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The Benefits of Creative Abilities in Education for 21st Century Learners

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THE BENEFITS OF CREATIVE ABILITIES IN EDUCATION FOR 21ST CENTURY LEARNERS

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Abstract

Creativity is defined as the use of imagination or original ideas, especially in the production of an artistic work. Creative abilities, while less defined, include abilities such as independent or divergent thinking, problem solving, curiosity, adaptability and self-awareness. Creativity has long been seen in education and learning as a skill linked to artistic endeavors. However, moving beyond this link, researchers have begun to pursue creativity's role in academics outside of artistic content. It is this link and a lack of realization of the importance creativity plays in the overall success of students that calls to be looked at closely. This review of literature observes creativity through the lenses of creativity traditions and implications in education, the development and fostering of creativity and the correlations between creativity and academic achievement, with the aim of viewing the benefits of the relationship between creativity, creative abilities and education.

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CHAPTER I: INTRODUCTION

Context of Research in Creative Abilities

In education there are numerous benchmarks and standards set for students to reach and surpass. Data pushes teachers and students alike towards higher test scores and minimizing achievement gaps. What can often be left at the wayside of these goals are the "softer" skillsets of creativity, a set so vast that it is sometimes questioned if one could even teach such skills. Yet, one that is so complex and vital to higher-level thinking that when fully realized can become a basic to any 21st century education. These basics include the ability to allocate resources; to work successfully with others; to find, analyze, and communicate information; to operate increasingly complex systems of seemingly unrelated parts; and, finally, to use technology (Eisner, 2002). There is an unparalleled opportunity to teach these higher-level basics that are increasingly critical, not only to tomorrow's work force, but also today's (Eisner, 2002).

Prior to 1940, little research was conducted in the area of creativity (Strange, 1940). It was in the years following, leading to the present, that research about creativity and it's relationship to education began to emerge. New philosophies were adopted that impacted the view on creative abilities, factors of creative abilities, measurements and proposed outcomes and benefits of such creative abilities. In regards to student learning, it was found that in addition to the teaching of creative abilities being a complex and interwoven experience, the greatest growth in creativity came when students were in a free and permissive situation drawing upon their own experiences (Michael, 1959). Research began to evolve with the formation of the National Art Education Association (NAEA) in 1949. An increasing amount of the research published was now conducted by

art educators who were products of the rapidly expanding number of doctoral programs in the United States (Hutchins, 2001). Unfortunately, this rise in research regarding creative abilities and art education began to decline in the 1970s. This decline has continued into the 21st century, with fewer research articles related to creativity and education published during the last 40 years than were published between the years spanning 1940 to 1960 (Bastos, 2015). This decline can also be seen in legislations and standards, highlighting the manner of thinking which places a lower importance on creativity and creative abilities. Due to this decline, the pool of research to draw upon when researching the possible benefits of creativity in education is limited.

When the standards movement emerged with the 1994 passage of the Goals 2000: Educate America Act, Title II of that act established a National Education Standards and Improvement Council. The council was charged with finding appropriate organizations to write standards (NCCAS, 2014). While the arts enjoyed recognition in the core subjects as defined by legislation, No Child Left Behind (NCLB) still had a subset of core subjects that received greater attention in the implementation of police (Bastos, 2015). This left little attention on teaching creativity in the classroom. As student access to arts education and quality of such instruction in the nation's public schools began to be of concern to policymakers, educators, and families (Coopersmith, 2012), national arts standards and data research was created and implemented.

Today, in addition to state standards, the National Core Arts Standards acts as a guide for educators in the skills and outcomes hoped to arise from and around art education. Creative abilities included in these national standards include analyzing, interpreting, conveying meaning, perceiving, evaluating, synthesizing, relating, refining,

creating, generating and conceptualizing. These abilities are not only recognized as being teachable but as abilities that equally convey standards reflecting a 21st-century economy and education environment.

Definition of Terms

In discussing the benefits of creative abilities within education, the following terms create a dynamic foundation in which to view the growing and evolving relationship of creativity and education. Within this review, creativity will be defined as the use of imagination or original ideas as related to problem solving or idea generation. This is in opposition to the usual definition of the creation of a work of art. As the list of creative abilities could continue for several pages, the abilities to be focused on will be the use of divergent thinking, problem solving, curiosity, adaptability and self-awareness.

Education will be defined as education taking place in mainstream classrooms within the range of primary or secondary education. Education will not be used as it relates to informal instruction or instruction gleaned from a family member or home school environment. For the purposes of this paper, the term education will be in regards to formal education practices only.

Academic Achievement will be in relation to student success as measured by GPA, Assessments and formalized testing. It will also include the idea of student engagement and involvement with their own academic process as well as their overall success in projects and assignments. Academic Achievement will also be in relation to language acquisition of English Language Learners as monitored by school standards and WIDA.

A student's self-efficacy is in connection to a student's inherent believe in their abilities due to the image they have built within their own understanding of self. This sense of self is built upon previous failures and successes and the belief that previous success or failure are indicators of what will happen in future endeavors.

21st century learners will be defined as those students currently receiving formal primary or secondary education with an emphasis on critical thinking and problem-solving, collaboration, adaptability, grit, resilience, empathy and global stewardship, vision, self-regulation, belief, curiosity, imagination, initiative and entrepreneurialism. The 21st century learner is a student who masters content while using higher level thinking skills over memorization and dictation.

Higher level thinking skills will be defined as learned skills, which are able to be easily utilized and implemented outside of the environment in which they were taught. Such skills include analyzing, synthesizing, evaluating, creating and applying. Higher level thinking skills are often connected with Bloom's Taxonomy in which remembering is the lowest point and creating, evaluating and analyzing are at the highest.

It is from the relationship of the first three terms of creativity, creative abilities and education that the following terms of academic achievement, self-efficacy, and higher level thinking skills find their co-dependent nature, one which allows for growth, change and adaptation to the benefit of the 21st century learner.

Rationale

The reason for my research is to enable myself and other educators to improve upon our current understanding of the role of creativity and creative abilities in education. I feel that this is an area of education that is often left under utilized outside of the

framework of arts education. My personal philosophy of education is to create in students a desire to learn that extends beyond the classroom, to foster in them the beginning seeds of life long learners with the ability to adapt and grow in a changing technological society. It is in the classroom that students will encounter much of their first experiences with education and learning. Because of this, it is the educator's responsibility to create environments that foster, not just the learning of facts, but the learning and acquisition of skills and abilities to aid their students down the road. I feel that it is the responsibility of all educators, not merely arts educators, to instruct students in their acquisition and understanding of creativity, creative abilities and how to implement such skills to the betterment of their educational experience and success.

Guiding Questions

In looking at creativity and its role in education, I chose to review and answer the following question: What benefits could arise for 21st Century Learners by adopting a more prominent role for creative abilities in education?

In order to examine my guiding questions, I began to survey research related to creativity and education, creativity and success, creativity and intelligence and the role of creativity in classroom settings. My hope for educators is for them to gain a better understanding and insight into the important role creativity and creative abilities can play in the success of their 21st century learners, learners with skills such as collaboration, digital literacy, critical thinking and problem solving. Within the following literature review are a number of resources and examples of how educators and researches implemented strategies, procedures and assessments aimed at creating environments for developing and fostering creativity in their learners.

