**What Creates Creativity:**

**Creativity Boosting Program to Promote Creativity in Art Education**

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Creativity is crucial for innovation. Creativity is the basis for human achievement and knowing how teachers can promote it is extremely valuable. Specifically, we need to know how art teachers can effectively nurture creativities.Recently, the acronym STEM became STEAM, because art education is supposed to help develop creativities. Productivity growth is stimulated by a rising creativity because creativity allows for the innovative solution of problems. And, of course, creativity is important for almost all areas of life beyond the economy. Although creativity is one of the most important elements in education, it is one of the least studied and emphasized in the modern education system.

We need to know which pedagogical techniques are most effective at getting students to become more creative. Researchers have found that creativity has decreased in the last few decades. General education rates and IQ have increased, while creativity as measured by standard tests such as the Torrance scale has actually decreased (Kim 2011). A drop in creativity happens around 4th grade (Claxton, Pannells, & Rhoads, 2005). As of yet, no researcher has determined why this happens, but it is strongly suggested that improved pedagogical techniques that focus on developing creativity are worthwhile to explore. Importantly, knowing what would allow us to facilitate students developing creativity will greatly increase the value of art education.

One major difficulty is that creativity is just one aspect that teachers must consider when they are working. This is particularly true in art classrooms, where most art educators have many goals that they wish to achieve and not all of them directly aligned with promoting creativity. Creativity must be taught while teaching specific art-making skills, so creativity lessons must fit easily into other lessons plans. Many times, art teachers are under time constraints which do not allow enough time in the classroom to focus on creativity. Furthermore, most state standards do not incorporate creativity as something that art educators should be focused on.

Due to the importance of creativity for human society, the fact that it is potentially declining in recent years, and its relevance for art education, I will examine how creativity can be promoted. I will do so by examining a literature review of research studies that examine techniques that promote creativity. I will highlight research studies to determine which techniques have been found to be successful and which have not worked well. I will also focus on techniques that fit within art education.

**Defining Creativity**

Before we can begin studying what can develop creativity, it is important to first define it. This is not an easy task as it is conceptualized by researchers quite differently. It does not lead itself to an easy definition because creativity fundamentally is a multifaceted, complex concept. Torrance (1967) gave a definition that shows how multifaceted it can be considered, defining it as "the process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses and possibly modifying and retesting them; and finally communicating the results”. A more straightforward definition was given by Gotz (1983) who defined it as “creativity is the process or activity of deliberately concretizing insight” (Gotz 1983, 300). More recently, Runco & Jaeger (2012) focus on two elements that would equate to creativity, when they defined it as, “creativity requires both originality and effectiveness” (Runco & Jaeger 2012, 92). Based on these definitions, we see that creativity is a multifaceted concept and, therefore, it will require many potential inputs to determine its feasibility in instilling it in students.

**Three Trends in Literature**

A review of the relevant literature shows there are three aspects that had been shown to determine whether students develop creativity. Teaching practices have been shown to be relevant in determining how successful teachers are in creating a pedagogical system that is facilitative to creativity.Classroom environments have been shown to be nurturing to creativity by fostering an environment that allows students to express their creativity, which in turn leads to more creative students.Teacher ethos concerns whether or not teachers actually believe that creativity is something that can be stimulated. If the teacher does not believe that creativity is changeable, it is likely they will not put effort into augmenting it, and therefore students will not be an environment that promotes them to be more creative. I now turn to examining each of these three concepts in-depth, by citing the relevant empirical academic literature on these topics.

*Teaching practices*
My review of the literature showed that there are six potential pedagogical techniques that have been used to promote creativity. First, there are creative problem-solving techniques. These come from the business administration research literature. They are used by corporations to make a more creative workforce, but could easily be applied in an art education classroom. Creative Problem Solving is a six-step technique: Objective Finding, Fact-Finding, Problem-Finding, Idea-Finding, Solution-Finding, Action-Finding, Divergent Thinking, Convergent Thinking (Osborn 1963, Parnes 1967; 1992). The central idea is to breakdown into six steps the issue at hand. At each point, the students are asked to make the step more innovative, so that all these six steps are more innovative when the process is done. By doing so, students learn a technique they can use to make more innovative outcomes.

