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Visual Arts Pedagogy And Its Impact On Creativity And Problem Solving Ability Of Elementary School Students

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Abstract

The present study aims to explore two pedagogical approaches of art in relation to creativity and problem solving ability among elementary school students. Using a Quasi Experiment Design a sample of N=120 elementary school children were initially grouped based on the pedagogical art they were receiving and later were assessed on their creativity and problem solving ability in general. It is hypothesized that Creative Art Pedagogy (CAP) can yield better results when it is used to enhance creativity and problem solving ability in a child as compared to Predetermined Art Pedagogy (PAP). Which is more stereotypical and encourages imitation. Results of the study reveals that students exposed to CAP scored significantly higher on creative thinking (M=4.5 & SD=2.72) than the students exposed to PAP (M=3.07 & SD=2.50). Similarly the CAP students scored significantly higher on problem solving (M=2.82 & SD=.98) as compared to PAP students (M=2.00 & SD=1.02). The findings show that CAP is crucial to enhance student's imagination, problem solving ability and critical thinking.

INTRODUCTION

Creativity is a unique ability found in human race. Creative thinking has enabled man to survive and solve problems throughout human evolution. There are numerous ways to express creativity – as a word and as a concept. Some researchers (e.g., Plucker, Beghetto, & Dow, 2004; Jaarsveld, Lachmann and Leeuwen, 2012) regard it as the expression of new, novel and practical ideas to solve the problem in hand. Extending the similar views, Dunbar (2008) considers creativity as a problem solving strategy where a person explores causes of the problem, its solution and utility for the purpose of adaptation. On the other hand, Pang, (2015), Treffinger, Sortore, and Cross (1993), and Umphrey (2004) pointed to the possibility of developing and enhancing creative thinking through art education and instructional pedagogies.

According to Wallas (1926) and Polya (1973) creative thinking and creative problem solving can be developed in four-stages. Preparation is the first stage where the subject identifies the problem and gather relevant information. In the second stage, subjects slips into incubation phase where their thoughts operate at the level of subconscious. The subconscious mind is the most creative part of the psyche. In the third step, the subject

draws ample inspiration from their own subconscious and seek solutions. Finally, after arriving at the right solution, the plan is executed. Another model of CPS was developed by Fox (2008) who framed the CPS as a five-step procedure. In the first phase the problem solver sets the goals. The second phase is generation of ideas. In the next level ideas are being organized based on prioritizing the tasks. Further, plan is then implemented in the interests of matching the goals. In the end, Fox emphasized the importance of evaluation process to monitor and checking the progress.

Background

Skills and knowledge have traditionally been delivered by mimic art. In 1850's linear drawing was included in many European schools to help students acquire the manipulative skills that the manufacturing industry needed but it lacked the expressive work (Brown, 2006). Linear drawing was thus a staple in European education, as precise, neat work was the goal, rather than creative work. Additionally, teachers considered their learners to be incapable of grasping complex concepts (Kennedy, 1988). As a result, students had to observe strict methods in order to produce set patterns. Art was, therefore, completely predictable. Efland (1990) claimed that through imitation, students can attain skills, however such practices also reinforce mimetic behavior. Herberholz and Hanson (1995) echoed the view that mimetic styles of teaching lead to predictable results. To explain and illustrate this traditional style of pedagogy, this study employed the term predetermined art pedagogy (PAP). This is based on simple observational learning which is required to acquire a skill or set of skills needed to reproduce any artifact or object. On the other hand, CAP requires abstract thinking, planning and executing some motor skills. It suggests a deep appreciation of spatial relations and indicate that the creator is engaging in conscious design. This kind of art work requires depth planning, sophistication and patience and it encourages wisdom (Sternberg, 2005a).

The Role of Creative Art pedagogy

Tarr (1996) and Alter's research (2011) concentrates on a total of six principal scenarios of creativity: free self-expression; the unfettered ability to use materials; learning from outside influences as well as one's own; obtaining expertise and methods to help an artist create their own identity; a helpful, supportive atmosphere in which to work; and consideration of the intellectual input into creativity in addition to the completed work.

Creative art pedagogy allows children to get firsthand experience and allows them to express their thoughts and feelings through art work (Corcoran & Sim, 2009). Predetermined art pedagogy, on the other hand, takes scant account of free thought and expression. Predetermined – or mimic – art results in mimetic behaviorism, as the only thing that students learn is how to imitate (Efland, 1990). This can make life easy for the teachers, but students' creativity is not enhanced, as they are basically just copying the work of someone else (Herberholz & Hanson, 1995; Peers, 2002).

