found no significant relationship between the performance based art assessment of collage making and the *Wallach-Kogan Creativity Test* scores or the *Real-World Divergent Thinking Test* scores. There was also no significant relationship between the performance based art assessment and the math or literacy assessments. In fact, there was no combination of the *Wallach-Kogan Creativity Test* or the *Real-World Divergent Thinking Test* that could predict any combination of the performance based assessment scores for the students. This study provides evidence that creative thinking test measures and performance in art, math, and literacy

are independent of one another because no significant correlation was found between the tests or the performances.

Chan and Zhao found similar results in their 2010 study with 223 students in Hong Kong aged 6-24 years old. In their study, all the students completed a *Creative Characteristics Rating Scale* that included items from the *Wallach-Kogan Creativity Test* and a fantasy drawing task. The students in the study who were in grades kindergarten through twelfth grade also completed a *Drawing Activity Checklist* in order to assess their level of artistic involvement whereas the undergraduate students' artistic involvement was assessed by their major in fine arts or not. The results of this study found that the creative thinking test scores did not contribute significantly to the prediction of artistic creativity in their drawings. This supports the evidence that creativity test measures may not correspond with domain specific creative performance such as art. However, the study also showed that children aged six to ten and more significantly adolescents aged eleven to sixteen years old with greater involvement in the arts had significantly higher drawing skills and artistic creativity shown in their drawings than their similar aged peers who had little artistic involvement. In addition, artistic involvement was a significant predictor of artistic creativity for adolescents. Also, there was a substantial correlation between drawing skills and artistic creativity shown in the drawings for participants across all ages. In fact, drawing skills was the most significant predictor of artistic creativity shown in the drawings. This finding suggests that students who have technical art skills are the more likely to be able to express artistic creativity in their artwork.

Rostan's 2010 study of the relationship between artistic talent and creativity found similar results as Chan and Zhao did. There was 51 children aged nine to sixteen who were enrolled in a private after school art program for at least a year and half by the recommendation of one of their public school teachers that participated in this study. Through two drawing tasks: one from life and one from their imagination, Rostan found the technical skill on the drawing from their imagination was significantly correlated with the assessed creativity of the drawing. In addition, the number of years the students attended the art program was significantly correlated with the technical skill and creativity of the students' drawings. Therefore, unsurprisingly the older students aged 11-16 had greater technical skills and creativity in their drawings as many of them had been in the art program longer than their younger peers. Rostan's study provides more evidence that students who participate in high quality arts education develop technical art skills while simultaneously increasing their artistic creativity.

A third study done in 2005 by Heath and Wolf also had a similar finding. They examined the effects of visual arts instruction in a public elementary school in the United Kingdom on children aged four to seven. Heath and Wolf found that over a year, the children made large gains in their artistic creativity particularly the component of elaboration as demonstrated through their drawings that contained more precise visual details and the verbal expressions of their ideas about their drawings. In Harland and colleagues (2000) quantitative study, also conducted in the United Kingdom, 36 of the 79 high school students interviewed made 67 statements that they believed an outcome of their participation in the arts was the development of their creativity.



Most of the studies done on the relationship between creativity and art education did not break down their results by gender or socioeconomic status. However, in 2007 Liu conducted a study in Taiwan that did just that. Four hundred and twenty seven third grade students from 16 elementary schools in the Hsinchu area of Taiwan completed the *Milne-Kasen Story Pictures Assessment* (a test of creativity), the *Young Artist's Checklist*, *Portfolio Review of Measurement*, and the *Milne Visual Spatial Intelligence Checklist*, all of which are American in origin. The results for each of these were scored, coded, compiled, and analyzed. Lui found every component of the creativity test (fluency, flexibility, originality, and elaboration) was significantly correlated with the students' visual arts understanding, performance, and visual/ spatial intelligence. When the results were broken down by gender, girls scored significantly higher on the creativity components of originality and elaboration. There was no significant difference in scores by gender for creativity components of fluency and flexibility. When the socioeconomic status of the students was examined in relation to their test scores, the students from higher socioeconomic families scored higher on all the components of the creativity test than their peers from lower socioeconomic families.

Overall, the studies on the relationship between art education and creativity show that increased education and experiences in the arts increase students' technical artistic abilities and their artistic creativity. However, the studies have shown that the artistic creativity does not seem transferable to other subject areas or domains.

### Art Education and Problem Solving

The skill of problem solving requires a balance of both critical thinking and creativity (Chishti & Jehangir, 2014). Therefore, it makes sense that research has been conducted in examining the relationship between art education and problem solving (Chishti & Jehangir, 2014; Holdren, 2012; Korn, et al., 2010; Lampert, 2011; Liem, Martin, Anderson, & Gibson, 2014; Naghshineh, et al., 2008; Rostan, 2010). In the Lampert (2011) study with ten elementary children already presented, not only did the study find that the children increased their critical thinking but also found that over the course of the afterschool art program it was observed that the children became significantly more comfortable and confidence with problem solving when it came to choosing, creating, and discussing art images. Also, during the Holdren (2012) study with high school juniors, it was observed that in the process of the students creating their visual art projects to demonstrate their reading comprehension, the students regularly engaged in both collaborative and individual problem solving in addition to critical thinking.

In 2010, Rostan conducted a study to examine the changes that occur in art students' artistic processing and products as they get older. There were 51 children aged nine to sixteen who were enrolled in a private after school art program for at least a year and half by the recommendation of one of their public school teachers that participated in this study. Through two drawing tasks and a *Need for Cognition Scale Likert Survey*, Rostan found the greater number of years of arts training the students had increased their technical drawing skills, creativity, amount of time spent generating

ideas, and more efficient in their problem solving. Therefore, not surprising that the older students, aged, 11-16, had greater problem solving skills than the younger students aged nine-ten.

That same year with similarly aged children, Korn and colleagues conducted a study to specifically examine arts instruction's ability to teach and build problem solving skills and found differing results than Rostan. A pre and post student questionnaire completed by 418 fifth grade students aged ten to eleven half of whom received arts instruction and a field trip to an art museum and the other half not, showed that all the students' overall problem solving skill scored did not significantly change between the two tests. More specifically, all students' problem solving strategies for math remained the same from the pre to post test. Interestingly, the questionnaire results showed the students' who received arts instruction had more positive attitudes in regards to the problem solving components of flexibility, where students resist giving up when encountering problems, and connections of end to aims, where students plan out the solution to their problems, than their peers who did not receive the arts instruction. In a second part of this study that involved 447 fifth grade students half of whom received arts instruction and the other half not, all completed an artistic problem solving activity that was observed, recorded, scored, and analyzed. The results showed the students who received arts instruction scored higher than their peers on the problem solving components of flexibility, connection of ends to aims, and resource recognition, where students identify helpful materials but lower than their peers on the problem solving component of experimentation, where students test the properties of materials, tools,

and techniques and no differences in the scores between the two groups of students on the problems solving components of imagining, and self-reflection.