CHAPTER II: LITERATURE REVIEW

Research Strategies

In searching for relevant studies for this thesis, publications from 1965 – 2017 were considered through searches conducted on Educator's Reference Complete, Education Journals, ERIC, ECO, EBSCO and JSTOR. For the purpose of the search, the following search phrases were used: *teaching creativity, creativity and academic achievement, creativity in students, education and creativity, creativity development* and *creative abilities*. This review focuses primarily on creativity as it benefits education and learning as opposed to creativity as abilities to be learned. The structure of this chapter is to review the literature on creativity first through creativity traditions and implications in education, then the development and fostering of creativity and finally the correlations among creativity and academic achievement. The guiding question underwent three revisions, broadening the question in order to allow for more original research to be reviewed.

Arts Education, Creativity and Education

The Center for the Learning and Teaching of Elementary Subjects partenered with the Institute for Research on Teaching to implement and compare five studies of teachers in elementary art and music education, conducted over a five-year period. This study was done simultaneously to the later mentioned study of two selected teachers. Of particular interest in this research was the improvement of teaching these subjects to enhance students' depth of understanding and meaningful applications in everyday life (May & Center for the Learning and Teaching of Elementary Subjects, 1993a). The study examined several art and music teachers and their approach and theories in their

development and mediation of curriculum as they planned, taught, reflected, collaborated and engaged in formal and informal conversations and interviews with researchers (May & CLTES, 1993a). Five different classrooms were observed and documented. Data was then collected and compared between all five arts classrooms, with there being a mix of art and music.

The findings in the Center studies compared the observations of the five teachers as well as previous data from the center, literature review of similar studies and came to the following conclusions. There is no one orientation that is alone sufficient for developing a coherent defensible program in teacher education because no one orientation adequately describes or explains the complexity of teaching and all that one needs to know (May & CLTES, 1993a). The limit of this study is found in the qualitative nature of the study. Without measuring the teachings against the student's academic achievement or creativity, it becomes difficult to assess which practice and orientation could be the proper manner of instruction within creative content such as music and art. The benefit of this study is that it offers insight into the complexities of best practices concerning arts education and creativity in education. The study does suggest that these are serious gaps in research and points out areas that hold a rich possibility for change (May & CLTES, 1993a).

In 1993, May's simultaneous case studies were published regarding the expert teaching of three separate Art Program Teachers, two music and one visual arts. The three studies were based on weekly observations of each teacher teaching at least two different classes or grade levels over a semester (May & CLTES, 1993b). In addition to observations of the three teachers, other classes and grade levels were observed as

comparisons. Research included audiotaped lessons, transcriptions, photo documentation, teacher interviews, observations, student interviews, teacher documents, lesson plans, curriculum and student work. The focus of the study was to pinpoint and define exemplary practices within teaching in the Arts. Formal data collection began near the opening of schools in the fall of 1989 (May& CLTES, 1993b). Grades observed included first through twelfth grade.

The overall data of these case studies sought to find a common thread and practices within expert teaching of these two creative fields. The key identified features included: the curriculum balanced breadth with depth by addressing limited content but developing this content sufficiently to foster conceptual understanding; the content is organized around a limited number of powerful ideas, basic understandings, or principles; teaching emphasizes the relationships or connections between these ideas; students have regular opportunities to actively process and synthesize information and construct meaning, and higher order thinking skills are not taught as separate skills but are developed in the process of teaching specific subject areas within contexts that encourage students to relate what they are learning to their everyday lives, by thinking creatively and critically about this knowledge, or by using knowledge to solve problems and make decisions (May & CLTES, 1993b). The limit of these case studies was the qualitative approach over the quantitative approach regarding the outcomes of the identified teaching features. A beneficial future study would be to build off of these three case studies, collecting data of the benefits on student academic achievement and growth when these features are implemented within a classroom. The final collection of features was

however, a perceptive look into what it takes to teach in a creative content area, and insight into developing more than mere understanding of skills and base knowledge.

A 2012-13 study examined a professional development program that equipped early elementary teachers in five urban California schools with arts-based strategies to promote the oral English development of ELs (Greenfader, Mulker & Liane, 2017). Catterall (2009) has argued that arts education in general enhances performance in non-arts academic content areas, such as literacy and mathematics. The program was titled the *Teaching Artist Project* (TAP) and consisted of two years of 28 weekly, 50-minute drama and dance lessons for K-2 teachers. The drama lessons emphasized speaking skills, while the dance lessons focusing on listening and vocabulary. Both the creative drama and the dance lessons were created with clear objectives of pairing movement, gesture, and expression with language or thematic content (Greenfader et al., 2017).

The participants were made up of 3,792 K-2 Hispanic English Language Students from five randomly selected Title I schools within a large school district in California. The study aimed to answer the following questions: Does pairing creative drama and dance activities with Language arts instruction boost the speaking abilities of K-2 Hispanic ELs? Are there any patterns of differential impacts that emerge for K-2 Hispanic Els? For two years, the weekly lessons were incorporated around the weekly curriculum. All lesson consisted of warm-ups, modeling/guided practice, and debriefing/evaluation (Greenfader et al., 2017). And, while only the selected EL students were a part of the study, all students participated in the TAP program from the first day of school.

Data on student oral language ability was collected through the California English Language Development Test (CELDT). School-district demographic data was also included in the final analysis. The results offered evidence of a positive relation between the TAP program and the English-speaking skills of the participating EL students. Specifically the findings from their regression models indicated that the K-2 Hispanic ELs in their sample who participated in TAP showed improvements in their speaking abilities in comparison with those who did not participate in TAP (Greenfader et al., 2017). This study shows a high correlation between implementation of arts curriculum to the academic achievement of ELs. However, the study was limited in the scope of EL students participating as well as the inclusion of data from equivalent EL intervention programs (Greenfader et al., 2017).

A participant observation study was set up to address the problems related to preconceptions about art and art education, suggest solutions, and explore a major metaphor of art education as creative tension (Stokrocki, 1992). The purpose of the study was to explore the problems and suggested solutions surrounding art education. Twenty participants were selected from a university course entitled "Art in the Elementary School," taught by Mary Stokrocki. The participants, while pursuing elementary educator degrees, all had diverse reasons for taking the course, 45% were taking it to help with their teaching abilities, art experience, only 50% had any prior art experience, and work backgrounds. Participant observation consisted of data collection, analysis, and interpretation of pre and post questionnaires, pre and post drawings, letters of complaint, informal interviews, and class discussions (Stokrocki, 1992). An interesting side observation throughout the study was that not all students in the group regarded art

seriously, to the point of even arguing over the expectations of the course they had enrolled in. The students had their own ideas and stereotypes about art. Stokrocki expresses in her notes that overcoming stereotypic ideas and icons in art continues to be the hardest part of her teaching.

The data collected by Stokrocki showed that by the end of the study 75% of the participants had changed their stereotypic images of art, 66% had changed their attitude toward art, 50% stated they better understood the hard work element of art, and 75 % found that being immersed in different types of art was a successful art activity (Stokrocki, 1992). The limits the study lay in the small sample size. If the findings are to be generally accepted and used to increase art education understanding and issues, future studies would need to draw from a larger sample. The data drawn in the study did however allow for a better understanding of current stereotypes and issues that non art educators can have towards art education as well as some ideas for addressing them. The first involves creative tension between students and their media, between teacher and student expectations, and between professional demands (Stokrocki, 1992).