Critical thinking and problem solving abilities are consider as unique attributes of the human intellect. These cognitive capabilities involve abstract thinking, future planning, goal directed behaviors and other executive functions that allow humans to organize and execute long-term strategies. Coolidge & Wynn (2001) argued that these cognitive operations are key to modern human cognition. Many researchers (e.g., Eaves, et al 1993; Pennington & Ozonoff, 1996; Wynn & Coolidge, 2001) cited evidence that they are heritable traits and first appeared in Homo sapiens about two million years ago. It is around this time that complex tools requiring a multistage sequential construction process appeared (Klein, 2000). Recent research (Birgili, 2015; Efland, 2002; Sternberg, 2005b) has revealed a link between these cognitive operations and creative art. Even more intriguing is the possibility that the above mentioned transformation among Homo sapiens was led by their creative art of tool making. Tool making itself is recognized as a form of problem solving actions and creativity that also served as an important mechanism of adaptation. Moreover, their involvement in creativity pushed human brain to expand and allow increased learning that further resulted in progressive evolution of intelligence.

The role of non-mimetic creative art has also proved of therapeutic value, particularly with young children and adults with emotional problems (Lydia & Aurora, 2014; Pizarro, 2004). But is usually considered aids or adjuncts to the total therapy program rather than systematic approach to psychotherapy. Painting, clay sculpturing and other art media may facilitate the communication of feelings and assist in the resolution of inner conflicts, as may creative writing and prose and poetry (Pizarro, 2004). In addition, patients commonly experience a sense of pride and accomplishment in their creative productions. In some instances, art exhibitions are held and prizes are awarded, and then may be competitions between different hospitals or clinics facilitate in such exhibitions. Art is an expression of perceptual experience of the artist (Dale, 2014). He depicts the perceptual features of his mental images of the physical and psychological worlds in his art work which makes it purely subjective. Therefore, in the therapeutic settings, both subjective and objective qualities of expression and compositional relation is fully perceived, analyzed and appreciated.

Statement of the Problem

Art is an important medium of expression of thoughts, feelings and emotions. It is the safest and creative way of problem solving. However, these creative thinking and problem solving capabilities can be influenced by different pedagogical techniques. The aim of this paper is to explore those pedagogical styles in arts. This research investigates how Creative Arts Pedagogy (CAP) affected elementary school students' creativity and problem solving ability as compared to the Predetermined Arts Pedagogy (PAP) and defines the most suitable pedagogy to promote creative thinking and problem solving abilities.

Hypotheses

The following hypotheses were formulated:

1. If students are taught creative art pedagogy they would obtain a higher scores on the problem-solving ability test as compared to those who are exposed to predetermined art pedagogy.
2. Students who are taught creative art pedagogy would obtain a significantly higher score on the creative thinking test as compared to those who are taught predetermined art pedagogy.
3. There would be a significant positive relationship between art education and the creativity and problem-solving ability of the elementary school students.

Research Design

Using a Quasi-Experiment Research Design, this research set out to explore causal connection between the pedagogical styles and two cognitive abilities i.e., creativity and problem-solving. Condition are not manipulated because the presumed cause of differences already existed between groups of individuals before the study is initiated.

Methodology

Sample

The target population of this study was the private elementary school students of Peshawar, Khyber-Pakhtunkhwa, Pakistan. A sample of N=120 students aged 9 to 11 from grade four and five were selected through stratified random sampling technique. The criterion for the selection of the school was based on the prevalent pedagogies, i.e., Creative Art Pedagogy (CAP) and Predetermined Art Pedagogy (PAP). The first stratum included schools practicing CAP, whereas the second comprised the schools practicing PAP. Two schools from each stratum were then further selected to randomly draw the sample which resulted in the two groups listed below.

Group A: (n=60) Students learning from the CAP approach.

Group B: (n=60) Students learning from the PAP approach.

Tools of Data Collection

Wallach and Kogan's Creative Thinking Test (WKCT)

To measure creativity, the Wallach and Kogan's Creative Thinking Test (WKCT) (1965) was used. This test is regularly used to assess creative thinking (Cheung, Lau, Chan, & Wu 2004). The test consists of 3-subtests i.e., Alternate Uses, Instances, and Pattern Meaning. Three separate items were chosen for each subtest. For the Alternate Uses test, the subjects were asked to provide the alternate uses of the item - such as a knife, and also list conceivable examples of various class concepts, such as items that can generate noise. According to Wallach and Kogan the total number of responses were assessed as fluency of ideas and unique answers as originality of ideas by two judges. In scoring WKCT

questions, units of fluency and originality were made functional. Fluency is defined as the total number of given responses by a participant when he is asked a question. All the responses produced by a participant are then summed up to yield his fluency score for that particular question. Originality (a unique or novel response) was obtained by scoring unusual and unique responses. Unusualness and uniqueness were further gauged on relative frequency (or percentage P) of responses given by participants of particular group.

