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**THE IMPACT OF ART THERAPY (PAINTING) ON VISUAL SPATIAL
INTELLIGENCE IN PRE – SCHOOL CHILDREN BASED ON HOWARD
GARDNER'S THEORY**

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ABSTRACT

Visual Spatial intelligence is considered to be one type of the intelligence that is directly related to the ability to properly perceive the whole world visually. This study is aimed at investigating the effectiveness and the usage of special painting methods based upon Howard Gardner's theory on the Visual Spatial intelligence among the preschool children that has been taken into consideration with regard to both the history and lack of information. This study is of the experimental type with both experimental and control groups and the participants mainly consist of 36 students (comprising two groups of students) that educate in two preschools of Isfahan (4th district) in the educational year 2013-14 in which all were randomly selected. All the students participating in the intelligence test known as "Raven" were classified in the pre-test and post-test groups in the experimental group, the painting instruction was conducted according to the components of Visual Spatial intelligence in 15 sessions. The analyses obtained via (through) the co-variance test demonstrated that the painting instruction has enhanced the children's intelligence to a degree of 21% according to the features (characteristics) of Visual Spatial intelligence. Likewise, the qualitative analyses conducted on the children's paintings remarkably confirm the effectiveness of the aforementioned method, the research findings are indicative of the validity and the approved of the hypothesis and its effectiveness over the teaching methods in enhancing the extent of Visual Spatial intelligence in the children.

Keywords: Multiple intelligence, painting instruction, preschool children, Visual Spatial intelligence

INTRODUCTION

For learning to occur, focusing on the strengths and skills of the child gives the child motivation and opportunity to learn in the ways that the child learns best. Howard Gardner looks at learning through his model of multiple intelligences. Gardner takes a pluralistic view of learning by recognizing that everyone has different cognitive strengths (1993).

Gardner suggested a general correspondence between each capability with an occupational role at the workplace, for examples: for those individuals with linguistic intelligence he pointed journalists, speakers and trainers; scientists, engineers, financiers and accountants on logical-mathematical intelligence; sales people, managers, teachers and counselors on the personal intelligence; athletes, contractors and actors on bodily-kinesthetic intelligence; taxonomists, ecologists and veterinarians on naturalistic intelligence; clergy and philosophers on existential intelligence and designers, architects and taxi drivers on spatial intelligence (Gardner Howard, 2006).

Since long time ago, the "intelligent child" was regarded as someone that was mathematically and computationally much more capable of the other counterparts. In general, "being intelligent" means the ability to achieve success in the IQ tests. At

this juncture, these children with high communicative and interactive skills, those interested in the nature along with the children with artistic and musical capabilities and the ability to give speech were neglected. In other words, the computational aspects and the natural sciences were addressed and evaluated by the researchers. But today, the intelligence does no longer make sense in general terms, and has been replaced by a broad and multi-dimensional definition and has been always regarded as one of the mental capabilities in the educational systems.

The imagistic code refers to the ability to create and manipulate images in the mind. Kozhenvikov, Hegarty, and Mayer (2002) stated that there are two groups of visualizers, those of high spatial ability and those of low spatial ability. Visualizers with low spatial ability are adept at visual imagery and have the ability to represent the form, color, brightness, and other aspects of an object's appearance.

The word intelligence also brings to mind the concept of individual differences in ability, and this concept is also central to the research reviewed here. A recent report (National Research Council, 2006) claimed that spatial intelligence is "not just undersupported but underappreciated, undervalued, and therefore

underinstructed” (p. 5) and called for a national commitment to the development of spatial thinking across all areas of the school curriculum