In a larger and broader study that does not involve students receiving direct art instruction but rather their use of art-related information and communication through technology, Liem, Martin, Anderson, and Gibson (2014) examined the role of art-related information and communication technology use in students' problem solving skills. In this study, 197,024 fifteen year old students from twenty five countries completed the *Programme for International Student Assessment* in 2003. This assessed students' problem solving skills, math and science skills, perceptions about their academic behaviors and school, and their use of arts related information and communication technology. An analysis of the assessment data, found that the quality of the arts-related information and communication technology use had significant positive effects on students' problem solving skills, whereas the quantity of arts related information and communication technology use was a negative predictor of students' problem solving skills. In other words, the higher quality of arts-related information and communication technology used was associated with students' heightened problem solving skills, whereas the quantity of such use was inversely connected to problem-solving skills. Interestingly, in addition, the negative effect of the quantity of arts-related information and communication technology use on problem solving skills was greater for students who had low quality information and communication technology use than for those with moderate or high quality information and communication technology use. Also, Liem et al. (2014) found that students' problem solving skills positively predicted both

science and mathematics achievement with a higher effect on science achievement than mathematics. Taken further through analysis of the indirect effects of quality and quantity of arts-related information and communication technology use mediated through problem solving skills on students' mathematics and science achievements, students' problem solving skills significantly mediated the relationship between arts-related information and communication technology use and students' mathematics achievements. The same was found to be true for science however the students' problem solving skills was a greater mediating link to mathematics achievement than to science achievement.

Looking at an older student population, there are two studies that have been conducted with undergraduate and graduate students in examining their problem solving skills and visual arts training. In Pakistan, Chishnti and Jehangir (2014) did a study with 150 undergraduate students aged 18-20 from two universities and examined their current problem solving skills in relation to their elementary visual arts educational experiences. Chishnti and Jehangir found that the students who had visual arts education in elementary school scored significantly higher on the problem solving test used as compared to their peers who did not have early visual arts education. The results of this study suggest that people who receive visual arts education in their early years of school have better problem solving skills when they become adults.

While, Chishnti and Jehangir (2014) looked at the retrospective impact of childhood art education on later problem solving skills, Naghishineh did an earlier study in 2008 with Harvard medical students and on whether visual arts training would

improve their medical diagnostic skills which require acute problem solving. This study involved 56 pre-clinical medical students with the mean age of 24 who all completed pre and posttests that included written visual skills examination questions and a report of observation and interpretations of three medical patients and two artworks. Twenty four of the fifty six students in the study took an eight week course co-taught by art museum art educators and Harvard medical faculty on visual arts literacy and medical diagnosis. Naghishineh found that the medical students who completed the visual arts course increased their visual observations by 38 percent over their peers who did not complete the course. This improvement was evidenced in both the clinical and art components of the post test. This improvement was followed by better interpretations of both the artworks and medical patients on the posttest than their peers who did not take the course. This study suggests that visual art education can be transferred to problem solving in other fields such as medicine. While some of the results of the research is promising, overall, it is somewhat weak and mixed on the relationship or impact that art education has on problem solving skills.

### **Art Education and Achievement in Core Subjects**

Since the 2001 No Child Left Behind Act that supported standards-based school reforms, there has been great focus and emphasis on student performance in math, science, and literacy. Consequently there have been many studies done to examine the impact of arts education on those core subjects and if any skills gained the arts is transferable to academic achievement in them as well.

## **Art Education and Literacy**

The first place people often look to for student achievement in literacy is standardized test scores. There have been several studies that have examined the relationship between arts education and student achievement in standardized literacy test scores (Catterall, Dumias, & Hampden-Thompson, 2012; Harland et al., 2000; Housen, 2002; Ingram & Seashore, 2003; Kinney & Forsythe, 2005; Luftig, 2000; Sharp & Tiegs, 2018; Vaughn & Winner, 2000). In 2012, Catterall and colleagues did a large analysis of data taken from four national longitudinal studies of students with high and low levels of arts engagement and from high and low socioeconomic families. The data showed that eighth grade students from low socioeconomic families who had high levels of arts engagement from kindergarten through elementary school scored higher on standardized writing tests than similar students who had low levels of arts engagement over that same time period. However, there was no difference in writing scores for the students from high socioeconomic families with high and low levels of arts engagement.

Ten years earlier, Housen concluded a six year longitudinal study of 52 students in a public school who received visual arts instruction over that time found somewhat similar results in standardized reading scores as Catterall et al. did with eighth grade writing scores. The students who received five years of visual arts instruction increased their average eighth grade Minnesota standardized reading test scores by 23 percent from the eighth grade students from the previous year who had not receive any of the visual arts instructions. The following year's eighth grade students who had received six

years of visual arts instruction increased their state reading scores by 11 percent over the previous year. Another study done in Minnesota found similar results. Ingram and Seashore (2003) examined the Minnesota standardized test scores in English/Reading for third and fourth grade students from 35 Minneapolis public elementary schools with 77 percent of those students receiving arts integrated into their English lessons. The scores revealed the third and fourth grade students who received the arts integrated into their English lessons had higher gains in their reading test scores than their peers who did not receive the integrated instruction. In addition, the relationship between arts integrated instruction and reading achievement was stronger for third grade students from low socioeconomic families and students who were English language learners than the rest of their peers. These results indicate a significant relationship between arts integrated instruction and improved student learning in reading.

However, a similar study done by Kinney and Forsythe in 2005 also with fourth grade students found differing results. The Ohio reading and writing standardized test scores of four elementary schools' fourth grade students were analyzed with half of the students having received comprehensive arts instruction outside of their core subjects and half not. The mean scores on the test revealed no significant differences in achievement between the students who did and did not receive the comprehensive arts instruction. Five years previous to this study, Luftig (2000) examined the standardized test scores of 615 students in second, fourth, and fifth grade also in Ohio from two school districts with a third of those students receiving arts education programming, a third receiving new non-arts curriculum, and a third receiving neither of those. The



literacy scores on the Iowa Basic Skills in Reading standardized test for the fifth grade students for one district showed no difference between the students who did receive the arts instruction and those that did not, however for the other district, the students who did receive the arts education programming scored significantly better than their peers in the same district who did receive the arts programming. Mixed results were also found by Sharp and Tiegs 2018 study in Texas with students in grades three, four, and five. Fifty four elementary schools in the study received fine arts programming and 135 elementary schools did not. The annual Texas Academic Performance reports from 2012-2016 were used in this study that include the standardized test reading scores for each of the schools years within that timeframe. The data analysis found the fourth grade writing scores for the students receiving fine arts programming was slightly significantly higher than the students not receiving such programming for the 2013-2014 school year. Additionally, the fourth and fifth grade reading scores for the rural public schools involved in the study the students receiving fine arts programming scored significantly higher than their peer not receiving the programming for the 2012-2013 school year. However, there was no statistical difference in the standardized reading or writing scores for the students receiving and not receiving arts programming for the 2014-2015 and 2015-2016 school years.

