

**Effectiveness Of Visual Spatial Intelligence Based Instructional Materials To Enhance
The Achievements Of The Secondary School Students**

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Abstract

Spatial intelligence is one of researcher Howard Gardner's nine multiple intelligences. The Spatial thinking is powerful and pervasive, underpinning everyday life, work, and science. They are skilled at using their ability to visualize and their spatial judgment to complete tasks and projects that include design, judgment, and creativity. Kosslyn (1978) distinguished four stages in the cognitive processing of spatial information. The investigators employed the experimental method for the present investigation. 40 high school students were taken from Government Higher Secondary School through Simple Random sampling technique. A questionnaire contains 50 items of "achievement" for high school students. Spatial thinking can be taught that learning to think spatially must take place within domain contexts.

Introduction

Spatial intelligence is unique of researcher Howard Gardner's nine multiple intelligences. Educator may logically accomplish that this intelligence involves how well a student may process info that is obtainable visually in one or more extents. This intelligence comprises the ability to visualize substances and rotate, transform, and operate them. Spatial intelligence is opening intelligence upon which many of the other eight intellects rely and interrelate. Engineers, scientists, architects, and artists are amongst those that Gardner sees as having high spatial intellect.

The Spatial thinking is influential and pervasive, underpinning ordinary life, work, and science. It plays a role in doings ranging from sympathetic metaphors, becoming good at

way and understanding works of art, to attractive in molecular modeling, generating geometry proofs, and understanding astral data. These scholars with high visual-spatial intelligence also have good spatial ruling and reasoning. That is, they are able to precisely judge the distance between themselves and a thing, how far the object is to the correct, etc. They are accomplished at using their ability to imagine and their spatial ruling to complete tasks and schemes that include design, ruling, and creativity. For this aim, they make good artistes, artists, architects, engineers, and inventors. Spatial thinking is powerful and inescapable, underpinning ordinary life, work, and science. It plays a role in doings ranging from sympathetic metaphors, flattering good at way finding, and understanding works of art, to attractive in molecular modeling, generating geometry proofs, and interpreting astral data.

Kosslyn (1978) distinguished four stages in the cognitive dispensation of spatial information:

1. Generating a symbol, either by recalling an object or event from long-term reminiscence or by making an image from words or ideas;
2. Maintaining a representation in employed memory in order to use it for cognitive or problem solving
3. Scanning a representation that is upheld in working reminiscence, in order to focus kindness on some of its parts; and
4. Transforming a representation, for example, by rotating it to a new viewing perspective, shrinking it, or imagining its shape if it were transformed by being folded or compressed.

Visual Spatial Intelligence

Domain-specific long-term memory of patterns in order to learn to classify patterns in a information domain more rapidly and precisely, one needs to study those specific shapes. There is little or no advantage from studying one set of forms in perceiving additional set of shapes.

However, perceptual learning of patterns goes hand in hand with the meta-cognitive information that (a) patterns can be increase classified and (b) studying shapes and practicing pattern identification style those patterns come quicker and more readily to mind when they are relevant to a task. Domain-specific mental changes of patterns in a memory: in order

to learn to envisage how molecular constructions will appear when rotated or long-drawn-out, one needs practice spiritually transforming those constructions and highly alike ones. In order to learn to envisage the cross sections subsequent from folds and physical events theorized within plate tectonics, one needs to practice those mental alterations for those types of patterns. However, practice in mental alteration goes hand in hand with the meta-cognitive information that such practice (a) wages off and (b) makes it easier to think and aim within that domain. It is also the ability to understand mental models, operate and shape them spatially and draw them in detail (Loori, 2005). Thus, exactly, people with highly industrialized spatial-visual intelligence (Ibman & Hadban, 2013) are known to:

- be good at puzzle building
- be good at reading, writing and sympathetic charts and graphs
- have good sense of direction
- have good sense of sketching and painting
- have good sense of interpreting visual images
- think in pictures
- create mental images due to retain info
- enjoy looking at maps, charts, pictures
- enjoy watching videos and movies

Objectives of the Study

1. To find out the effectiveness of Visual Spatial intelligence based instructional materials to enhance academic achievement of high school students.
2. To find out significant difference if any, between the mean scores of male and female students' academic achievement that acquired through Visual Spatial intelligence based instructional materials.
3. To find out the significant difference if any, between the mean scores of academic achievement among their locality.
4. To find out the relationship if any between the academic achievements in science of the high school students.

HYPOTHESES

1. There exists significant difference between the mean scores of academic achievement in the pre-test and post-test through Visual Spatial intelligence based instructional materials.
2. There is significant difference between the mean scores of male and female students' academic achievement acquired through the Visual Spatial intelligence based instructional materials.
3. There is significant difference between the mean scores of urban and rural area students in academic achievement acquired through Visual Spatial intelligence based instructional materials.