Teaching Creative Abilities

Creativity is a result of cognitive development wherein individuals gain knowledge and the capability to logically think and organize information (Hirschman, 1980). In a longitudinal study, an undergraduate-level creative problem-solving class is designed and implemented to enhance students' creative problem-solving skills, and to test both short-term and long-term effects of creative problem-solving training on students' creativity scores. Forty-five undergraduate students were selected to participate in the study. The researchers state that while there is a growing need for creative

problem solving in the workforce, there are few programs with content designed to teach such a skill. The goal of the study was to be able to move towards the development of content that focused on the development and fostering of creativity in undergraduate education. The course that ran within the study focused on the idea of divergent thinking as developing numerous "correct" answers, in contrast to convergent thinking, which focuses on arriving at a single, correct answer (Im, Hokanson & Johnson, 2015).

This study sought to answer if the creative problem solving in class improved a student's creativity short term and how much would be retained long term. The final data did show a positive relationship between creative problem-solving training and long-term creative benefits. The limit of such a study is in the narrow selection of the students. In future studies, a sample selection of a variety of majors and interests would prove more global in the scope of results. This study is however, a response to the call for a need to develop creativity training that can increase measurable creativity and raise the creative problem-solving capabilities of the future workforce (Im, Hokanson & Johnson, 2015).

Although a handful of studies have examined the relationship between creativity and personality, or between creativity and cognitive style, few have assessed creativity, creative personality, and learning preferences simultaneously (Tsai, 2014). A study conducted in Taiwan explored the relationship between creativity, creative personality, and learning styles by employing creativity tests and self-reporting systems. The study included forty-five children, 24 in grade six and twenty-one in grade five. All of the participants were selected from one selected elementary school in Taipei, Taiwan, and was conducted during the second semester of the 2013-2014 school year. The students

were first given two divergent thinking assessments, followed by the Index of Learning Styles (ILS), a 44-question assessment to gage different learning styles.

The major finding of this research was that creative personality is positively related to creativity (Tsai, 2014). The data suggested that students with higher creative personalities would have a higher tendency towards having an intuitive learning or global learning style. The only consistent predictor of creative personality was found to be those who had a sensing-intuitive dimension on their ILS. The main limitation of this study was the small size of participants. In order to further understand the relationships among learning styles, creative personality, and creativity, larger sample sizes would be needed as well as a wider time frame of observation. The study did show that it can be speculated that some learning styles might play a partial role in affecting creative personality, which in turn may influence creative performances (Tsai, 2014).

While the study by Wai, Lubinski, and Benbow (2005) showed a positive relationship between intelligence and creativity, there are other studies where such a positive finding is not the case. Creativity is more connected to competencies, which are not intelligence but a wider array. Such a case would then imply that if creativity is not solely related to intelligence then it can be taught through instruction. Feyzullah Sahin, an assistant professor in Duzce, Turkey published his work on the relationships between creativity and other educational competencies. His main research interest includes assessment of giftedness, gifted teacher education, mentoring, emotional intelligence of giftedness and creativity (Sahin, 2016).

The study included 178 intellectually gifted high school students, attending high school within the 2014-2015 school year. The scale Sahin used was adapted from

Kaufman's domains of creativity scale (KDOCS). The domains were creativity, mechanic/scientific, artistic performance and self/everyday, art domain, and total scale (Sahin, 2016). Scores from the KDOCS as well as two separate pieces of information obtained through the school administration acted as the basis for the study's data and findings. The relationships between the subdomains of creativity and general intelligence, emotional intelligence and academic achievement were analyzed with the following results: Modest correlations between creativity and the science course score, positive correlations between mechanical/scientific creativity and the mathematics and science score, positive correlations between performance creativity and sociability, and a positive correlation between art and sociability.

The findings obtained from the study may be classified into two subtitles. The first is the relationship, which emerged specifically to definite creativity domains and the second one is the creativity domain, which is associated with more than one variant (Sahin, 2015). It is important to note that while many positive correlations appeared between creativity and other scholarly competencies, grade point was not one of these competencies. The main limit in this study is the narrow area of student aptitude in selection of participants. Future studies could benefit from a larger pool of participants. When the findings of the study mentioned above are considered in general, it can be said that the creativity responses of the individual occur, dependent on some competences, which may be classified under cognitive and extra cognitive processes and a series of interactions that are non–linear on every occasion (Sternberg & Lubart, 1991).

Felicia, one of six children observed intensively in a longitudinal study conducted at the James Jackson Putnam Children's Center (JJPCC), was selected for a published

study because she possessed not only superior intelligence but also demonstrated unusual artistic ability at a very early age (Brown, 1970). The longitudinal studies at JJPCC focused on the personality development of a normal child, and have been conducted for many years. The study included psychoanalysts, psychologists, pediatricians and nursery school teachers, most of whom had had experience in other longitudinal studies and all of whom had had extensive clinical experience with emotionally disturbed preschool children and their families (Brown, 1970). Felicia, like the other participants, was the firstborn child of a professional family and was above average in intelligence. Observations began throughout their postpartum hospital stay.

The results of this longitudinal study did pose some issues as the data was analyzed. It was found to be difficult to separate behavior patterns that were specific precursors to her creativity due to her intelligence, creativity and emotional maturity. However, the characteristics that were drawn from comparing Felicia's study to the other simultaneous studies were a capacity for depth and focus of attention, unusual visual awareness, inner-directedness, good fine motor coordination, humor, an openness of perception, high strength of self image and a tendency toward unconventional responses, unreal percepts and fanciful and imaginative treatment of ink blots (Brown, 1970). While the study is limited due to having only one participate, the characteristics identified as being present when studying creativity in young children offer an opportunity to view creativity as a whole with the same lens, as well as future opportunities for research in these characteristics in older children in formal education.

Exploring the Structure of Creative Potential and Development

Using the Evaluation of Potential Creativity (EPoC), 482 children and adolescents were assessed to better outline the multidimensional and hierarchical structure of creative potential and the need to measure it with comprehensive test batteries sampling a range of creative tasks, domains, and creative thinking-modes (Barbot, Besançon & Lubart, 2016). The EPoC is a holistic measure of creative potential involving multiple convergent and divergent thinking tasks. Participants were French children and adolescents from Paris and Lyon public schools. Students participated in two sessions of 45 minutes in which four tasks were presented. The two sessions occurred at two-week intervals and each task was either connected to a domain specific factor of a thinking-process specific factor.

Specifically the final data analysis was used to explore the structure of creative potential as operationalized and measured with EPoC and provided evidence for the contribution of five sources of influence in creative potential: general creative thinking-process, specific thinking-process, domain specific skills, task specific skills and measurement error (Barbot et al., 2016). In sum, the results suggested that as creative potential tasks vary so does the effective use of creative processes. For example a highly domain related skill would not require as high of a specific creative thinking process than one more closely related to a creative skill (Barbot et al., 2016). Overall the study shed light on the relationships between creativity potential and the opportunities afforded to students. To improve construct representation, future studies should attempt to include additional indicator variables (Babot, 2016).

In relation to artistic potential is artistic development, which was examined through cognitive process models of creativity within an investigation of artistic development (Rostan, 1997). The study included sixty children between grades Kindergarten and Grade 5. All participants were enrolled in a private after school art program and attended schools within the local suburban New York public school system. The after school program offered families individualized instruction for their children once a week in small groups for one and a half hour sessions. The children were videotaped, with parent permission, while solving artistic and puzzle-like activities. Susan Rostan implemented this study in her sessions at the after school art program to better understand the components of creativity. These included motivation, knowledge, problem finding, ideation, evaluation, age, and context (Rostan, 1997).