Meanwhile during that same year, Harland and colleagues' (2000) study in the United Kingdom also found mixed results. The United Kingdom's National Exam (GCSE) scores of 27,607 eleventh grade students from 152 schools for the years 1994-1996 were examined in relation to the self-reported arts courses they had taken. The results

showed that 11<sup>th</sup> grade students who took music and drama courses scored significantly higher on their English national exams than students who took no art courses. The students who took visual art courses scored no different than the student who took no art courses. That same year, Vaughn Winner (2000), conducted a very similar study with the Scholastic Aptitude Test (SAT) scores from 1996-1998 in relation to the art courses students had taken as self-reported on the Student Descriptive Questionnaire that is a voluntary part of the SAT. The analysis of the verbal SAT scores showed a positive significant relationship between the numbers of high school art courses the verbal SAT scores. The verbal SAT scored increased linearly from zero to three art courses taken and then there was a sharp jump in score up at four or more art courses taken.

Outside of standardized test scores, two small studies have found art education to have a somewhat positive impact on students' literacy achievement (Heath & Wolf, 2005; Wandell et al., 2008). Forty nine children aged seven to twelve who were part of the National Institute of Health's three year study of reading development were assessed through reading fluency tests and phonological awareness tests as part of Wandell and colleagues 2008 study on arts instruction and literacy. During the first year of the study when the participants had a mean age of ten, those who had early training in visual arts had statistically significant higher degree of phonological awareness than their peers with no such training. However, these differences dissipated two years later when the participants had a mean age of twelve. Also, the amount of musical training participants received was significantly correlated with the amount of improvement in their reading fluency scores over the three year period. There was no significant

correlation between the participants' visual arts training and their reading fluency scores. In the 2005 study by Heath and Wolf, conducted in the United Kingdom with four to seven year old students at a public elementary schools, the qualitative data showed large gains in the students' vocabularies after receiving visual arts instruction as demonstrated in their verbal comparative analysis and stated cause and affect relationships of their artworks.

There are two studies that specifically examine the impact of art education and the literacy achievement of English language learners (Brouillette, Childress-Evan, & Farkas, 2014; Craig & Paraiso, 2008). In 2014, Brouillette and colleagues conducted a study with students who were English language learners at ten urban Title I elementary schools in San Diego with half of the schools have arts education programming and other have not. The scores of the students' performance on the California English Language Development Test were analyzed and showed that the kindergarteners who were English language learners and who received the arts education programming scored significantly higher on the listening and speaking subtests than their peers who were English language learners but did not receive the programming. However, there was no difference in scores for the first and second grade English language learners who did and did not receive the arts education programming. Previously in 2008 there was a small qualitative study done by Craig and Paraiso with 34 urban middle school immigrant students who were all English language learners with arts integrated into their English class to examine the impact of such instruction on the students' language development. Craig and Paraiso found the students increased their oral English

proficiency skills through the creation and discussion of their artworks in particular their vocabulary grew. It was also observed that the students transferred the language they used to describe and discuss their art to other content in their English class.

All the studies presented thus far examined arts education on the literacy achievement of students in school, however, an interesting part of the Catterall et al. (2012) study referenced earlier, looked at literacy engagement of adults in light of their middle school and high school arts engagement. With data taken from the *National Education Longitudinal Study* of 24,599 students, the *Educational Longitudinal Study* of 15,361 students, and the *National Longitudinal Survey of Youth* of 8,984 analysis showed that 26 year old adults from low socioeconomic families who had engaged in the arts in middle school through high school were more likely to read at least one book during the preceding year (82 percent) compared to peers of the same socioeconomic families who did not engage in the arts (74 percent). In addition, 55 percent of the 26 year old adults from low socioeconomic families who engaged in the arts in middle and high school had visited a library at least one in the past year compared with 43 percent of the peers of the same socioeconomic families who did not engage in the arts. While the studies show that overall positive impact of arts education and student achievement in literacy is somewhat small to none, there are no studies that showed a negative impact on the literacy achievement of students and even could possibly assist in students becoming literacy engaged adults.

### **Arts Education and Mathematics**

Just like the relationship between art education and literacy has been analyzed through standardized test scores in reading and writing, the same has been done with standardized test scores in mathematics in an effort to examine the relationship between art education and student achievement in math (Harland et al., 2000; Ingram & Seashore, 2003; Kinney & Forsythe, 2005; Korn et al., 2010; Luftig, 2000; Sharp & Tiegs, 2018; Vaughn & Winner, 2000). In 2003, Ingram and Seashore examined the Minnesota standardized test scores in mathematics for third and fifth grade students from 35 Minneapolis public elementary schools with 77 percent of those students receiving arts integrated into their English lessons. The test scores showed the third and fifth grade students who received integrated arts instruction in their math classes had significantly higher gains in their scores than the students who did not receive the integrated arts instruction. Kinney and Forsythe found similar results in their 2005 study with fourth grade students at four public elementary schools in Ohio. The students in the study who received comprehensive arts instruction had a significantly higher mean score on the Ohio Proficiency test in mathematics compared to the students who did not receive the arts curriculum. Interestingly, when the scores were broken down by the socioeconomic status of the schools, the lower socioeconomic schools had a significantly greater mean difference in math scores between the students who did and did not receive the arts instruction when compared to the higher socioeconomic schools. This finding suggests that comprehensive arts instruction could have a greater effect on the students' achievement in math who come from low socioeconomic families.

In looking at older students, in the same study where Vaughn and Winner (2000) examined the verbal SAT scores of high schools students in relation to the self-reported art classes they had taken, they also examined the SAT mathematics scores in relation to the art courses completed. The scores showed a significant positive relationship between the number of high school art courses and the SAT math scores. The math scores of students with zero to three art courses was significantly lower than the scores of the students with four or more art courses. However, it is important to note that the math SAT scores in comparison to the verbal SAT scores for students with zero to three art courses show that the effect of the number is of art courses is significantly smaller on the math SAT scores than the verbal scores. This finding suggests that there may be a greater relationship between the number of high school art courses and the verbal SAT score than the math score.

Four other studies found different results than the previous studies. In 2010, Korn and colleagues examined the New York state standardized mathematics test scores of 418 fifth grade students from six elementary schools. Half of those students received in school arts education for a year including a field trip to an art museum and the other half did not. The scores showed the students who did not receive the arts instruction scored significantly higher than the students who did receive arts curriculum. Ten years prior, Harland and colleagues' (2000) analyzed the United Kingdom's National Exam (GCSE) scores in math of 27,607 eleventh grade students from 152 schools in relation to the self-reported arts courses they had taken. The results showed overall there was no difference in mathematic scores between students who took arts courses and those

who did not. However, when the scores were broken down by the type of art courses taken, analysis showed that students who took music courses scored significantly higher on their national exam in math than their peers without any art courses and students who took art and drama courses scored significantly lower than their peers who did not take any such classes.