The computation of unusualness and uniqueness was based on the relative frequency or percentage P of a particular response x produced by participants of a particular group. The formula is as follow

$$P = \frac{\text{frequency of response x produced by participants of a particular group x } 100\%}{\text{Number of participants of a particular group}}$$

Reponses that were given by only 5% of a group were unusual and were given 1 point. Responses that were given by only 1% of a group were unique and scored 2 points. Sum of all the points made the participant‘s originality score for a particular question (Lee & Laird, 2004). For example a participant generated 2 unusual responses and 1 unique response for alternate uses of a shoe; he got 2 points for unusualness and 2 points for the uniqueness. Therefore for the shoe item his originality score is 4.

Therefore, Originality = 1(X) + 2(Y)

Where, X= total number of unusual responses of a particular question

Y= total number of unique responses of that particular question

Reliability coefficient of WKCT was found to be .86 for fluency measure and .62 for originality measure, indicating the scale as a dependable measure.

Problem-solving Ability Test

Problem solving was assessed through four Matchstick Problem Tasks (MPT) (Goel & Vartanian, 2005; Kleibeuker et al. 2013). Participants were required to re-arrange given patterns by moving the specified number of matchsticks to form a specified new pattern. In order to assess participant’s problem-solving ability in regard to matchstick problem tasks (MPT), their total amount of accurate responses was accepted as their overall score. Ten points were awarded for every accurate response, making 40 the maximum achievable result. To analyze the problem solving ability of a participant on Matchstick Problem Tasks, a total number of correct responses was taken as the participants’ total score. Each correct response was given ten points thus the maximum possible score was 40. Reliability coefficient of Matchstick Problem Tasks (MPT) was found to be .71 indicating the scale as a dependable measure.

Procedure

The concerned authorities of private and privilege schools were contacted and permission was taken to conduct research work. Students of class four and five were randomly

selected. The tests were administered on two consecutive days. Demographic information was collected and the two tests and subtests were administered individually by a team of researchers and well trained surveyors from the field of psychology. In introductory session rapport was developed so that children could feel free if they had any query regarding the tests' items. The MPT were administered on the first day. These comprised four different matchstick problem tasks. Children were required to re-arrange them by moving specified number of sticks to form a specified new pattern. Trained surveyors were there to attend each participant individually. Besides written and verbal instructions, the demo trial was also given. Children were given three trials to solve a problem and if they failed to do so they were asked to move on to the next matchstick problem.

The next day children were briefed about Creative Thinking Test. The team of trained surveyors attended six children at a time. At first the participants were asked three questions from Alternate Uses subtest. The test began with a sample question e.g., the participants were asked to tell different ways they could use a brick. Similarly, the participants were asked to generate responses for Instances subtest. For example, they were asked to name all the things that produce noise. In pattern meaning section participants were shown three geometrical patterns and asked to come up with as many possible meanings as they could think of.

The general instructions for administering WKCT were based upon instructions provided by Wallach and Kogan (1965). For the assessment of creative thinking, a self-regulated pencil and paper examination was conducted by the subjects. No time bar was set as suggested by Wallach. Two judges were consulted to determine the original responses generated by the sample subjects.

Results

Table 1 Differences between the means on MPT & WKCT by Art Pedagogies between (N=120)

		Group A (n=60)		**Group B (n=60)**				**95 % CI**	
Scales	Subscales	Mean	SD	Mean	SD	t(118)	P	LL	UL
MPT[1]		2.82	.98	2.00	1.02	-4.45	.000	-.45	-1.180
WKCT	Originality[2]	4.50	2.72	3.07	2.50	-3.00	.003	-.48	-2.379
	Fluency[3]	37.48	10.04	35.13	12.36	-1.14	.255	1.72	6.421

The analysis seem to highlight the effects of two pedagogies on creative thinking and problem solving ability. Descriptive statistics on MPT revealed that students who were

exposed to condition A were more imaginative and creative in their ideas as compared to the students who were exposed to condition B. This difference is found significant, t^1(118, 120) -4.455, $p < .001$.