The study implemented several measures and tasks meant to collect data relating to age, problem solving, evaluation abilities, ideation and general knowledge of mediums. The data revealed a significant correlation between age and the amount of time spent choosing and manipulating life-drawing objects (Rostan, 1997). Equally, there was a high correlation between time spent drawing that the higher assessments of repleteness, composition and novelty in the final work, as well as choice based free drawing with student motivation. The data found in Rostan's study offers insight to a child's creativity, motivation, problem finding, ideation and evaluation skills, offering links and significant relations between the given areas. What her study does not offer is if the motivations, age correlations and problem finding abilities are those that could be transferred over as opportunities for education and educational interventions (Rostan, 1997).

Identification and Organization of Creativity

When studying the physiology of higher mental functions, it is not only desirable but necessary to apply psychological methods, including existing psychological tests and theoretical considerations (Starchenko, Vorob'ev, Klyucharev, Bekhtereva & Medvedev, 2000). With creativity being interacted with in education circles as a high mental function, it becomes beneficial to then investigate creativity through psychological methods. This study assessed a sample group of thirty volunteers to explore principal cognitive strategies of performing creative tasks as well as the validity for the use of such studies in the psychophysiological investigation of creative work (Starchenko et al., 2000). Researchers used sets of sixteen words to serve as stimuli for the participant to use to create a mental story, a connected narrative and memorization practices. Making a story out of the given combination of words is a sufficiently difficult task; its performance requires the involvement of creative way of thinking (Starchenko et al., 2000).

Results were categorized into insight strategy, normal strategy, change of strategy, mechanical memorizing, attempts to establish association, and change in memorizing strategy (Starchenko et al., 2000). Collected data showed a high use of cognitive strategies in order to perform creative tasks, showing that creativity is ordered in a similar manner to other higher level thinking skills, such as learned strategies and techniques. Empirical substantiation of the proposed test showed its validity for the use in the psychophysiological investigation of creative work (Starchenko et al., 2000). A following study could easily step off of these findings by looking into the psychological

development of creative work and what variables influence best when learning to create and develop create work.

In March 1991, *Interacting for Quality Learning: A Gifted Education Strategic Plan for the 1990's* was published under the direction of the Task Force for Effectiveness of Programs for Gifted Children (Ohio, 1992). The goal was to appropriate funds to establish research and demonstrate projects for the development of gifted education programs in a handful of areas, including identifying creative thinking ability in students (Ohio, 1992). The project moved forward with the belief that to better educate creatively gifted children, there first must be a process in place to identify their needs. The student identification process included research-based activities, standardized and performance-based assessment, and multiple resources and forms (Ohio, 1992). The project with a focus on creativity worked under the direction of Dr. Margaret Morrison and Dr. Rebecca Dungan, both from Ohio schools, as well as a committee of educators of gifted students. Over 10,000 students were included in the project, comprised of students from Upper Arlington School and Hilliard School. Students were identified by four areas including their creative-thinking ability and their grade level being between grades first through twelfth. The final goal was to develop a practical identification process for children who are gifted in creative-thinking ability that links identification criteria with current conceptualizations about the nature of the creative process (Ohio, 1992).

The process included developing a systematic approach to the identification of creative-thinking abilities, reviewing and evaluating assessments, programs and materials, and finally field testing a staff development program designed to increase teacher confidence in the areas of creative thinking and problem solving (Ohio,

1992). With there being a positive relationship between creativity and problem solving already having past research, this study did not focus it's energy on answering this question, but rather on identifying how to make a beneficial link for students between their creativity and problem solving abilities. In addition to the previously mentioned training, observations and assessments, creativity portfolios were created for participants and included student work such as: samples of creative writing, samples of artwork, copies of musical compositions, descriptions and pictures of inventions, description of Science Fair or History Day projects and descriptions of "real life" problems that were solved creatively (Ohio, 1992).

The final data displayed the importance of staff development to fostering creative-thinking in students as well as identified three formats to be utilized to gather data at schools regarding the specific needs of students within those schools. The limit of this study was the limited number of schools included. Because of this, the study can offer only guidelines for similar research at other schools, rather than a definitive listing of the needs of creatively gifted students, with the one exception of identifying the need of creativity focused professional development for educators.

Creative Abilities and Self-Efficacy

In Seoul, Korea, the Ministry of Education began to identify art education as a practical living subject that promotes creative problem solving, integrated knowledge and self-efficacy (Naymyong, 2004). Students with high self-efficacy agree show a belief that they will be able to learn the material in the class, and that they can expect to be able to do well at an activity (Santrock, 2011). Practical arts is a subject that not only promotes learners' better understanding of work in their daily lives, but also enables them

to find ways to solve work-related problems by fostering basic skills and attitudes necessary for performing the work (Ministry of Education, 1993). In the South Korean primary education system, “practical arts” is a required course. In a study conducted surrounding the benefits of this requirement, the data showed a significant difference in creativity sub-areas. These areas included fluency, flexibility, and originality as well as student self-efficacy. For the subjects of this study, two out of seven third grade classes at H Elementary School in the city of Pohang, Kyungsanpook-do, Korea, studying practical arts as required in all Korean elementary schools were chosen as the experimental and comparative classes (Naymyong, 2004).

This study shows the progress of creativity and self-efficacy in the experimental and control groups after the experimental group received problem-solving instruction and the control group received typical instruction (Naymyong, 2004). Educational psychologists increasingly advocate the importance of self-regulated learning (Winne & Nisbett, 2010). Self-regulatory learners are able to set goals for knowledge, sustain motivation, monitor progress, fine tune or revise, and evaluate obstacles (Santrock, 2011). Keifer-Boyd, Trauth, and Wagner-Lawlor (2015) examined a merged art and science curriculum, which engaged not only intellectual skills but also emotional and sympathetic (imaginative) skills. Within the curriculum, students were required to research several different areas related to marine life, waste management and ocean health, evaluate the obstacles of our current situation, fine tune their response and find a common goal to work towards. The final project was a student designed and created mural made from waste commonly found in oceans. The skills the students walked away with were beyond learning the facts or creating a work of art. The role of creativity in this

curriculum was to access new ways of posing problems with others by reframing it, responding, and reframing again (Younging, Dewar & DeGagne, 2009).

A study was published in 2002 which examined the relationships among age, culture, training in the fine arts, the technical and aesthetic properties of drawings, and realized artistic giftedness, the researchers intermixed the juvenile drawings executed by critically acclaimed artists with artworks executed by contemporary North American and Chinese North American children (Rostan, Pariser & Gruber, 2002). The goal of this study was to better understand the role of technical skill in the development of artistic potential. To what extent is creative visual art creative and to what extent is it technical or cultural? One hundred sixty children's drawings were collected alongside of 32 juvenile drawings of now critically acclaimed artists (Rostan et al., 2002). The children were randomly selected and represented both suburbs of New York City, Montreal and Toronto. For the study, each child made two drawings, one from life and one from imagination and were placed with juvenile drawings that matched the age when the drawing was created. There were 26 variables used within the final analyses and judgment of the work.

It was found that the younger ages tend to be more fanciful, with older ages moving closer to learned shapes and forms, even when drawing from imagination. The students employ ways of representing what they see with varying degrees of accuracy, value, and relative aspects of the real objects (Rostan et al., 2002). There was a positive relationship shown between the drawings and a child's culture or technical education. The impact of these on the creativity of the final drawing is consistent in the final analysis of the drawings from both the children and juvenile drawings from current

adults. This shows a great possibility for future research and the impact that other variables could have on creativity, and processes beyond drawing in a child's creative repertoire (Rostan et al., 2002).