That same year in two Ohio school districts, Luftig (2000) examined the standardized math test scores of 615 second, fourth, and fifth grade students who had taken the Iowa Test of Basic Skills math exam with a third of the students in each district receiving fine arts programming, a third receiving new non-arts curriculum, and a third receiving neither of those. The math scores for one of the district's fifth grade male who did not receiving the fine arts programming or the new curriculum scored the highest followed by the male students who received the arts programming while the female students who received the arts programming scored the lowest of all the students. For the other school district the in study there was no difference in math scores between any of the students whether they received the arts programming, new non-arts curriculum, or neither of those.

Eighteen year later in Texas, Sharp and Tiegs (2018) examined the standardized math scores for third, fourth, and fifth grade students from 54 elementary schools who did received fine are programming and 135 who did not from 2012-2016. The State of Texas Assessments for Academic Readiness Level II in math was the standardized test used in this study. The data analysis showed that for the 2013-2014 school year the fifth grade math scores for the rural public schools receiving arts programming were

significantly higher than the rural public schools not receiving the programming.

Additionally, the fifth grade math scores for all schools during the 2015-2016 school year showed the schools with arts education instruction had slightly significantly higher scores than the schools no receiving the instruction. However, there was no difference in math scores between the schools receiving and not receiving arts education programming for the 2012-2013, 2014-2015 school years for the fifth grade students or any of the years for the second and fourth grade students.

There are three studies that examined the relationship of arts education and achievement in mathematics outside of standardized test scores (Catterall et al., 2012; Liem et al., 2014; Wandell et al., 2008). Wandell and colleagues' did a small study in 2008 with 49 children aged 7-12 who completed an arts education questionnaire, the *Woodcock-Johnson III Calculations Test* and the *Memory for Digits Test* (CTOPP). The test results showed a positive correlation between the children's weekly visual arts experience hours and their math calculations scores. There was also a moderate correlation between the children's weekly music experience outside of school and how well they could remember a series of numbers which is a measure of their working (short-term) memory that is critical for mathematical calculations. In Catterall and colleagues' large scale data analysis of four national longitudinal studies in 2012 involved 48,944 students. They found the students from low socioeconomic families who took art courses in high school were more likely than their similar peers without those courses to complete and pass a calculus course. In addition, the data showed that students from low socioeconomic families who took art courses in high school had



slightly higher grade point averages in math courses than their similar peers who did not take art classes.

Two years after this study, Liem, Martin, Anderson, and Gibson (2014) did a broad study that did not involve students receiving direct art instruction but rather their use of art-related information and communication through technology as it related to the achievement in mathematics. Parts of this study were presented earlier in art education's relationship to problem solving. In this study, 197,024 fifteen year old students from twenty five countries completed the *Programme for International Student Assessment* in 2003. Liem and colleagues found the quality of art related information and communication technology use had a significant positive effect on students' mathematics achievement, whereas the quantity of arts related information and communication technology use was a negative predictor of students' mathematics achievement. In other words, when students interacted with quality arts related information and communication technology they also had greater mathematics achievements, however, if they interacted with a high quantity of arts related information and communication technology they had lower mathematics achievement. An analysis of the indirect effects of quality and quantity of arts related information and communication technology use mediated through problem solving skills showed to have a larger effect on students' mathematics achievement than their direct effects. Overall, the studies that examine the relationship between art education and student achievement in mathematics show a weak, mixed, and even negative correlation.

### **Art Education and Science**

The relationship between art education and student achievement in science has been examined through standardized test scores just as with mathematics and literacy (Harland et al., 2000; Kinney & Forsythe, 2005; Sharp & Tiegs, 2018). The results that Kinney and Forsythe found in the fourth grade Ohio Proficiency standardized test scores in math were the same for the science. The students in the study who received comprehensive arts instruction had a significantly higher mean score on the Ohio Proficiency test in science compared to the students who did not receive the arts curriculum. Similar to the math scores, when they were broken down by the socioeconomic status of the schools, the lower socioeconomic schools had a significantly greater mean difference in science scores between the students who did and did not receive the arts instruction when compared to the higher socioeconomic schools. This finding suggests that comprehensive arts instruction could have a greater effect on the students' achievement in science who come from low socioeconomic families.

In the 2018 study in Texas Sharp and Tiegs examined fifth grade standardized science scores for 54 schools receiving arts education programming and 135 not. They found there was no difference in scores between the schools receiving and not receiving arts programming from 2012-2016. However, the 2013-2014 science scores for fifth grade students in rural schools receiving arts programming were significantly higher than the rural public schools not receiving arts programming. This small but significant finding suggests that comprehensive arts instruction could have a greater effects on students' achievement in science for students in rural areas.

Conversely, the results that Harland and colleagues found in their study in 2005 with 11<sup>th</sup> grade students are opposite of Kinney and Forsythe. The United Kingdom's National Exam (GCSE) scores in science of 27,607 students from 152 schools in relation to the self-reported arts courses they had taken. The results showed that music was positively correlated with higher attainment on the national science exams, while art and drama were negatively correlated with science attainment.

There are three studies that examine the relationship between art education and student achievement in science outside of standardized test scores (Catterall et al., 2012; Liem et al., 2014; Naghshineh et al., 2008). Catterall and colleague's 2012 analysis of the data from four national longitudinal studies of children and youth found that eighth grade students from low socioeconomic families who had high levels of arts engagement from kindergarten through elementary school had higher test scores in their science classes than similar students who had low levels of arts engagement over the same period. Two years after this study, Liem, Martin, Anderson, and Gibson (2014) did a broad study that did not involve students receiving direct art instruction but rather their use of art-related information and communication through technology as it related to the achievement in mathematics. Parts of this study were presented earlier in art education's relationship to problem solving and mathematics. An analysis of 197,024 completed *Programme for International Student Assessment* by fifteen year old students from twenty five countries found the quality of art related information and communication technology use had a significant positive effect on students' achievement in science, whereas the quantity of arts related information and

communication technology use was a negative predictor of students' science achievement. In other words, when students interacted with quality arts related information and communication technology they also had greater science achievement, however, if they interacted with a high quantity of arts related information and communication technology they had lower science achievement. An analysis of the indirect effects of quality and quantity of arts related information and communication technology use mediated through problem solving skills showed to have a larger effect on students' achievement in science than their direct effects.