Method

The investigators employed the experimental method for the present investigation in which the single group experimental design administered to enhance students' academic achievement acquired through Visual Spatial intelligence based instructional materials.

SAMPLE

A total of 40 high school students were taken from Government Higher Secondary School, Kadukkaivalasai through Simple Random sampling technique.

TOOLS

A questionnaire contains 50 items of "achievement" for high school students (pretest and posttest) Visual Spatial intelligence based instructional materials developed by investigator were used as tools for the present study.

DATA ANALYSIS**Hypothesis 1:**

There exists significant difference between the mean scores of academic achievement in the pre-test and post-test through Visual Spatial intelligence based instructional materials.

Visual Spatial intelligence based	Pre-Test	Post-Test	t-value	Significant level
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instructional materials	M	S.D	M	S.D		
puzzle building	46.64	11.70	49.50	9.67	1.28	NS
understanding charts	45.60	11.12	48.75	8.24	1.61	NS
sense of direction	54.55	1.54	60.40	10.1	2.38	S
think in pictures	57.45	8.00	68.90	8.33	6.55	S
create mental images	46.64	11.70	54.95	9.74	3.73	S

From Table1, it is inferred that there exist significant difference between the pre-test and post-test scores of all skills. Hence, it is understood that the Visual Spatial intelligence based instructional materials are enhancing achievement very effectively. There is no significant difference between puzzle building and understanding charts. There is significant difference between sense of direction, think in pictures and create mental images.

Hypothesis: 2

There is significant difference between the mean scores of male and female students' achievement acquired through the Visual Spatial intelligence based instructional materials.

Gender	N	Mean	S.D	t-Value	Significant
Male	20	49.50	9.63	6.15	S
Female	20	60.40	10.15		

Table-2 shows that there is significant difference between the male and female students' life skills. Hence it is concluded that the Visual Spatial intelligence based instructional materials enhancing the achievement irrespective of gender.

Hypothesis 3:

There is significant difference between the mean scores of urban and rural area students in academic achievement acquired through Visual Spatial intelligence based instructional materials.

Gender	N	Mean	S.D	t-Value	Significant
Urban	10	55.30	8.16	4.11	S
Rural	30	66.10	9.07		

Table-3 shows that there is significant difference between the urban and rural area students' life skills. Hence, it is concluded from the statistical finding that the Visual Spatial intelligence based instructional materials enhancing achievement among high school students irrespective of locality of the students.

Findings

- It is inferred that there exist significant difference between the pre-test and post-test scores of all skills. Hence, it is understood that the Visual Spatial intelligence based instructional materials are enhancing achievement very effectively. There is no significant difference between puzzle building and understanding charts. There is significant difference between sense of direction, think in pictures and create mental images.
- There is significant difference between the male and female students' achievement. Hence it is concluded that the Visual Spatial intelligence based instructional materials enhancing the skills irrespective of gender.
- There is significant difference between the urban and rural area students' achievement. Hence, it is concluded from the statistical finding that the Visual Spatial intelligence based instructional materials enhancing skills among high school students irrespective of locality of the students.

Conclusion

Spatial thinking can be taught that learning to think spatially must take place within domain contexts and that while transfer from one specific domain of knowledge to another is neither automatic nor easy, it is possible with appropriately structured programs and curricula. On the basis of these conclusions, the committee derives two educational principles: first, instruction should be infused across and throughout the curriculum;

second, instruction should create skills that promote a lifelong interest in spatial thinking. These two principles lead in turn to ideals for the design of a K–12 curriculum that would promote and support spatial thinking.

References

1. R.Udhaya Mohan Babu&DrG.Kalaiaraasan(2019),a study on visual spatial intelligence skills among the secondary school students,**International Educational and Research Journal,E-ISSN No : 2454-9916 | Volume : 5 | Issue : 6 | June 2019.**
2. R.Udhaya Mohan Babu&DrG.Kalaiaraasan(2019),**“Visual-Spatial Skills for Visually Impaired Students”** Organized by Department of Special Education, Alagappa University, Karaikudi held on 4th& 5th September 2019.**ISBN.**
3. R.Udhaya Mohan Babu&DrG.Kalaiaraasan(2019),**“Visual Perception of Brain”** Organized by Alagappa University College of Education, Alagappa University, Karaikudi held on 11th& 12th July 2019.**ISBN.**
4. R.Udhaya Mohan Babu&DrG.Kalaiaraasan(2019),**“Brain Based Strategies for Learning ”** Organized by Department of Education, Alagappa University, Karaikudi held on 7th& 8th March 2019.**ISBN 978-93-5346-994-8. P.no.291-293.**