Another approach is called possibility thinking. Possibility thinking is about asking students ‘what if’ and ‘as if’ questions (Craft, 2000). The idea is to get students to think beyond what is concretely and immediately in front of them and imagine something innovative and new. Another approach that has been empirically validated to correlate with greater creativity is higher-level thinking exercises with concept mapping and graphic organizers (Cropley, 1992). These exercises help students think beyond the small details and look to the connections between specific facts. By having higher order thinking skills, creativity is easier and more likely from students. Problem based learning is using problem solving exercises (Fryer, 2003). It has been shown to help motivate creativity because it focuses students on developing solutions for problems, and these solutions require innovation. Similarly, design-based learning is using design projects in the classroom (Nelson, 1984). When students create new designs, they must use creativity to develop designs that are innovative and new. These six techniques have been shown to develop creativity in students and are worthwhile to consider incorporating in our classrooms.

*Classroom environments*Research is also clear that classroom environments provided a platform by which creativity could be nurtured. One of the things that has been found in the empirical literature is that classroom environments are able to stimulate creativity by providing incentives where being creative is rewarded. Alternatively, it is possible to have a classroom environment where the focus is strictly on rote memorization and testing performance, and that can delimit creativity. If a teacher works to create a classroom environment that supports students thinking about issues in new ways and allows the student to have time to develop innovative thoughts, then it will be much more likely that the student will become more creative. Classroom environments are both about the incentive structure and the support that students get from their fellow students in pursuing creative ideas.

The empirical literature has found several techniques or aspects of the classroom environment that are beneficial for instilling creativity in students. One of the most important things a teacher can do is create a classroom environment that rewards creativity (Hennessey, 1995).Research also says that is beneficial if a teacher tries to create social interactions where students can view other students being creative (Woods & Jeffrey, 1996).This is very much related to the cooperative learning literature where students help each other learn something new. In this case, students are teaching each other how to be more creative. It is also beneficial to promote motivation and enthusiasm for being creative (Collins & Amabile, 1999). Additionally, a teacher can adopt practices that promote creative behaviors (Lucas, 2001). If a teacher works to have a classroom environment that does these things, then we can expect students in the classroom to develop more creativity.

*Teacher ethos*One often overlooked aspect of creating students who have more innovative thinking is the beliefs of the teachers themselves over whether creativity is something that is worthwhile to teach or whether it is even possible to increase creativity. If the teacher is not interested in promoting creativity, then more than likely we can expect her classroom will not emphasize this and it will have little effect on the students. Conversely, if the teacher is focused on the promotion of creativity, students will be more likely to respond to this motivation and to develop creativity. This speaks to one avenue by which society can have more emphasis on creativity in schools, by incentivizing teachers to focus on this aspect of learning. If alongside of standardized testing scores, teachers were judged in annual evaluations on how creative they made students, then they would be more focused on promoting creativity in their classroom. Currently, the incentive structure is for teachers to focus on having students pass standardized testing and this often does not involve creativity,

Additionally, one of the longstanding debates in academia is between nature versus nurture, where the causation of behavior is determined either genetically or by social inputs. It is highly possible that many teachers are of the belief that creativity is innate and genetically determined. If so, it is going to be unlikely that they will try in their classroom to create an environment that is focused on promoting creativity, because they do not believe it can be changed. If we know what the teacher believes, it will help us determine what they focus on as a teacher.

In interviewing teachers about whether or not creativity is something that can be changed or whether it is innate and unchangeable, researchers have found that many teachers believe that creativity is innate and unchangeable (Paek, Sumners & Sharpe 2019). Based on these beliefs, we should assume that most teachers who believe that creativity is innate will not work in their classrooms to promote it. Teachers must believe that creativity is something that can be taught and is not innate (Paek, Sumners & Sharpe 2019).It helps if teachers have a personal goal or interest in promoting creativity (Chen, 2008).It also helps if the teachers have a humanistic pupil control ideology (Cremin, Barnes, & Scoffham, 2009).It helps if the teachers themselves score high in creativity (Esquivel, 1995). If society wants to have more creativity, then giving teachers more information on the malleability of creativity will be important.

**Influences on These Factors**

Now that I have explored three factors that foster creativity, it is important to examine the potential influences on those factors. In other words, it is important to know what promotes the factors that develop creativity. If what affects these factors can be known, perhaps programs that influence the development of more creative environments in education can be created. Figure 1 shows a diagram which shows the main influences on each of these three factors that foster creativity.