In a study with a slightly older population, Naghshineh et al. analyzed if graduate medical students from Harvard received arts education whether this would improve their medical diagnostic ability. This study was presented earlier with problem solving, however, the scientific nature of the practice of medicine makes the finding relevant here as well. Naghshinah et al. found that the medical students who received eight weeks of visual arts training course improved their visual observations both artistically and medically by 38 percent over their peers who did not take the course as evidenced in the post course evaluation. Additionally, a qualitative analysis of the data collected showed the medical students who participated in the visual arts course used more fine arts concepts linked to medical findings making them more descriptive and accurate such as the specific mention of color, shadow, light, contrast, and balance in their post course evaluations than the students who did not take the course.

In 2008, Root-Bernstein et al. did a study to examine if success in sciences is correlated with creative and artistic activities of scientists outside of their field of study.

He and his team of researchers gather data from all Nobel laureates between 1901 and 2005, all obituary notices, and biographical memoirs of the Royal Society members between 1932 and 2005, all National Academy of Science members biographies and memoirs between 1877 and 2005, a 1936 avocation survey of Sigma Xi members, and a 1982 survey of public participation in the arts among the United States public. Roots-Bernstein et al. found a very significant relationship between the success of a scientist and adult arts and craft pursuits. The data showed that eminent scientists were more likely to have arts and crafts avocations than typical scientist or the general public. The eminent scientists who were Royal Society and National Academy of Science members were almost twice as likely to have arts and craft pursuits as the typical scientists who were Sigma Xi members or the American public. The Nobel laureates were almost three times more likely to have arts and craft hobbies than the Royal Society and National Academy of Science members. The data showed not only that successful scientists are much more likely to be polymaths but the increasing success in science is accompanied by developed ability in a variety of other fields particularly arts and crafts. As a result of this study, Roots-Bernstein stated, "Purely academic skills are not sufficient to train a person for creative scientific work. Such creative work requires the entire range of abilities subsumed in the arts and crafts, integrated and focused on specific scientific problems and techniques" (p.60).

Overall, studies shows that arts education is weak and marginally related to student achieve in science. However, there is some evidence of more indirect skills

learned in the arts such as observation, problem solving, creative solutions, and more that can be learned in the arts and impact achievement in the sciences indirectly.

### **Arts Education and Personal Development**

The personal development of students into moral and engaged citizens throughout their compulsory education and beyond is an often overlooked aspect of schools especially in light of standardized testing. Several aspects of personal development that have been studied in relationship to education in the arts and will be presented here: self-efficacy, communication skills, sustained attention, participation, and civic engagement.

#### **Art Education and Self-Efficacy**

The relationship between art education and various aspects of students' self-efficacy have been examined in several studies (Burton et al., 2000; Catterall & Peppler, 2007; Catterall et al., 2012; Craig & Paraiso, 2008; Harland et al., 2000; Korn et al., 2010; Liu, 2007; Luftig, 2000). The study done in 2000 by Burton et al. with 2,406 students in grades, 4<sup>th</sup>, 5<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> from twelve public schools with varied to no art programs in the eastern part of the United States, who a *Self-Description Questionnaire* and a *Student Arts Background* questionnaire. An analysis of these two sets of data revealed a significant but weak correlation between students' art education experiences and their academic self-concepts which included their perceived abilities in school as a whole and specifically in reading and math. The students with greater art education training had higher academic self-concepts scores than their peers with little art educational training. Meanwhile, there was no significant associations between students' art education

experiences and their non-academic self-concepts which included their perceived physical ability, physical appearance, peer relations, and parent relations. In addition to the student questionnaires, qualitative data was collected through interviews, observations, and examination of students' artworks, performances, and writings. The qualitative data analysis showed students exposed to strong and varied art experiences over time were more confident, willing to explore and take risks as well as take ownership and pride in their work. The students involved in Craig and Paraiso's 2008 study also demonstrated increased self-confidence. In their study, 34 urban middle school immigrant students had arts integrated into their English language learning. It was observed that the students conversed with more self-confidence and personal strength after having arts integrated into their English curriculum. Similar qualitative results were found in Liu's 2007 study with 427 third grade students from 16 elementary schools in the Hsinchu area of Taiwan. A positive relationship was found between the student's self-image and their ability to produce high quality artworks as observed by art educators and classroom teachers. Interestingly, Liu found that females had better self-images and simultaneously demonstrated more original ideas and could apply more elaborate details in their artworks than the males.

Related, in 2000, Harland et al. concluded a three year study of 79 students from five secondary schools in the United Kingdom who completed multiple interviews over that time. In the student interviews over the three years, 70 percent of the students made 141 statements that an outcome of their participation in the arts was increased self-confidence. Similarly, 38 students of 79 (48 percent) made statements that an

outcome of their participation in the arts was increased self-esteem. In addition, 68 percent of the students stated that their participation in the arts increased their ability to express who they are including their emotions, ideas, and opinions. Taking that further, 48 percent of the students stated that an outcome of their arts experiences included an increased ability to deal with difficult emotional states like anger. A similar result was found by Korn and colleagues in the 418 student questionnaires completed by fifth grade students with half having received arts instruction and half not. An analysis of the questionnaires showed students who received arts instruction felt less mad when they made a mistake on their art projects between their pretest at 82 percent and their posttest at 92 percent whereas the students who did not receive arts instruction did not change between the tests and remained at 82 percent.

Catterall and Peppler found mixed results in their 2007 study with 179 third grade students in public elementary schools in Los Angeles, CA and St. Louis, MO. One hundred and three of the students participated in visual arts educational programming and 76 did not, all completed pre and post surveys that included a general self-concept scale and self-efficacy questions and were formally observed several times. The quantitative and qualitative data showed more than half of the students who received arts instruction made significant gains in the beliefs of their general self-efficacies compared to only one third of the students who did not receive the arts instruction between the pre and post surveys. More specifically, there was significant growth in the self-efficacy beliefs related to perceived control over their futures and their confidence in overcoming obstacles to achieve their goals for the students who experienced the



arts programming. While the majority of students in the study registered gains on the general self-concept scale, the pre and post surveys showed the students who received the visual arts education did not gain relatively more in their self-concepts than their peers who did receive the visual arts training. Similarly, Luftig's study in 2000 with 615 public elementary school students in Ohio who completed the Culture-Free Self-Esteem Inventory Form A half of whom received arts integrated programming and half did not found no difference in the self-esteem scores between the students who did and did not receive the arts integrated instruction.

In a later study done by Catterall, Dumais, and Hampden-Thompson (2012) with data analyzed from tens of thousands of students gathered from four longitudinal studies, both eighth grade and high school students from low socioeconomic families who had high levels of arts engagement were more likely to aspire to attend college than their similar peers with less arts engagement. Those aspirations were then followed up with action as 71 percent of students from low socioeconomic families who had high levels of arts engagement attended some college after high school, whereas only 48 percent of similar students without the arts engagement did. Breaking that down further, students from low socioeconomic families with high levels of arts engagement were more than twice as likely to attend a four year college (39 percent) compared to their similar peers without arts engagement (17 percent). In addition, students from low socioeconomic families with intensive arts education in high school were three times more likely than their similar peers who lacked those experiences to earn a bachelor's degree.