Fostering Creativity

The increasing demand for creative individuals in the labor market requires well-prepared professionals, capable of enhancing competitiveness through new ideas and innovative actions (Fabricatore & López, 2013). Educational programs should, therefore, rely on approaches and learning environments that foster creativity (Fabricatore & López, 2013). In Italy, a study was published that took a new viewpoint on how creativity can be fostered and developed in education settings. This study explored the extent to which students perceived that educational game development projects mimicking real-world dynamics recreated contextual conditions appropriate to foster creativity, and whether they associated these conditions with their self-perceived creativity improvement (Fabricatore & López, 2013). Participants included students between the ages of nineteen and thirty-two, with no prior experience in video game development. Participants were given a 33-item questionnaire to gage their perception on the environmental and task characteristics of their learning experience.

The final data showed a high correlation between contextual characteristics and creativity development with 84.2% of the students surveyed believed that there was a development in their creativity, and that it was directly related to the game development program. The main limit of this study was the small size of participants. Because of this, the conclusions cannot be widely generalized. However, the findings suggest that developing video games in an educational context recreates a work climate that supports

creativity (Fabricatore & López, 2013). While the data may not be able to be generalized, it does point out the ability of such programs to enhance the metacognition of one's creative development. Enhancing student creativity in postsecondary educational settings is of paramount importance, because, as a peer of Fabricatore and López, Basadur (2004) pointed out, creative skills are valuable to all industries that need employees capable of thinking creatively, to leverage innovation, foster competitiveness, and adapt to the rapid changes of today's world.

Within the creative cognition framework, the ability to be creative is considered part of normative human cognitive functioning, rather than an out of the ordinary talent available to only a select few (Ward, 2007). This cognitive function is beginning to be seen as a methodology in many education settings, something to learn and teach. Creativity is known today as an ability that can be developed and improved (Doron, 2017). With this, the question must then arise, how can creativity be taught? Could there be a best practices in regards to teaching creativity?

In a recent study conducted by Eyal Doron (2017), 286 school children from ages ten to fourteen participated in an intervention program over a period of ten weeks. The aim of the study was to measure the growth of divergent thinking skills in the student participants. Results showed that children who participated in the program activities scored significantly higher in the creativity tests at the end of the program and indicated that creative thinking, and divergent thinking abilities in particular, can be enhanced through the kind of intervention that was proposed in the study (Doron, 2017).

The intervention program consisted of 90-minute weekly sessions over a ten week period, where students would learn special techniques and prompts towards thinking

creativity, divergent thinking and developing their overall creativity. To examine the contribution of the intervention program to improvement in creativity Doron conducted a mixed designed analysis of variance (ANOVA) in which groups served as the between subject independent variable and time served as the within-subject independent variable (Doron, 2017). In other words, the ANOVA allowed Doron to analyze the differences among the group means and associated procedures. The findings showed a positive relationship between the interventions, specialized instruction in varying creative abilities and techniques, and the student's creativity and divergent thinking. The findings were limited by not having a control condition, in which students participate in an enrichment activity that did not expected to have any effect on their creativity scores (Doron, 2017). The uniqueness of this study is in its approach to specifically teaching creative techniques over offering creative opportunities.

In a study by Flinders University of South Australia, the process of learning to draw is explored through the analysis of thirty-five children's drawings and their process of learning to do so. The study focuses on children born between 1724 and 1900, using biographies, autobiographies, and collections of youthful drawings (Duncum, 1985). The goal of the study was to better understand the creative processes and the development of a child's ability to draw. As work and information was analyzed, accepted strategies for learning to draw were applied to each child's process. Biographies and autobiographies were examined where it was thought likely that the subject had drawn prolifically as a child and where it was found that the subject's child-hood was recorded in some detail (Duncum, 1985).

The results showed cases of the following means of learning a creative process: copying from other pictures, tracing, observing others making images, studying pictures, self-instruction through how-to-draw books, verbal instruction and drawing from life. No cases were found of children copying from peers, parents, or older siblings (Duncum, 1985). The overall data suggest a historical precedent in the movement of drawing abilities. For example, children learn first what others know and then grow within their own creativity and understanding. Thus, the belief that children's drawing today is influenced by popular media seems well founded, not because children are manipulated but because they actively seek to be influenced. The interesting limit of this study is the time frame to which the drawings and journals belonged. This study ends at a point optimal for other studies to begin to study the process of 21st century learners and their growth in the creative process of drawing.

Creativity, IQ and Practical Abilities

Studies of creativity and of psychological disturbances in children have suggested the presence of slumps, which may be correlated with developmental transitions (Torrance & Georgia Univ., 1967). One of the more notable slumps occurs within the fourth grade. Paul Torrance studies this slump through several avenues; his longitudinal studies of creative development will be discussed for further use in this thesis. Spanning the years 1959 to 1964, all children in two selected Minnesota elementary schools were tested using a grouping of tests on creative thinking. A random selection of one hundred students was then chosen from the total number of those tested. To test the significance of the fourth grade slump when studied longitudinally means and standard deviations were

computed for each grade level for fluency, flexibility, and elaboration and the one-way analyses of variances were run among grades (Torrance & Georgia Univ., 1967).

From the data collected Torrance found there to be a drop of approximately one-half standard deviation occurring on each of the four variables between the third and fourth grade. Results also showed that while there is a significant slump for over half of the tested students, there is not a significant increase shown in the remaining half. Through comparison of his research in child development, his data drawn from his longitudinal study and equivalent data from cross cultural studies, Torrance concludes that these discontinuities tend to occur most when children are confronted with stresses and demands or are presented with a stimulating or disruptive influence on development, producing discontinuities in creative development (Torrance & Georgia Univ., 1967).

When questioning the benefits of teaching creative behaviors to primary students, a beneficial manner of judging the longevity of such skills can be found through longitudinal studies. The time spent to build data over years of research is a wait that can produce results that other studies can merely speculate on. In 2005, a twenty yearlong study was published, which had built upon two prior longitudinal studies regarding creativity and occupational accomplishments among youths thirteen to thirty-three (Wai et al., 2005). Assuming that formal education is in place to provide students with the necessary means to succeed after they have completed their formal education years, what better manner to judge the usefulness and success of the skills learned than to see those skills at work outside of a formal education setting?

Wai et al. (2005) conducted their study in multiple phases, phase one consisted of two cohorts. Cohort one included 2,188 participants who, by age 13, secured a score of

370 or above on the SAT-V and was primarily from the state of Maryland (Wai et al., 2005). Cohort two included 778 participants who scored 430 or above on the SAT-V and was drawn from the mid-Atlantic States (Wai et al., 2005). The selected participants were tracked and surveyed at age thirty-three regarding occupation, degrees, income, patents, and professoriate positions. Phase two participants were within the top 1% of intellectual; ability within their age group and were also tracked and followed up with a twenty-year survey. The results of the study showed a positive relation to early SAT assessment placements as factors into individual differences in occupational performance and creative expression (Wai et al., 2005). The top quartile of the participants displayed findings, which pointed towards the track of developing more effective interventions for enhancing the educational experience. Positive findings on above-level assessments and conventional preference inventories in educational settings foreshadowed the emergence of exceptional achievement and creativity in the world of work (Wai et al., 2005). A limitation of this study is that their predictor set is underdetermined because of the lack of inclusion of spatial ability measures, which would have most likely added precision to their forecasts (Wai et al., 2005).