**Figure 1: This chart shows the potential influences on the factors that foster creativity.**

Examining Figure 1 shows us how we can conceptualize what influences the likelihood that creativity will be fostered in a school. Teaching practices will be chiefly influenced by what the teacher believes is the best for their classroom and since the teacher has wide leeway to create pedagogical techniques and practices as long as they meet state standards, then the teacher will be the primary influence on teaching practices. Classroom environments will likely be influenced but what is happening in the school. School administration and the parents of the students will create pressure on the teacher to make the classroom emphasize particular aspects of education, while downplaying others. If teachers are in schools which promote classroom environments that facilitate creativity, then they will not feel pressure for promoting it. Teacher ethos will be primarily promoted by a society that teaches future teachers in education programs that creativity is possible to be taught. If society promote this idea to teachers, then they may adopt the idea that creativity is something that can be developed. On the other hand, if society promotes the idea that it is innate and unmovable, then the teachers will probably not try to promote it in their classroom. These three influences will determine the factors that promote creativity in schools.

**Gaps in Existing Research**

My review of the research also shows several gaps in the literature that needs to be addressed for us to have a full and complete understanding of how creativity can be influenced in the classroom. First, it is crucial that we know how culture influences how the value of creativity is perceived vis-à-vis other educational goals. It is possible that some cultural groups within society have a greater emphasis on traditional learning goals, such as mathematics and reading. Whereas, other groups may be more interested in promoting creativity. These goals are not antithetical per se, but often in practice education goals seemed to be a zero-sum game whereby more mathematics and reading equals less creative pursuits. It is possible that some cultural groups in society are more interested in creativity and yet there is almost no research on this important aspect of how creativity is promoted in classrooms.

The rise of information technology in delimiting creativity in students is another area that needs more research. One thing that we see is that students are online a large percentage of their free time. If they are consuming media, but not actually creating anything online, this could be limiting their prior experiences at being creative. Notice that if the decline in creativity happens around fourth grade, this is a plausible time period in which students may start using information technology often. We do not know how the dramatic increase in screen time affects behaviors such as creativity. As much of the student’s time is spent online now, we need to know how this activity potentially limits—or even increases—their ability to be creative.

How parental education, affluence and resources affect creativity is currently ignored in the literature, but has the potential to explain much of the variation in creativity. Students who come from homes that have more affluence and resources may be more likely to have grown up with stimulating toys and books that allow them to express their imagination more vividly. Further, it may be that they have had more experiences with enriching activities, such as going to zoos and museums, where their creativity may be sparked. Finally, by having educated parents, it could be that the prior levels of creativity that their parents have is transmitted through some social process to the children. By growing up in homes in which creativity is commonly displayed and engaged in, it may be helpful in the child’s development. Further research should examine how exactly parental Influence and home environment affects creativity.

**Methodology**

I plan on creating an in-class experiment using the creative problem-solving techniquesprogram developed byParnes (1992) with 100 ninth grade students.This program come from the business administration research literature. This program is used by corporations to make a more creative workforce but could easily be applied in an art education classroom. Creative Problem Solving is a six-step technique: Objective Finding, Fact-Finding, Problem-Finding, Idea-Finding, Solution-Finding, Action-Finding, Divergent Thinking, Convergent Thinking (Osborn 1963, Parnes 1967; 1992). The central idea is to breakdown into six steps the issue at hand. At each point, the students are asked to make the step more innovative, so that all these six steps are more innovative when the process is done. By doing so, students learn a technique they can use to make more innovative outcomes.

The advantage of the experimental method is that randomization between the treatment and the control group produces homogeneous groups that only differ from exposure to the experimental stimulus. This is a successful method that is used as the gold standard to test causal mechanisms. We can be sure that the only difference between the two groups is exposure to the experimental stimuli because randomization produces two groups that are equivalent amongst all characteristics except that one group has been in the program and one group has not. By testing the outcomes of those who have not been in the program compared to those who have been in the program, we can see the impact of program participation on creativity. Exposure to the creative problem-solving techniques program should be correlated with greater creativity after program participation. Therefore, I hypothesize that those students who participate in the creative problem-solving techniques program will have greater creativity on Torrance’s (1967) Test of Creative Thinking (TTCT).