Spatial ability involves the visual manipulation of objects (Gardner, 1993; Olson, 1984; West, 1997) the ability to comprehend the relationships between fluid, changing patterns (Dixon, 1983) and the ability to manipulate complex visual material (Shea et al 2001). It refers to “competence in encoding, transforming, generating, and remembering internal representations of objects in space and their relationships to other objects and spatial positions” (Cooper & Regan, 1984, p. 138-139). Spatial ability is a dimension of cognition that combines with verbal and quantitative abilities to define how an individual perceives the world and acquires new knowledge (Gardner; Shea et al.). Individuals who possess spatial strengths are adept at using images to search for solutions to problems and express their thoughts, and spatial ability has been shown to be a better predictor of accuracy in reasoning than verbal ability. West (1997) described a hierarchy in spatial thinking skills in which each step is more complex than the one before. West viewed the process of spatial thinking of which the highest levels were manifested in the

creative work of persons such as in Picasso, Edison, Rodin, da Vinci, and Einstein.

These types of intelligence are as follows: linguistic intelligence, logical-mathematical, Visual Spatial, bodily – kinesthetic, musical, interpersonal, intra personal and naturalistic intelligence. Having proposed his standpoint, Gardner addressed the instruction methods based upon each type of intelligence. Consequently, this instruction method laid the basis for the performance of many instructors develop educational methods that result in the dynamic and pleasurable "teaching – learning" process. Gardner believes that if this process is based upon multiple intelligence and if the individuals will be able to enhance and deepen their understanding and perception in numerous fields. Thereby providing the context/grounds for developing and promoting intelligence of many different sorts.

At this juncture, however, instruction of the arts – especially painting based upon the multiple intelligence approach is no exception at all. Painting as a visual and pleasurable category, has been always regarded as a factor in elevating and reinforcing creativity among the children. With regard to the concordance with Gardner's thoughtful theory of multiple

intelligence painting and the Visual Spatial intelligence in each individual are closely intertwined as it was mentioned earlier, Visual Spatial intelligence, represents the ability to recreate the external frame of mind into the internal frame. It also emphasizes the ability to think in the form of shapes and modals. (Dalvandi, 2010,52)

This study aims at investigating the effectiveness of painting on the Visual Spatial intelligence in the pre-school children. The research hypothesis was proposed to fulfill this need. It appears that in the field of painting instructions, imaginative and visual methods play a substantial role in improving the level of Visual Spatial intelligence among the pre-school children. As the care foundation of this type of intelligence is to realize and to actuate the imagination and transformation of abstract phenomena to the concrete ones, this type of transformation may manifest itself in different aspects. Devoting enough attention to the imaginative aspect of intelligence and analyzing this type of capability will shed light to a new horizon in the artistic educational system. The researcher to examine the paintings by pre-school children from Gardner's point of view. He also attempts to delve into the results obtained by their artistic talents which are based on spatial-visual intelligence. He does his test to fulfill. This

by proposing methods that are compatible of his objectives as well as providing a more dynamic atmosphere in the children's painting class

Hesam, the intelligence has been defined along with its various types and some guidelines were proposed to enhance it. These guidelines are based upon the games. Like wise, in the book: the skills required by the children to enter school: authored by Ahmad Abedi a fully independent chapter is specified to explain the effective ways to foster the visual skills in the children. Generally there has no particular study conducted on the spatial – visual intelligence in Iran. For this reason, researcher finds it absolutely essential to do research in this area due to its particular significance especially for the children and attempts to conduct research in this respect. Spatial- visual intelligence has considerable attention in the many studies. In a study known as "spatial intelligence and challenging the research" Moshe Karakowski et.al. have explicated the efforts made by the training center for spatial intelligence " in order to exert its influence over the awareness of the elementary school teachers to introduce the spatial concept's into the course syllabus. In her research " the use of spatial intelligence in creating a world of arts: Leah Rotschild, explicates a lesson plan based upon Visual

Spatial intelligence . in this lesson plan, the student raise their awareness of multiple int by focusing their attention on Visual Spatial intelligence.