In an earlier attempt to clarify the nature of the relationship between IQ, creativity, and academic achievement (Cicirelli, 1965), a study including 609 sixth grade students attending school in a suburban Detroit school system was conducted. This study would act as a stepping-stone for many later studies on the relationship of creativity and academic achievement. The participants were categorized into eight levels of intellectual ability and three levels of creative ability in order to obtain different degrees of the independent variables (Cicirelli, 1965). The California Short-Form Test of Mental

Maturity, the California Arithmetic Test, the California Language Test, the Gates Basic Reading Text, and the Minnesota Tests of Creative Thinking were used to assess participants IQ and creativity. The final data analysis offered little support for creativity and achievement and only some evidence of the relationship between IQ and language achievement. The limit of this study was in the approach to linking creativity to achievement. The methods implemented left out a variety of impacts that later studies have found to have a positive relationship. Since the ability gradient model appears inadequate to explain the varying degrees of relationship between creativity and achievement found in different studies, the effect of such factors as family structure, cultural environment, and teaching methods upon creativity and achievement might profitably be investigated (Cicirelli, 1965). This study offered an opportunity for later researchers to build upon what had been done, now with the missing needed pieces.

In 2008 there was a study published in the Creativity Research Journal with the goal of studying the impact of creativity on GPA and how that relationship could vary classroom to classroom. Freund and Holling (2008), the researchers behind this study, pointed out in their preface that while creativity seems to becoming more highly valued in western society, it can often be devalued in many classrooms. Their study had two substantive research questions at its core. Is creativity, as measured with tests of figural, numerical, and verbal content, strongly connected with school performance, and if so, is the relationship similar to that of reasoning ability and school performance (Freund & Holling, 2008)? Is creativity a better predictor in some units of analysis than others (Freund & Holling, 2008)? To study these questions, a total of 1,133 students from sixty classrooms were identified to participate. The students were selected based on their

cognitive abilities after grade 4, with a representative blend of students to ensure that the entire ability spectrum was present in the data set (Freund & Holling, 2008). The study followed the students from grade seventh to tenth, and the data collected included student scholastic achievement through GPAs and scores on the BIS-HB, scales of creativity and reasoning ability.

The results obtained within the multilevel framework suggested a rather strong effect for reasoning ability and, to a lesser degree, also for creativity when predicting GPA (Freund & Holling, 2008). The positive relationship between both predictors however did have a considerable variation between classrooms. The data showed that among classrooms with higher levels of creativity and reasoning ability, there was a larger difference in the predictive power of the two constructs than classes with lower levels (Freund & Holling, 2008). The main limit of this study is the inconsistency between classroom grading systems and the variance in school GPAs. Because of these differences it is observed in the data that the findings were not constant for all units within the educational system. This could possibly stem from teachers rewarding creativity or diminishing creativity. In sum, the application of multilevel framework yielded a more fine-grained picture of the relationship between creativity, reasoning ability, and scholastic achievement (Freund & Holling, 2008). Because of this, it would be beneficial in the future to continue to look more closely at teaching concepts of the teachers who value these constructs more than their peers, to find manners of mirroring such fostering and development of these abilities.

In Saudi Arabia, forty-two students from the fifth and sixth grade at the AL-Shawkany School were randomly chosen to participate in a study investigating the effects

of a school enrichment program on the analytical, creative, and practical abilities of gifted elementary students (Aljughaiman & Ayoub, 2012). Participants were broken up into two groups, an experimental and control. Both groups received a pretest and posttest, with the experimental group participating the enrichment program. The pretest was applied three days before the beginning of the program within the preparation phase, whereas the posttest was conducted on the final day of the program (Aljughaiman & Ayoub, 2012). Six of the students were unable to complete the study, their scores were not included in the final analysis of data. The enrichment program offered the experimental group a higher amount of challenges, instruction and opportunities for creativity than normal instruction time.

The initial findings demonstrated that there were statistically significant differences between the medians of the experimental and control groups on analytical and creative abilities in favor of the experimental group (Aljughaiman & Ayoub, 2012). The findings showed a positive relationship between the cultivation of analytical and creative abilities with the implementation of the enrichment program. This result can be explained in light of the program activities, which provided ample opportunities for students to improve their skills, and increase their knowledge in various academic domains (Aljughaiman & Ayoub, 2012). The study did not show a positive relationship between the program and practical abilities, explained by the lack of activities focused on the development of such skills. The limit of this study is the sample. For future research, a larger variety of schools and students would help to make the findings richer and more universal. The study does show that there is a measurable positive outcome to enrichment programs when implemented correctly. The researchers state that enrichment

programs ought to be provided for a sufficiently long period of time, be sensitive to real-life needs, promote the cognitive and mental abilities, and be sensitive to the affective needs of participating students to achieve maximal benefits for all involved (Aljughaiman & Ayoub, 2012).

Creativity and Academic Achievement

A fact is discovered, a theory is invented, but only a masterpiece is created (Sen & Hagtvet, 1993). Arun Sen and Knut Hagtvet used this idea as a starting point for their study revolving around creativity. In their study conducted at the University of Bergen, Norway, students in Grade 11 were observed to investigate the ties between creativity, intelligence, personality and academic achievement. The results showed significant positive relations between all categories but intelligence, in which little significant correlation was made.

The study consisted of three hundred students between the ages of 15 and 16 years old. Within the three hundred, students were broken up into ten groups consisting of 28 to 32 students. The tests used were the Torrance Tests of Creative Thinking, Raven's Progressive Matrices, the Eysenck Personality Questionnaire, and the Study of Values (Sen & Hagtvet, 1993). The tests were broken up into two sections, the first being creativity and personality, with the second round being the progressive matrices and the study of values. In addition to the tests, student's school records were recorded for each participant. School subject marks were then utilized to measure academic achievement.

As the data from the examinations was collected and compared, the analysis showed that the highly creative group scored significantly higher than the less creative on

theoretical value pattern, aesthetic value, scholastic achievement, and extraversion (Sen & Hagtvet, 1993). According to Sen and Hagtvet's findings, creative students scored higher on the measures of theoretical and aesthetic value pattern of life as well as holding higher academic achievement. In regards to intelligence however, there was no such pattern found. The data showed that intelligence while necessary, was not an index of high creativity (Sen & Hagtvet, 1993).

Esquivel and Lopez (1988) explored the correlations among nonverbal reasoning ability, creativity, and academic achievement in gifted minority children, 89 girls and 71 boys in grades first through eighth in a program for gifted (Esquivel & Lopez, 1988). The participants were assessed using Raven Progressive Matrices, Torrance Tests of Creative Thinking, and the California Achievement Test. All selected participants attended school in an urban school district with a primarily Hispanic population of low socioeconomic backgrounds. Participants were randomly placed into two selections, the first being tested at the beginning of the year, and the second after the first seven months.

The data showed interesting relationships and correlations between the studied characteristics. For example, while previous studies suggest that the learning potential of a lower functioning group may be predicted from performance on Raven's test, and this was not the case for the gifted students in this study (Esquivel & Lopez, 1988). In fact, the lack of positive correlations between nonverbal reasoning ability and creativity suggests a greater association between the former with convergent rather than divergent thinking (Esquivel & Lopez, 1988). There was a positive relationship between creativity and reading achievement that the researchers state in the findings deserves further study. The main limitation of this study is the scope and time frame allotted. In summary,

cognitive, creative, and academic abilities appear to be relatively independent for this particular group of gifted minority children, excluding the positive relationship between creativity and reading achievement (Esquivel & Lopez, 1988).