## Arts Education and Communication Skills

There were several studies with qualitative data on the impacts of arts education on students' communication skills (Catterall & Peppler, 2007; Craig & Paraiso, 2008; Harland et. al., 2000; Ingram & Seashore, 2003; Korn et al., 2010; Lampert, 2011). In Harland and colleagues' 2000 study with 79 secondary students in the United Kingdom who were interviewed multiple times over three years, 75 percent made statements during their interviews that an outcome of their participation in the arts was communication and collaboration with their peers. However, only 22 percent of the students made statements that improved communication skills was an outcome of their participation in the arts. Three years later, Ingram and Seashore (2003) conducted classroom observations at 45 Minneapolis public schools over a three year period with 77 percent of the teachers at those schools integrating arts in their curriculums. The qualitative data showed that integrated arts instruction in non-art subject areas improved communication and teamwork within the classrooms between students and students to teachers

Four years after that study, Catterall and Peppler's (2007) study with 179 third grade students in Los Angeles, CA and St. Louis, MO and 103 of them receiving arts education and 76 not, it was observed that students who had arts instruction consistently had more positive communications with their peers and teachers, however, the difference was small between the students who did and did not have art education programming. In the following year Craig and Paraiso's (2008) study with 39 English language learning middle school immigrant students with arts integrated into their

English language classes found that the communication skills of the students improved as they were given opportunities to create and share their artworks with their peers. Lampert (2011) found the same qualitative results with the ten elementary students who participated in an afterschool art program as it was observed that the students steadily increased their ability to communicate their ideas with words and images as the art program went on. Meanwhile a year earlier in 2010, Korn and colleagues found all 418 fifth grades students in the study made gains in their communication skills especially in asking peers for help when they make a mistake as shown on the student questionnaires they all completed. There was no difference in responses between the 209 students who received arts education programming and the 209 who did not. Overall, there is qualitative data showing that arts educations increases communication skills of students but there is not quantitative data to accompany it.

### **Art Education and Attention**

There are three studies that examined the relationship between art education and student's sustained attention (Catterall & Peppler, 2007; Heath & Wolf, 2005; Posner et al., 2008). In Heath and Wolf's 2005 study with four to seven year old students at a public elementary school in Kent, England, the qualitative data showed the students' sustained attention increased from less than ten minutes at the start of the school year to a half an hour a month of the students receiving art education. Two years later, Catterall and Peppler (2007) study with slightly older public elementary students aged nine and ten in Los Angeles, CA and St. Louis, MO found that the 103 students who received arts classes had sustained attention 15-30 percent more of the

time in their non-art classroom than their 76 peers who did not have art classes. This finding suggests that there is a modest case for transfer of increased sustained attention from the art classroom to non-art classrooms. A year later in 2008 Posner and colleagues did a study with two to seven year old children on how training in the arts can influence other cognitive processes. They found that for children with an interest and ability in the arts, art training did also train their attentions which resulted in improved cognition as evidenced in their intelligence test scores. This finding suggests art education only improves the sustained attention for children with an interest in the arts. Overall, there is a small amount of evidence that art education can improve student's ability to sustain their attention.

### **Art Education and Student Participation**

In order for students to be engaged and participate in school they first have to be there. Two studies analyzed the relationship between arts education and student attendance rates (Brouillette et al., 2014; Sharp & Tiegs, 2018). In Texas in 2018, Sharp and Tiegs examined the attendance rates for four years (2012-2016) of third, fourth, and fifth grade students in 54 public elementary schools with fine arts programming and 135 public elementary schools not receiving fine arts programming. For the 2012-2013 school year, the data showed the attendance rates for the public schools receiving arts programming was slightly significantly higher than the public schools not receiving such programming. However, for that same year the data showed the attendance rates for specifically rural public schools with arts programming were significantly higher than the rural public schools without arts instruction. Then for 2014-2015 and 2015-2016 school

years there was no statistical difference in attendance rates between the schools receiving and not receiving fine arts programming. Overall, the data analysis found no predictable pattern of relationship between attendance rates of elementary schools receiving fine arts programming and those not.

In San Diego, California, four years earlier Brouillette and colleagues examined the daily attendance rates of students at five urban elementary schools that all received arts education programming. They found that student attendance was .65 percentage points higher on days where students had art lessons than on days they did not. When this percentage point is applied to the existing attendance rate at these schools the increase of .65 is a ten percent reduction in absences on the days students had art lessons. In addition to the attendance rates, the qualitative data gathered through teacher interviews and surveys found that the arts were linked to increased student participation in art and non-art classrooms. Additionally, over 90 percent of the teachers believed the art education instruction was beneficial to their students as evidenced in the students' increased participation and improved behavior in class.

Outside of attendance rates, Kinney and Forsythe (2005) did a study in Ohio with fourth grade students at four elementary schools with two of those receiving arts education and two not. They found that there was lower staff and student turnover rates at the schools with comprehensive arts curriculum than those that did not. This finding suggests that the arts contributes to teacher and student engagement both in and out of the art classroom. Five years prior to that study, Burton and colleagues (2000) conducted a study with all the teachers and principals at seven elementary

schools and four middle schools in New York, Connecticut, South Carolina, and Illinois who all completed the *School Level Environment Questionnaire* that measured the perceptions of eight school dimensions: affiliation, student support, professional interest, achievement orientation, formalization, centralization, innovativeness, and resource adequacy. In analyzing the questionnaire scores, there was a positive correlation between the years of arts programming and the school dimensions of: affiliation, student support, professional interest, innovativeness, and resource adequacy. However, there was negative correlations between the years of arts programming and the school dimensions of: achievement orientation, formalization, and centralization. These findings suggests that arts programming may support the engagement and participation components of school. The teachers also completed the *Classroom Teacher Arts Inventory* survey that provided data on their integration of the arts in their classrooms, collaboration with other art providers, use of arts as a tool to teach other subjects, and perceived arts teaching self-concept. The results of this survey showed classroom teachers who integrated the arts and collaborated with other arts providers were more likely to have good relationships with their students which increased engagement and participation.

Catterall and colleagues looked at students' participation outside of the classroom in extracurricular activities. Their 2012 analysis of student data collected from four national longitudinal surveys found that students from low socioeconomic families with a high level of arts engagements were twice as likely as their similar peers with low arts engagement to participate in extracurricular activities during their senior

year of high school. Overall the evidence is weak and does not seem to show arts programming increasing student attendance by much, however, the qualitative data collected from teachers seems to suggest that arts education does increase engagement and participation in art and non-art classrooms.