A central aim of visual arts is to promote sensory perception, learning and to enhance the cognitive resources in young children (Epstein & Trimis, 2002). Wood (1977) investigated school children receiving directed arts activities and found an increased performance using the above mentioned outcome measure Frostig's DTVP after 8 weeks of arts education. Arts education is highly valued by the elementary school community for its intrinsic and instrumental contributions to academic achievements (Gibson & Larson, 2007). Meanwhile several visual arts education programmes exist (Braun & Wardelmann, 2009; The Government of Manitoba, 2011). Empirical data on the effect of arts education on specific abilities such as space visualization or visual-spatial integration skills in pre-school children are rather scarce.

METHODOLOGY

This research is quasi – experimental with both control and experimental groups. The statistical population comprises the preschool children educating in the schools of Isfahan (4th district) in the educational year (2013-2014). The statistical sample consist of two groups of 18 students

belonging to two schools that were randomly selected. The independent variable in this research is found to be : "painting instructions to the children" while the dependent variable is the children's visual-spatial intelligence that have been considered both at the beginning and at the end of the instruction.

Then the painting instruction was began with the experimental group with an approach to visual-spatial intelligence. There was no intervention and instruction made in the first two sessions. The following items were investigated: the way the children deal with painting (the way they view painting), how to draw shapes, how to pay attention to the children's mentality, the ability to communicate/ interact with the subject of interest, and imaginative and visual factors, including care toward all the directions in painting , the usage of colors, the children's care for the details and the placement of the subjects in the painting space. Afterthat, as many as fifteen 60- minute sessions were specified for instructing painting based upon spatial- visual intelligence. In thesessions, children become engaged with various concepts such as familiarity with the concepts of direction, transforming subjective concepts to objective ones, integrating different levels and constructs with the aim

of creating newer and more familiar levels, the ability to creativenew pictures and so on that are regarded as the characteristics of visual-spatial

While the name “visual-spatial intelligence” might make you think of people who need to see things or have graphically-based learning experiences to learn best, in fact, Gardner’s visual-spatial modality really refers to visualization (with the mind’s eye) and with spatial judgment (i.e., the ability to gauge the relative distances and proximities of objects visually). In less academic terms, this type of intelligence is required for navigation, mental visualization when planning to build or assemble something, recognizing faces or scenes quickly, and picking out fine visual details.

So, someone who is strongest in visual-spatial intelligence might be the type of person who never gets lost, the type we would say has “a good sense of direction.” We all know someone like this (you may be one), and can easily see the value in this modality.

TOOLS

Raven IQ Test was as a tool in evaluating and estimating the data. Numerous studies were carried out regarding this test and has

been reconsidered many times. Those reconsidered forms belonging toRaven IQ Test are used to measure the individual’s IQ level in all the levels of capabilities (from the 5-year old children to the adults).

The first part includes quantitative study of the instruction results based upon visual-spatial intelligence .therefore, the data and the scores obtained from the assessment of visual-spatial intelligence was statistically examined. For this reason, co-variance statistical analysis was used. To begin co-variance analysis, twohypotheses were initially proved to be valid, including the normality of the data and alignment (compatibility) of the variances .to prove the normality of the data to be valid, Kolmogorov-Smirnov test was used. To prove the compatibility of the variances, "Leven" test was used. These statistical figures were demonstrated on graph or diagram and then the hypothesis was examined. The second part of the data analyses consists of the qualitative study of the findings/results, including the qualitative study of the results according to the painting works by children.

Hypothesis 1: teaching different visual and imaginative methods can help enhance the visual-spatial intelligence in the children.

Table 1- the descriptive data related to the hypothesis

Variable	Group	Numbers	Pre-test	POST-TEST
			Mean and SD	Mean and SD
Intelligence	Experimental	18	103/94 (11/24)	116/66 (11/17)

	Control	18	112/38 (17/11)	112/22 (15/42)
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In order to use co-variance analysis, the presuppositions such as the normality of the data and the sustainability (consistence) of the variance should be taken into consideration.

