RELATIONAL STUDIES ON MULTIPLE INTELLIGENCE AND ACHIEVEMENT IN SCIENCE AMONG HIGH SCHOOL STUDENTS

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Abstract

Intelligence is the aggregate or global capacity of an individual to act purposefully, to think rationally and to deal effectively with the environment. This mental capacity or mental energy helps an individual to face new challenges and problems of life as successfully as possible. Ones own mental energy can be judged in terms of the quality of his behavior or performance. This paper reports on the multiple intelligence and achievement of high school students. The sample consisted of 200 high school students. A scale on multiple intelligence was used to get the data from the students. Percentage analysis, t-test, F-test and Pearson-Product moment correlation of co-efficient, were used for analyzing the data. The result shows that there is a correlation between multiple intelligence and achievement in science among high school students.

Key Words: *Relational Studies, Multiple Intelligence, Achievement, Science.*

Introduction

Education is a complex social cultural and ethical process designed in a social or cultural context. It is related with social structures, cultural environments values and ideals of people,

society and the government. All these factors are dynamic. By all these the definition of teaching has been changing depending on time, place and society. A good teaching may be designed to affect maximum learning.

Howard Earl Gardner was born in Scranton, Pennsylvania in 1943. Howard Gardner proposed a new theory and definition of intelligence in his book (1983) entitled "Frames of Mind: The theory of multiple intelligences". The basic question he sought to answer was: Is intelligence a single thing or various independent intellectual faculties? Gardner set about studying intelligence in a systematic, multi-disciplinary and scientific manner, drawing from psychology, biology, neurology, sociology, anthropology and the arts and humanities. This resulted in the emergence of his theory of Multiple Intelligences (MI) theory as presented in Frames of Mind (1983).

MULTIPLE INTELLIGENCES

Howard Earl Gardner proposed eight different intelligences to account for a broader range of human potentials in children and adults. These intelligences are:

(i) **Linguistic Intelligence (word smart)**-sensitivity to the meaning and order of words.

(ii) **Logical-mathematical Intelligence (number/ reasoning smart)**-ability in Mathematics and other complex logical systems.

(iii) **Musical Intelligence (music smart)**-ability to understand and create music. Musicians, composers and dancers show heightened musical intelligence.

(iv) **Spatial Intelligence (picture smart)**-ability to think in pictures, to perceive the visual world accurately and recreate or alter it in the mind or on paper. Spatial intelligence is highly developed in artists, architects, designers and sculptors.

(v) **Bodily-kinesthetic Intelligence (body smart)**-ability to use one's body in a skilled way, for self-expression or toward a goal. Mimes, dancers, basketball players, and actors are among those who display bodily-kinesthetic intelligence.

(vi) **Interpersonal Intelligence (people smart)**-ability to perceive and understand other individuals-their moods, desires, and motivations. Political and religious leaders, skilled parents and teachers, and therapists use this intelligence.

(vii) **Intrapersonal Intelligence (self smart)-**an understanding of one's own emotions. Some novelists and or counselors use their own experience to guide others.

(viii) **Naturalist Intelligence (nature smart)**-ability to recognize and classify plants, minerals, and animals, including rocks and grass and all variety of flora and fauna. The ability to recognize cultural artifacts like cars or sneakers may also depend on the naturalist intelligence. Some people from an early age are extremely good at recognizing and classifying artifacts. For example, some children of age 3 or 4, are good at recognizing dinosaurs than most adults. Gardner identified Charles Darwin as a prime example of this type of intelligence.

The criteria to consider 'Multiple Intelligence' (Gardner, 1999, p. 36) are

- The potential for brain isolation by brain damage,
- Its place in evolutionary history
- The presence of core operations
- Susceptibility to encoding
- Support from experimental psychology and
- Support from psychometric findings.

Need for the study

All students can learn and succeed but not all on the same day in the same way. Intelligence in the ability to see a problem, then solve a problem or make something that is useful to a group of people. Howard Gardner's theory of Multiple Intelligence identifies that there are many forms of intelligence and that people have varying strengths and combination of these. We can all improve each of the intelligence area then in others. With an understanding of Gardner's theory of Multiple Intelligence, teachers, school administrators and parents can better understand the learners in their midst. They can allow the students to safely explore and learn in many ways and they can help students direct their own learning. Adults can help students understand and appreciate their strengths, and identify the real-world activities that will stimulate more learning.

Today in this world technological advancement Multiple Intelligence plays a vital role. Application of Multiple Intelligence theory helps students begin to understand how they are intelligent. Thus it was thought prudential by the investigator to search into the relationship between Multiple Intelligence and achievement in science.

Statement of the Problem

The entitle on "**Relational studies on Multiple Intelligence and Achievement in Science among High School Students''**

Multiple Intelligence

By the term 'Multiple Intelligence' the investigator means a set of skills such as Verbal-linguistic intelligence, Logical-mathematical intelligence, Visual-spatial intelligence, Bodily-kinesthetic intelligence, Musical-rhythmic intelligence, Interpersonal intelligence and Intrapersonal intelligence.