### **Art Education and Civic Engagement**

In Catterall and colleagues' 2012 study just previously presented, the data showed that students from low socioeconomic families with high levels of arts engagement participated in student government and school service clubs at four times the rate of their similar peers who did not have those art experiences. In addition, the twenty six year old adults from low socioeconomic families with high arts engagement in high school were more likely to vote (45 percent) compared to their similar peers who lacked those experiences (31 percent). Twelve years prior to this study, Harland and colleagues' (2000) completed a three year qualitative study with 79 secondary students in the United Kingdom over the course of 219 student interviews there were 57 statements that an outcome of their participation in the arts was greater awareness of social, moral, and real-life issues. Related, there were 80 statements that an outcome of their participation in the arts increased their understanding of other people and their different perspectives including 31 references to empathy, 28 to understanding others' feelings, and 18 to the appreciation of others. Similarly, Huye did a study in 2015 with 12 undergraduate nursing students who had arts integrated into their nutrition course. Huye found the arts helped students connect with nutrition related social issues such as poverty and food scarcity as shown through their survey responses at the end of the

course. These three studies offer some evidence that participation in the arts increases awareness of others and civic engagement.

## **CHAPTER III: DISCUSSION AND SUMMARY**

### **Summary of Literature**

In total, thirty three published, peer-reviewed empirical research studies on art education and its impact on students were used in this literature review. The findings from the studies were analyzed and synthesized into five categories that art education impacts which are: critical thinking, creativity, problem solving, achievement in core subjects, personal development, and civic engagement. The results of these studies are summarized below.

#### **Art Education and Critical Thinking**

Elementary students who visited art museums showed an increase in their critical thinking skills using the critical thinking measurement rubric developed by Housen in 2002 (Adams, Foutz, Luke, & Stein, 2006; Bowen, 2013). Outside of art museums, after school art programming showed an increase in elementary students' critical thinking skills as well (Lampert, 2011). Also, elementary students who received in-school art instruction along with teaching on metacognition showed higher levels of critical thinking (Goldberg, 2005). For high school students who had art integrated into their English class showed evidence of greater critical thinking than their peers who did not (Holdren, 2012). Undergraduate students who had art instruction as part of their coursework showed increased critical thinking skills (Huye 2015, Lampert 2006). In



addition, art education with kindergarten through undergraduate students has shown to positively impact critical thinking skills that can be transferred across context and content (Holdren, 2012; Housen, 2002; Huye, 2015).

### **Art Education and Creativity**

Creativity was found to be declining among Americans of all ages since 1990 and particularly significant in kindergarten through third grade students (Kim, 2011). Four studies using the *Torrance Test of Creative Thinking – figural* found that students who received art education increased their creative thinking especially in the components of elaboration and originality (Burton, Horowitz, & Abeles, 2000; Catterall & Peppler, 2007; Liu, 2007; Luftig, 2000; Schlegel et al., 2014). Students from families with higher socioeconomic statuses had greater creative thinking than their peers from families with lower socioeconomic statuses according to Liu's 2007 study. Four other studies found that while artistic creativity increased after receiving art education that creativity did not transfer across domains (Chan & Zhao, 2010; Han & Marvin, 2002; Heath & Wolf, 2000; Rostan, 2010).

### **Art Education and Problem Solving**

Elementary students through graduate students showed slightly increased problem solving skills after receiving art education particularly with the component of flexibility (Chishti & Jehangir, 2014; Holdren, 2012; Korn, et al., 2010; Lampert, 2011; Liem, Martin, Anderson, & Gibson, 2014; Naghshineh, et al., 2008; Rostan, 2010). However, problem solving strategies for math did not increase after art education (Korn, et al., 2010; Rostan, 2010). A retrospective study found that adults who received art

education in their elementary years had greater problem solving skills as adults than their peers (Chishnti & Jehangir, 2014).

### **Art Education and Achievement in Core Subjects**

Five studies found elementary through high school students who received arts instruction scored slightly higher on literacy tests than their peers with more significant results for students from low socioeconomic families (Catterall, Dumias, & Hampden-Thompson, 2012; Heath & Wolf, 2005; Housen, 2002; Ingram & Seashore, 2003; Winner 2000). Four other studies with students of the same age demographic found no significant differences in the literacy test scores of students who received arts education when compared their peers (Kinney & Forsythe, 2005; Luftig, 2000; Sharp & Tiegs, 2018; Wandell, 2008). Two studies with elementary English language learners found opposite results, Craig and Paraiso (2008) found art education to increase literacy test scores while Brouillette, Childress-Evan, and Farkas (2014) did not.

Six studies found elementary through high school students who received art education scored slightly higher on math tests than their peers with more significant results for students from low socioeconomic families (Catterall et al., 2012; Ingram & Seashore, 2003; Kinney & Forsythe, 2005; Liem et al., 2014; Vaughn & Winner, 2000; Wandell et al., 2008). Three other studies with students of the same age demographic found opposite results, student who received art education scored lower than their peers on math tests (Korn, et al., 2010; Luftig, 2000; Sharp & Tiegs, 2018). Meanwhile, Harland and colleagues' 2000 study found no difference in math scores between high school students who did and did not receive arts education.

Three studies found elementary through high school students who received art education scored slightly higher on science exams than their peers with more significant results for students from low socioeconomic families (Catterall et al., 2012; Kinney & Forsythe, 2005; Liem et al., 2014). Harland and colleagues (2005) found opposite results with high school students who received art education scoring lower on their science exams than their peers. Meanwhile, Sharp and Tiegs (2018) found no difference in science test scores for elementary students who received and did not receive art education. Eminent scientists have been found to have more arts and crafts avocations than typical scientists or the general public (Root-Bernstein et al., 2008).

### **Art Education and Personal Development**

Five studies found elementary through high school students who received art education increased their self-confidence and self-esteem over their peers who did not receive the arts instruction (Burton et al., 2000; Craig & Paraiso, 2008; Harland et al., 2000; Korn et al., 2010; Liu, 2007). Two studies with the same age demographic found no difference in the self-confidence and self-esteem of students who did and did not receive art education (Catterall & Peppler, 2007; Luftig, 2000). Students from low socioeconomic families who had high involvement in art education were shown to be more likely to aspire to go to college, attend college, and obtain a bachelor's degree than their peers of similar socioeconomic status who were not involved in art education (Catterall et al., 2012).

Qualitative data shows that students who receive art education increase their communication skills over their peers (Catterall & Peppler, 2007; Craig & Paraiso, 2008;

Harland et al., 2000; Ingram & Seashore, 2003; Korn et al., 2010; Lampert, 2011). Also, students who received art education slightly increased their ability to sustain their attention particularly for students interested in the arts (Catterall & Peppler, 2007; Heath & Wolf, 2005; Posner et al., 2008). However, attendance rates for elementary students was not shown to be significantly impacted by receiving art education (Brouillette et al., 2014; Sharp & Tiegs, 2018). Meanwhile, teacher and student overall school engagement was higher in schools with art education when compared schools of similar demographics (Burton et al., 2000; Kinney & Forsythe, 2005).