	Average (mean)	Standard deviation	k-s-z	Level of significance
intelligence	113/94	13/39	0/6	0/75

In order to carry out analytical examination of the major hypothesis, the co-variance analysis is used with the results shown in the table below:

Statistical power	Square root	Level of significance (p)	F	The average of square root	Degree of freedom	Total square root	The major source of changes
Pre-test	3662/18	1	3662/18	45/9	0/000	0/57	1
group	731/55	1	731/55	9/26	0/005	0/21	0/84

Table 2: the findings of co-variance analysis analyses related to intelligence in both experimental and control groups as the above table shows. After omitting the impact of pre-test on the dependent variable and with regard to the calculated coefficient " F" , it can be said that there lies a difference between the moderated averages(means) of the participant`s IQ scores in terms of the group membership (experimental and control groups). This difference can be observed in the post- test stage (26/9=F P<00/005).Therefore , the hypothesis is said to be confirmed and instruction of numerous visual and imaginative methods can be influential in enhancing the children`s visual-spatial intelligence. The extent of this impact in the post-test stage is 0/21.

B) qualitative analysis: in the process of quantitative analysis of the data, the statistical findings obtained from the test known as "Raven IQ Test " , were analyzed by co-variance. As it was illustrated earlier, the analyses revealed /demonstrated the effectiveness of painting instruction with an approach toward visual-spatial intelligence. In the section dedicated for qualitative analysis, the painting works by children be examined. Likewise, they will be evaluated according to the components of visual-spatial intelligence as well as their formation. Enhancement of the child`s visual-spatial intelligence through reinforcing the power of imagination.

Table 3: the result obtained from the pretest of experimental group

	The power of imagination	Recreation of the images	Understanding the direction	Determining the route or direction	Understanding the spatial relations
Participant number 1	Creating cliché pictures	Integrating the flowers	The shape from another view(direction)	Error in repetition	Six in lengthways
Participant	Creating	One single	The shape from a	Disarrangement in	Six in

number 2	complicated shapes/forms	flower with limited color	linear view	repetition	lengthways
Participant number 3	Creating cliché pictures	One single flower with limited color	Lack of attention to the direction	The error percentage limited	One cut
Participant number 4	cliché pictures	One single flower with limited color	The opposite direction	The error percentage limitedvery	Two cuts
Participant number 5	Creating cliché pictures	One single flower with limited color	The opposite direction	Error in repetition	Four cuts

Table 4: the result obtained from the post test: experimental group

	The power of imagination	Recreation of the images	Understanding the direction	Determining the route Or direction	Understanding the spatial relations
Participant number 1	Variety of the shapes	Variety of the shapes and color	The concept of up and down	Close to the direction	Six cuts with appropriate direction
Participant number 2	Transparency of the shapes	Variety of the shapes and color	Up and down upside down	Close to the direction	Six cuts with appropriate direction
Participant number 3	Variety of the shapes	Variety of the shapes and color	Up and down upside down	Close to the direction	Six cuts with appropriate direction
Participant number 4	Variety of the shapes	Variety of the shapes and color	Up and down upside down	No errors	Six cuts with appropriate direction
Participant number 5	Variety of the shapes	Variety of the shapes and color	Up and down upside down	No errors	Six cuts with appropriate direction

CONCLUSION

visual-spatial (VS) Intelligence can be seen in its purest form in the active imagination of children involved in such things as daydreaming, pretending to make themselves invisible, or imagining themselves to be on a great journey to magical times and places. People use this intelligence when they draw pictures to express their thoughts and feelings, or when they decorate a room to create a certain mood. they use it when they use a map successfully to get someplace they want to go. VS Intelligence helps they win at chess, enables theirto turn a blueprint on paper into a “real” object (a model or a dress), and allows theirto

visualize things they want in their lives, like a new outfit, car, or career.

Arts-based education is a field of developmental learning for a child in pre-school. It is based on visual, visual- spatial and tangible components which are realized in building, drawing, painting, modelling, sculpting and similar activities requiring perceptual and fine-motor skills. Such abilities are associated with the acquisition of academic skills like reading, spelling, writing or mathematics (Kulp, 1999; Pieters et al., 2012). There is some evidence that arts-based education may have an effect on perceptual-motor learning as described in the introduction (Kulp, 1999; Pieters et al.,

2012), which is beyond the intrinsic values of the arts themselves.