At the University of Minnesota a study was attempted to clarify relationships between creative abilities and academic achievement using Creativity Test Scores, Millers Analogies Scores (MAT), and achievement scored representing Guilford's categories of Cognition, Memory, Divergent Thinking and Evaluation (Bentley, 1966). Consisting of seventy-five graduate level students, the selection of participants were given weekly reading examinations which included items intended to draw data on the above listed qualities.

Data from participant scores showed high positive correlations between several of Guilford's qualities, while showing low correlations with others. Scores from a test of creative thinking would correlate significantly with divergent thinking and evaluative achievement, indicating a relationship between creative ability and divergent thinking process (Bentley, 1966). The overall scores presented tend to support assumption that academic achievement consists of numerous abilities, many of which are unable to be measured by traditional tests of academic ability. If this assumption is accepted, Bentley (1966) points out that academic testing should then be constructed to asses not only recognition and factual information, but also the searching for answers, the seeking of new solutions and the evaluation of the information that is learned.

CHAPTER III: DISCUSSION AND CONCLUSION

Summary of Literature

Creative Abilities in Education

Within the creative cognition framework, the ability to be creative is considered part of normative human cognitive functioning, rather than an out of the ordinary talent available to only a select few (Ward, 2007). The ability to be creative is a skill to be taught and included in all 21st century learners' formal education. This however, is not simply implemented into current education practices without a plan and a process to ensure success. In the Ohio (1992) study, it was found that research data proved the need for staff development for fostering creative thinking in students, which is individualized to both the educator and students. There is no one orientation that is alone sufficient for developing a coherent defensible program in teacher education because no one orientation adequately describes or explains the complexity of teaching and all that one needs to know (May & CLTES, 1993b). When a successful professional development is put in place, May and CLTES (1993b) found that there was an improvement of teaching which enhanced students' depth of understanding and meaningful applications in everyday life. It was in the same study that May and CLTES (1993b) found serious gaps in research and areas that hold a rich possibility for change.

Educational mindsets that decrease the implementation of more creative abilities aimed coursework are the many preconceptions of arts, art education and related practices. A participant observation study was set up by Stokrocki (1992) to address the problems related to preconceptions about art and art education the tensions that arise. The study immersed non-art educators into the arts and what it takes to teach creativity as

well as the other approaches and mindsets that are taught within the arts. The data collected by Stokrocki (1992) showed that by the end of the study 75% of the participants had changed their stereotypic images of art, 66% had changed their attitude toward art, 50% stated they better understood the hard work element of art, and 75 % found that being immersed in different types of art was a successful art activity (Stokrocki, 1992).

Creative Motivations and Development

As these skills develop, it is important for them to be continually fostered. The study by Duncum (1985) focused on better understanding the creative processes and the development of a child's creative process as they grew their ability to draw. Barbot et al. (2016) found that as creative potential tasks vary so do the effective uses of creative processes. For example, a highly domain related skill would not require as high of a specific creative thinking process than one more closely related to a creative skill (Barbot et al., 2016). Tsai (2014) and Rostan (1997) researched the motivations and connections of creative abilities in students. The findings showed a positive relationship between creative abilities and creative personalities in Tsai's research and the exterior motivators in Rostan's. Through comparison of his research in child development, Torrance (1976), concluded that creative development can actually be halted when stresses and demands are presented with a stimulating or disruptive influence on development.

Creative Abilities and Higher Level Thinking Skills

Higher level thinking skills, skills which are able to be easily utilized and implemented outside of the environment in which they were taught, are found to closely relate to even overlap with many creative abilities and characteristics of creativity (Bentley, 1966; Esquivel & Lopez, 1988; Fabricatore & López, 2013; Fruend, 2008; Im,

Hokanson & Johnson, 2015; Namyong & Ro, 2004; Rostan, 1997; Sen & Hagtvet, 1993; Sahin, 2016; Starchenko et al., 2000). If creativity is a result of cognitive development wherein individuals gain knowledge and the capability to logically think and organize information (Hirschman, 1980), then it is an ability that calls for much more attention. Catterall (2009) has argued that arts education in general enhances performance in non-arts academic content areas, such as literacy and mathematics. Supporting Catterall's (2009) argument are the findings of Greenfader, Mulker and Liane (2017), who found that English Language Learners participating in extra arts programming showed higher improvements in language acquisition than their counterparts who did not participate in extra programming. Freund and Holling (2008) found that among classrooms with higher levels of creativity and reasoning ability yielded a more fine-grained picture of the relationship between creativity, reasoning ability, and scholastic achievement. Additionally, data from Sen and Hagtvet (1993) showed that highly creative groups scored significantly higher than less creative groups on theoretical value pattern, aesthetic value, scholastic achievement, and extraversion.

In the research of Rostan, Pariser, and Gruber (2002) and Doron (2017) and Aljughaiman and Ayoub (2012), it was seen that when students are correctly supported, there is a chance for students to grow in both analytical and creative abilities. In 2005, Wai et al. (2005) showed a positive relation to early SAT assessment placements as factors into individual differences in occupational performance and creative expression. This understanding of creative abilities being linked to assessments and occupational performance has also been seen in the work of Fabricatore and López (2013) and Im (2015). Starchenko et al. (2000) collected data showing a high use of cognitive strategies

in order to perform creative tasks, showing that creativity is ordered in a similar manner to other higher level thinking skills, such as learned strategies and techniques.

Creative Abilities and Self-Efficacy

Creative abilities can also impact the level of a student's self-efficacy, one's belief in their abilities and probability of success in a given situation. In Seoul, Korea, the Ministry of Education began to identify art education as a practical living subject that promotes creative problem solving, integrated knowledge and self-efficacy (Naymyong, 2004). As students succeeded within creative problem solving, they had small successes that aid in the building of their belief in their own abilities. This study shows the progress of creativity and self-efficacy in the experimental and control groups after the experimental group received problem-solving instruction and the control group received typical instruction (Naymyong, 2004).

Creative Abilities and Academic Achievement

In an earlier attempt to clarify the nature of the relationship between IQ, creativity, and academic achievement (Cicirelli, 1965), a study including 609 sixth grade students attending school in a suburban Detroit school system was conducted. While Cicirelli (1965) found only a slight connection between IQ and academic achievement, there was a positive relationship between creativity and academic achievement. Esquivel and Lopez (1988) explored the correlations among nonverbal reasoning ability, creativity, and academic achievement in gifted minority children. Esquivel and Lopez (1988) also found a positive relationship between creativity and achievement. At the University of Minnesota a study was attempted to clarify relationships between creative abilities and academic achievement using Creativity Test Scores, Millers Analogies Scores (MAT),

and achievement scored representing Guilford's categories of Cognition, Memory, Divergent Thinking and Evaluation (Bentley, 1966). Scores from a test of creative thinking would correlate significantly with divergent thinking and evaluative achievement, indicating a relationship between creative ability and divergent thinking process (Bentley, 1966). Overall the link between creativity, creative abilities and academic achievement was a positive one.