The results on the creative thinking test indicate that students who were exposed to condition A scored significantly higher on the originality measure of the test as compared to the students who exposed to condition B, t^2 (118, 120) -3.003, $p < .01$. However, on the fluency measure there appeared no effect by a kind of pedagogy. It shows that both pedagogies were equally effective in enhancing fluency of ideas, t^3 (118, 120) -1.143, $p > .05$.

Table 2 Correlation Matrix on all the study measures

	Fluency	**Originality**	**MPT**	**Age**	**Visual Arts**
WKCT					
Fluency	1	.428**	.193**	.232**	.092
		1	.238**	.195*	.275**
Originality					
MPT			1	.174	.374**
Age				1	.434*
					1

**p < .01

A depiction of the study measures' correlation matrix is illustrated in Table 2 definite standard of real and positive connections between the diverse variables is illustrated by the matrix, concentrating on creative thinking (originality, fluency), the ability to problem-solve, exposure to the visual arts and the age of the subjects.

Discussion and Conclusion

This study investigated the impact of Creative Arts Pedagogy (CAP) and Predetermined Art Pedagogy (PAP) on creativity and problem-solving ability of elementary school children. Results revealed that students who were practicing CAP showed greater sign of creativity as it stimulated self-expression, imagination and critical thinking in them. These results encourage the use of creative arts in schools providing students a chance to use their imagination and critical thinking with problem solving. Studies (e.g., Efland, 2002; Burton, 2009; Getzels, 1987; Lowenfeld, 1960) support that creative intelligence is associated with creative arts. Creative Art Pedagogy pushes to seek novel solutions and look for innovative ideas. Prior studies (Chishti, 2015; Hurwitz & Day, 2007; Peers 2002; Weisberg, 2004) support the idea that CAP point students to the discovery of myriad ways of helping their ideas come to fruition, thereby enabling them to participate more in the world. Open

learning environments enable unfettered self-expression, inspiring thinking processes that can deliver numerous solutions to problems (Burton, 2000; Hurwitz & Day, 2007).

Study findings revealed that students who were taught creative art pedagogy obtained a significantly higher scores on the problem-solving ability test as compared to those who were exposed to predetermined art pedagogy. These findings also echo Lowenfeld and Brittain (1987) assessment that creative arts enhances problem solving ability among elementary school children.

Study findings also revealed that students exposed to two pedagogies showed a significant mean difference on one of the creativity markers such as originality of ideas. However, both groups scored equally well on fluency test. It shows that both kind of art pedagogies enhance fluency of ideas. The students involved in creative arts scored higher on originality of ideas as compared to the students involved in predetermined art. This has enabled a conclusion to be reached that creative environment elements like the ability to self-express, openness and inclusivity stimulated students from Group A to produce work that was more inventive. These findings are in line with previous research that children who learn in and through the arts are more creative, imaginative, expressive, and critically thinking individuals (Alter, 2010; Chishti & Farhana, 2014; Efland, 2002). Ideational fluency and originality make the students able to look for alternatives, and organizing and selecting the best possible solution. Creativity brings the novel solutions at forefront thus inculcate inventiveness and prepare the students to meet the day to day challenges of life.

On the other hand, the predetermined art limits the process of exploration and divergent thinking therefore, their art work lacks creativity and novelty. This type of pedagogy inculcate imitation and make the students passively waiting for the instructions of the teachers.

It can be concluded from the body of research that visual art education is one of the domains of the elementary school curriculum through which a creative learning environment can be induced. Findings from this research are in line with prior discoveries that for well-rounded and productive thinkers, we have to be more focused on Creative Art Pedagogy (Brown, 2001; Burton, 2000; Chishti & Jahangir, 2014; Hurwitz and Day, 2007).

This research also recommends that diverse educational art activities may need a variety of styles to be learned. Teachers are required to encourage divergent and creative thinking. To accomplish this goal, teachers supplement creative arts with lectures and demonstrations. They can schedule outings to galleries and museums that showcase styles of art or particular artists, or show their students the work of great artists and designers. In the same way, teachers can encourage dialogues with their students, conferring about projects and organizing group-working. Collaborative art projects can also inspire cooperative learning, and serve as a source of motivation. It enables students to value diversity and see different viewpoints and cultural perspectives, thereby enabling them to be confident about interacting with diverse groups. Engaging in fundamental art ideas can

help students attain the basic abilities and realize their potential. It provides a safe medium to express their feelings and emotions. It can also enable them to acquire higher order thinking that can form and shape their ideas and thus allow them to let their creativity and problem-solving talents flourish.

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