Increasing the level of difficulty, encouraging visualization teaching holistically, using humor, color, mnemonics, and using manipulatives are methods that may be successfully used with these learners (Mann, 2001; Silverman , 2002).

In this study, the results obtained from the instruction of painting and its impact on the children`s visual intelligence were examined through qualitative (works by children) and quantitative analyses (Raven test answer sheet in both pre-test and post-test). With regard to the approach that encompasses multiple intelligence and Howard Gardner`s theory, the standard way of proving and confirming the hypothesis and considering the results were mainly based upon the qualitative measures. However Howard Gardner argued that some of the abilities regarding this type of intelligence are measurable through using the test (Gardner,1993).

Regarding the explanation made about visual- spatial intelligence, it was mentioned that this type of intelligence elaborates on the ability to fully and precisely observe the phenomena in order to classify and to organize the shapes and pictures to perceive and explain visual ideas. It also refers to the objective

(concrete) categories to change the form of the aforesaid ideas. To illustrate, the painting category can be regarded as a process that transformed the ideas and imaginations into the imaginative and objective categories. in this regard, the ability to process the visual-spatial information is involved and observed more than any other factors. As it was mentioned earlier, the most important advantage and capability provided by the visual- spatial imagination for the individuals, is believed to be the talent to precisely perceive the visual world in such a way that it facilitates imagining the shapes and forms, mobilizing /moving them in mind and creating different types of imagination to emerge and to be transformed in the individuals, this will be proved to be valid only through conducting research, experience and experiment.

Being highly aware of this fact that teaching instruction can enhance this type of intelligence to the great extent and considering this point that the approach to enhance/expand the visual- spatial intelligence plays a substantial role in this respect. The instructor will be able to direct more careful attention in regulating and organizing his/her lesson plans.

The educational sessions based on the visual- spatial intelligence were held between April to the mid may 2014. The

number of total sessions was 15.(except for on public session). The painting instruction was held twice a week that increased to three sessions in the final weeks(three sessions per work). The researcher believes that if the sessions are held in more ... intervals and more sessions(e.g. the beginning of educational year), the children will benefit from more physical facilities, including more space, more opportunities,more various tools etc. thanks to the sustainable and the pace of the drills and homework assignments, this type of intelligences thought to be enhanced. If this intelligence finds an opportunity to develop better, all the other types of intelligence will be considerably promoted in the children.

The more awareness of how influential this type of intelligence will be over the children, reminds the instructors of the remarkable significance of the painting classes.

It is often observed that –except for a limited number of the schools- in the majority of the educational centers, the painting class is often regarded as a completely funny and recreational purpose. It is also observed that due to the lack of time, the painting classes are replaced by some other lessons and syllabi. In other words, the painting instruction is disregarded by taking a brief look at the

children`s painting notebooks, this will be possible to spot. Although the current research does not aim to focus on pathological aspects, it is worthy of notice that any type of painting instruction. Is expected to be targeted and age-appropriate.

In addition to introduction and explanation of spatial-visual intelligence, it was also mentioned that there are numerous techniques that considerably influence the growth of this intelligence of those popular methods in activating this type of intelligence, one can mention imagination, colorful signs, visual metaphors, mental designs and graphical symbols. Considering these factors, the researcher has endeavored to found his lesson plans based upon these components.

The strongest emphasis was placed by the researcher on the imagination and reinforcement of recreation in the children, implementation of mental designs/ plans. Along with the use of colors and assignments to enhance the visual perception in the children. In order to promote visual- spatial intelligence, using the recommended methods and making these components compatible with each other and aligning them with painting assignments and , eventually, transforming these components into the visual/imaginative methods are all among

the most necessary factors that help the enrichment of painting instruction to children.

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