### **Art Education and Civic Engagement**

High school and undergraduate students who received art education were shown to increase their empathy and awareness of social issues (Harland et al., 2000; Huye, 2015). High school student from low socioeconomic families who had art education were more likely to be involved in student government, school service clubs, and volunteer than their peers of similar socioeconomic demographics who did not have art education (Catterall et al., 2012). In addition, adults from low socioeconomic families with high involvement in art education in high school were more likely to vote in political elections (Catterall et al., 2012).

### **Limitations of the Research**

To locate the literature for this thesis, searches of Education Journals, ERIC, Academic Search Premier, JSTOR, and EBSCO MegaFILE were conducted for publications from 2000-2019. An extensive investigation of relevant empirical studies' reference lists was also conducted to locate additional literature. This is was narrowed by only

reviewing published empirical studies from peer-reviewed sources that focused on art education and its effects and impacts that addressed the guiding questions. The key words that were used in these searches included “art education and critical thinking”, “art education and creativity”, “art education and academic achievement”, “art education and skill transfer”, and “learning in the arts and divergent thinking”. An effort was made to focus mainly on studies done in the United States, in public education institutions, and with students in kindergarten through high school. In addition, a balance between qualitative and quantitative and short term and longitudinal studies was strived for. The research was also limited to visual art education or multiple domains of art education that included visual art education.

There were several limitations to the research used in this study. Many of the studies had very small sample sizes and in some cases the researcher was also the art instructor which presents a possible bias. There was also not much consistency in the type assessment tools used and there was a very large range of types of art education used in the studies, in many cases the type of art education was not specified. In addition, many of the studies had multiple uncontrollable variables that could have impacted the results. The large longitudinal studies were based on a very small number of survey questions that relied on self-reporting. Due to the nature of the studies, none were able to show causality in the impact that art education had on the variety of variables.

### **Implications for Future Research**

While the impact of art education on students' test scores in the subjects of literacy, math, and science are somewhat inconclusive, there is stronger evidence of art education impact on students' critical thinking, creativity, and problem solving skills. Further exploration of specific types of art education related to these three important thinking domains would be beneficial to the educational community as they are increasingly important skills students need and indirectly affect performance in the core subjects. In particular, studies with larger sample sizes and more consistent assessment tools used would bring greater validity to the results.

A theme throughout the research was the significant impact that art education had on students from low socioeconomic families across academic, personal, and civic developmental areas. In America where socioeconomic status is often correlated with race and the achievement gap between white students and students of color is large; further research on this could possibly present an avenue to positively impact student achievement for students of color from low socioeconomic families.

Another beneficial area of further research should be the impact of art education on empathy, awareness of social issues, and civic engagement. The few studies with undergraduate and graduate students in the field of medicine who had arts education incorporated into their study had increased empathy and awareness of social issues which potentially improves their interactions with future patients. Further research should be done with younger students to explore if there could possibly be similar results which then could lead to decreased bullying and harassment in schools.

### **Implications for Professional Application**

There are five main ways that this current research professionally applies to my role as a high school art educator. The first is intentionally teaching my students about metacognition and how it relates to all areas of their learning including art. The high school I teach at has incorporated Carol Dweck's approach to teaching metacognition called "Growth Mindset" as part of its strategic plan. So far the positive impact of that in conjunction with art education has only scratched the surface. Students walking into my classroom tend to believe strongly that they are either good at art or bad at it and that greatly affects what they get out of the class. If they think they are good at art and their artwork is not turning out the way they want it to they tend to shut down and give up. If they think they are bad at art they often refuse to try from the start. However, teaching them about the plasticity of their brains and how malleable their brains are to grow and develop new ideas, abilities, and skills helps the students to slowly be more accepting of the learning process whether that be in art or any other subject that they may have preconceived fixed notions of their ability in. Our school's growth mindset motto is "Not there yet" to replace the students' "I can't" statements. I have noticed when I use this for myself in front of students and with students there is a shift in their openness to try, grow, and learn. I want to continue to find more ways of incorporating metacognition into my art classroom.

A second implication of this research is intentionally incorporating the specific components of critical thinking and creativity into the art curriculum. While I talk in generalities about critical thinking and creativity in my classroom, there is a need for me

to break those concepts down for my students. Just the other day I was talking a student about her clay sculpture and asking her to do some critical thinking about what else she should do to it and she asked me, “what is critical thinking?” Her response in conjunction with the research shows me that I need to break those two concepts down and guide my students in exploring each component for themselves. I want to assist my students in the critical thinking components of observation, interpretation, evaluation, associations, problem finding and flexible thinking as well as the creativity components of fluency, originality, elaboration, and persistence. Doing so will not only strengthen my students’ understanding of those concepts but also strengthen their skills to use them.

The third avenue for applying the research to my teaching is to strive for more cross subject collaborations in order to allow and help students to use art as a way for them to demonstrate their comprehension and analysis of a variety of contents such as English, science, or foreign language. This can be particularly helpful for students who struggle in a content area. I had an art student who had difficulties reading and writing, her English teacher allowed her to do an artwork to illustrate a theme from the book she had to read. She did and her English teacher shared with them that her work demonstrated much deeper analysis of the theme than most of her students who wrote papers. I want to intentionally encourage more cross subject collaboration with art to help students’ critical thinking, creativity, and problem solving across contexts and contents.

The fourth implication that the research has for me is to advocate for my students to not lose out on their art education due to low performance in the core



subject areas. I have often observed students, particularly in elementary and middle school, who are struggling in their core subjects taken out of their art classes in order to have more remedial time in those core subjects. While I'm not against remedial time, the research seems to point to the lack of art education being detrimental to students' short and long term learning and development in a variety of ways especially if that student is interested in art. Many times students who are struggling in multiple core subjects have extenuating circumstances influencing them such as coming from families of low socioeconomic status. The research repeatedly showed that students from those type of families more greatly benefited from art education. I want to be an advocate for all students to receive the opportunity for art education.

The fifth and final application of the research is to try and take my students on field trips to art museums. The art department I am a part of discontinued such field trips several years ago stating they are not worth the work and students aren't interested. However, I know other schools in my district still do take students to local art museums and the research shows that students' critical thinking is positively impacted but such experiences. On top of that, most students have little to no experiences going to art museums and exposure to them could possibly lead to more social engagement in the arts beyond high school.

### **Conclusion**

The current research shows compelling evidence that art education does positively impact critical thinking, creativity, and problem solving skills. There is inconclusive evidence whether art education positively impacts student performance in

math, science, or English however there doesn't seem to be strong evidence that it negatively impacts it. In addition there is some research that shows art education positively impacts students' self-confidence, empathy, and civic engagement. There is also evidence that shows students from low socioeconomic families are more positively impacted by art education than students from high socioeconomic families. All of the research points to art education enhancing the academic and personal development of students of all ages.

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