I plan to take 9th grade art classes and randomly divide them into two groups. One group will participate in the creative problem-solving techniques program and another one which is randomly assigned to not participate in this program. Therefore, my independent variable is random assignment into the creativity program. I will dichotomize my independent variable to be coded a one if the student participates in the program and a zero if the student is randomly assigned to not participate in the program. I expect this independent variable to correlate positively with the dependent variable. The group that is randomly assigned to participate in the creativity boosting program should score higher on the dependent variable then the control group. I will test my hypothesis using a t-test difference in means, whereby I compare the mean average score of the control group to the mean average score of the treatment group. I expect that I will see a statistically significant difference between the two groups at a 95% confidence interval.

Additional more sophisticated statistical techniques can be applied to measure the specific differences of subgroups within the experiment. It may be that program participation has a differential impact on female students than male students. One way to potentially test this is to use a difference-in-difference design, where I compare the difference between treatment and control in male students to treatment to the difference between treatment and control in female students. In this case, I would expect based on prior research for female students to have a disproportionate impact from program participation (see Parnes 1992). Thus, I expect that the difference between the treatment and control for female students will be greater than the difference between treatment and control for male students. I have a second hypothesis based on gender. Hypothesis 2 is that female students will be disproportionately benefited by participation in the creative problem-solving techniques program. I suspected this difference will be statistically significant.

One potential problem that we need to mitigate for is statistical power. It could be that once the experiment is broken down into both treatment and control groups and by gender that there is not enough participants in each category to produce a statistically significant result. In this case, the results would be shown is statistically insignificant even if there is actually a causal impact from program participation due to the lack of statistical power. The worry is without enough participants in each category the statistical variation between the groups will not be large enough to show an impact. Statistical power is necessary because it could be that if both groups were large enough it would be able to have enough participants to show a result, but the difference between them would be able to be shown through statistical analysis. To ensure that there is enough statistical power, I will replicate the same experiment in four different ninth grade art classes. This should produce a total number of students participating in the program of about 100. If it does there should be around 50 female students and 50 male students in each category in the experiment. In each experiment category we should have approximately 25 female students in the creativity boosting program, 25 female students that are not in the program, 25 male students that are in the program and 25 male students who are not in the program.

The outcome was tested with figural version of the Torrance Test of Creative Thinking (TTCT). This is my dependent variable which tests the impact of random assignment to the treatment and control groups. Random assignment should produce groups that do not differ on the Torrance test to creative thinking before program participation. However, to ensure that program participation does not vary and that random assignment does work to create homogeneous groups prior to program participation, I will do a pretest of all 100 students using this Torrance test of creative thinking. I will be able to determine, therefore, if random assignment produces homogeneous groups based on the dependent variable of creativity before this experiment. Also, I can compare the change in each student based on whether they did or did not participate in the program.

**Conclusion**

Creativity is a crucial goal for education, yet it is often ignored. Art is a particularly valuable area of education to promote creativity. By its very nature, art education involves promoting the student to think outside-the-box and engage in creative activities. Art education allows students an opportunity to engage with creation. It is in these areas that art education can really help develop a new form of creativity in the student. Promoting creativity could be one of its primary justifications as budgetary concerns often threaten art educators. The techniques that were explored in this research shows ways that art education can be more effective in this primary goal of promoting creativity.

Three main areas where creativity can be fostered were highlighted: Teaching practices, Classroom environments, Teacher ethos. A variety of teaching practices were shown to be effective in promoting creativity in art students. Additionally, it was shown that having a supportive classroom environment that rewards of creative activities is helpful in boosting student’s willingness to explore being creative. Finally, the research showed that what the teacher believes about creativity—such as whether it is innate or able to be developed—affects whether or not the teacher engages in practices which promote creativity, which will then in turn determine whether the student becomes more creative. These techniques were shown through empirical research to be beneficial in promoting creativity and may be useful if they were applied in art education.

More research is needed on how to implement best practices. Although it is crucial for human innovation to have a workforce that is creative, a surprising lack of research has adjudicated what is necessary to promote creativeness. Specifically, there are aspects of education as well as the social economic environment from which students come from that could attenuate these best practices. Just as we now know that differentiation is crucial to promoting learning goals, it is highly probable that differentiation could be useful in promoting creativity. As students are diverse in many aspects of learning and human cognition, it is possible that they are also diverse in ways that creativity can be created and promoted to them. More research needs to examine ways in which the differentiation of lesson plans can help students become more creative.

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