Research Limitations

The main limitation in researching the relationship between creativity, creative abilities and education is the lack of research. Prior to 1940, little research was conducted in the area of creativity (Strange, 1940). It was in the years following, leading to the present, that research about creativity and it's relationship to education began to emerge. Research began to evolve with the formation of the National Art Education Association (NAEA) in 1949. An increasing amount of the research published was now conducted by art educators who were products of the rapidly expanding number of doctoral programs in the United States (Hutchins, 2001). Unfortunately, this rise in research regarding creative abilities and education began to decline in the 1970s. This decline has continued into the 21st century, with fewer research articles related to creativity and education published during the last 40 years than were published between the years spanning 1940 to 1960 (Bastos, 2015). Due to this decline, the pool of research to draw upon when researching the benefits of creativity in education is limited. This lack of research on the subject causes for older studies to be referenced as well as a smaller selection of current research to review.

A secondary limitation of research on creativity, creative abilities and education is the fluidity of terms. For different studies, different expectations and means were utilized, causing for slightly different outcomes depending on the original approach and belief of the researcher. The stereotype of creative education also acts as a barrier for research done with educators outside of the arts field. To overcome such a limitation a new understanding is needed in what it means to teach creativity, one that encompasses a style of education, which revolves around the acquisition of creative abilities such as independent or divergent thinking, problem solving, curiosity, adaptability and self-awareness.

A third limitation that applies to all research conducted on creativity and creative abilities as they relate to student success are the outside factors impacting each participant's role within the study. At the end of his study regarding the fourth grade slump in creative thinking, Torrance (1967), concluded that there was for that study alone, too many factors that need more study in order to better understand the truest connection between creative abilities and academic achievement.

The final selection of research was limited by original research, which included an aspect of creativity, be it development, connection to academic achievement, or creative abilities in education. Age was limited to primary and secondary, with the exception of longitudinal studies requiring the inclusion of middle-aged participants who were in primary education upon initial inclusion to a study. Size was limited from one participant to the hundreds. Lastly, location was limited by the expectation of studies being done in educational settings.

Implications for Future Research

As educators continue to seek the best approaches and manners of scaffolding for their students, better approaches for the instruction, development, fostering and correlation of creativity and the creative abilities need to be addressed. Current research has shown the importance of creativity to academics, yet there are still many gaps. What strategies will help students to best embrace a mindset of creativity and how do we implement such strategies within our current educational models? These are the questions that future research should seek to answer. These are the questions that will best help our students to access what current research has already shown.

One key area that is currently very weak is the connection between creative abilities and self-efficacy in students. This is an area that would benefit greatly from more study of a larger pool of participants. The idea of belief is such a key factor to the education of 21st century learners, that it should be researched from as many angles as possible. The connections of creativity and creative abilities to a student's belief in their abilities and new situations could display new opportunities for growth within the implementation of creativity within education. A beneficial study in this area would be to first find if there is a strong relationship between them and then move to viewing how to improve upon that relationship to the benefit of a student's creative abilities skillset and self-efficacy.

Another key area that was lacking greatly was researched benefits of using creative ability focused curriculum in the mainstream classroom. While there was much speculation and several research journals revolving around creativity and academic achievement, there were only a small sample of actual implementation of

documented curriculum that showed creative abilities being taught and benefits stemming from that instruction. This is an area that I would have liked more data from as it would have greatly benefited my final conclusion on the actual physical ramifications of introducing creative ability focused curriculum.

One last area that could have used a wider variety of studies was the relationship of creativity and academic achievement as it relates to each specific section of education, primary, secondary and post secondary. While I was able to find a sizeable sampling of research, it was very spread out over the education age range. The original guiding question was meant to focus on elementary education alone. This was unable to be as there was not enough research done on the subject. Moving forward, it would be extremely beneficial for each area of education to have more detailed research pertaining to their student group and the unique characteristics and circumstances that accompanies each.

Professional Application

Teaching for creativity is an area that education needs to move forward in, even if only in small ways at first. The stereotypes of creativity and creative abilities living inside of the arts must be continued to be removed and replaced with an understanding of what creativity can be and how the creative abilities such as divergent thinking, problem solving, curiosity, adaptability and self-awareness, can transform a classroom from that of the past to a 21st century learner's haven. It is essential for educators to take note and view what is happening in education research and theories, such as Bloom's Taxonomy which holds creativity as one of the highest level of thinking. It should not seem a large step to move from embracing higher-level thinking to embracing the myriad of creativity

and the benefits it has to offer within the classroom. Teaching creative abilities will prepare students to adapt and grow as the world demands of 21st century learners.

Schools and educators can take action towards embracing curriculum, which highlights creativity in many ways. Divergent thinking and problem solving, for example, are skills that the arts and STEM programing have long held in esteem, while convergent thinking is more prominent in "core" classes. One example of these abilities moving into core content can be found in Minnesota Public School District 197, who recently implemented a new math curriculum with a creative and application based approach. The students learn math, mathematic language and then use higher level-thinking skills that were previously saved for engineering STEM projects or art class to solve, create and discuss real life situational math. Along the same thread, when given time to plan it in, curiosity driven lessons, or the backwards design, can engage students in a manner beyond other approaches. These are a mere few ideas for the implementation of creative abilities within core content. If given the chance, the proper professional development and resources, such a relationship of creativity and education could flourish.

As an art educator, teaching for creative abilities is something that may seem intrinsically embraced. However, teaching for creative abilities on a day-to-day basis means a deviation from a more formal past approach to teaching visual arts. When I review my own experience as a student going through primary and secondary art education, I remember a multitude of close-ended craft-like projects, with an intended outcome. The classes rarely deviated away from this formula of show-teach-create. So what does this research mean to art educators? It means, more individualized goals for the students, with less teacher lead results. It means that classrooms will need to move

towards teaching for creative abilities over teaching for an end result. Projects will shift not only in approach but also in student reception. Each student will begin to embrace and acquire skills that can be brought beyond the art room. For my own room it means to push my students towards self-expression, synthesizing, creating, problem solving, offering moments and opportunities for curiosity to reign, and allowing for opportunities to reflect and grow in self-awareness and to move away from teacher led assignments where the skillset they learn is limited and unable to be moved outside of my room.

Conclusion

What benefits could arise for 21st Century Learners by adopting a more prominent role for creative abilities in education? Current studies point to positive relationships between creativity and academic achievement, occupational performance and self-efficacy. This is seen in numerous studies observing the impact teaching creativity can have on student assessment and abilities. Within the same scope is the importance of educator professional development in proper implementation of the teaching of creativity and creative abilities in relation to student academic achievement. There is no one perfect solution for teaching creativity as it relies heavily on the unique characteristics and situations of individual schools, teachers and students. However, when implemented correctly, the creativity academic achievement relationship is a fruitful one.

In addition to a positive impact on academic achievement, creative abilities are linked to and overlap, in some cases, with higher-level thinking-skills, which hold a prominent place in much of today's education. For the 21st century learner, the importance of adaptability, self-awareness, divergent thinking, problem solving, creative thinking and curiosity can be seen in this dynamic collection of moving parts, working

together to create a foundation for education that extends beyond the classroom into occupations and further. The benefits for 21st Century Learners at current rates of creative abilities in education have been measured throughout numerous studies. Imagine how much more impactful the relationship of creativity and education could be on student academic achievement, self-efficacy and higher-level thinking skills if creative abilities had an even more prominent role in education, a role that mirrored the importance of core content. A fact is discovered, a theory is invented, but only a masterpiece is created (Sen & Hagtvet 1993).

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