Objectives

➢ To find out the level of multiple Intelligences of High school students in terms of sex.

➢ To find out the significances difference between a) boys and girls b)rural and urban c) Tamil medium and English medium d) government, aided and self financing school students in their multiple intelligences.

➢ To find out the level of achievement in science among high school students in terms of sex.

➢ To find out the significance difference between a) boys and girls b)rural and urban c) Tamil medium and English medium d) government, aided and self financing school students in their achievement

➢ To find out the significant relationship between Multiple Intelligence and achievement in science among the high school students.

Hypotheses

➢ There is no significant difference between male and female students in their multiple Intelligences.

➢ There is no significant difference between rural and urban students in their multiple Intelligences.

➢ There is no significant difference between Tamil medium and English medium students in their multiple Intelligences.

➢ There is no any significant difference among government, aided and self financing school students in their multiple Intelligences.

➢ There is no significant difference between male and female students in their achievement.

➢ There is no significant difference between rural and urban students in their achievement.

➢ There is no significant difference between Tamil medium and English medium students in their achievement.

> There is no any significant difference among government, aided and self financing school students in their achievement.

> There is no significant relationship between Multiple Intelligences and achievement in science among the high school students.

Methodology

The investigator has adopted the survey method of research to study the relationship between Multiple Intelligence and the achievement in science among the high school students. Survey research is a procedure in which information is systematically collected from a population through some form of direct solicitation such as face-to-face interview, administering questionnaire or schedule.

A worthwhile survey study can collect three types of information.

- Of what exists by studying and analyzing important aspects of the present situation.

- Of what we want by clarifying goals and objectives possibly through a study of the conditions existing elsewhere or what exports consider being desirable.

- Of how to get these through discovery the possible means of achieving the goals or the basis of the experience and opinions of exports.

Sample

The standard IX students form the population of this study. Among them 200 students from 8 high schools were taken as sample random sampling technique had been adopted for this study.

Tools Used

Multiple Intelligence Inventory

For the study of the Multiple Intelligence of the high school students, *'Multiple Intelligence Inventory'* developed by Dr. Terry Armstrong and modified by the investigator with consultation of guide and experts was used.

Source of Achievement in Science

No separate tool was prepared by the investigator to measure the achievement score in science. The marks in science subjects in their half yearly exams conducted by the school as recorded in the respective school register were taken as the achievement score in science.

Data Analysis

TABLE- 1

THE LEVEL OF MALE AND FEMALE STUDENTS IN THEIR MULTIPLE INTELLIGENCE

Dimensions	Category	Low		Average		High	
		N	%	N	%	N	%
Multiple Intelligence	Boys	22	17.6	87	69.6	16	12.8
	Girls	15	20.0	42	66.0	18	14.0

It is inferred from the above table that 17.6% of the boys have low, 69.6 % average and 12.8% high levels of multiple intelligence. Among the girls 20.0 % of students have low, 66.0 % average and 14.0 % high levels of multiple intelligence.

TABLE- 2

DIFFERENCE BETWEEN MALE AND FEMALE STUDENTS IN THEIR MULTIPLE INTELLIGENCE

Category	Mean	SD	Count N	Calculated value 't'	Remarks
Boys	77.82	16.73	125	0.69	Not Significant
Girls	75.41	15.21	75		

(At 5% level of significance, the table value't' is 1.96)

It is inferred from the above table that there is no significant difference between male and female students in their Multiple Intelligence and hence the null hypothesis is accepted.

TABLE- 3

DIFFERENCE BETWEEN RURAL AND URBAN STUDENTS IN THEIR MULTIPLE INTELLIGENCE

Category	Mean	SD	Count N	Calculated value 't'	Remarks
Rural	65.12	15.53	115	3.20	Significant
Urban	72.41	16.21	85		

(At 5% level of significance, the table value't' is 1.96)

It is inferred from the above table that there is a significant difference between rural and urban students in their Multiple Intelligence and hence the null hypothesis is rejected.

TABLE- 4
DIFFERENCE BETWEEN TAMIL MEDIUM AND ENGLISH MEDIUM STUDENTS IN THEIR MULTIPLE INTELLIGENCE

Category	Mean	SD	Count N	Calculated value 't'	Remarks
Tamil Medium	69.83	14.73	105	1.86	Not Significant
English Medium	66.41	11.21	95		

(At 5% level of significance, the table value 't' is 1.96)

It is inferred from the above table that there is no significant difference between Tamil medium and English medium students in their Multiple Intelligence and hence the null hypothesis is accepted.

TABLE -5
DIFFERENCE AMONG GOVERNMENT, AIDED AND SELF FINANCING SCHOOL STUDENTS IN THEIR MULTIPLE INTELLIGENCE

Variable	Source of variation	Sum of squares	Degrees of freedom	Mean square value	Calculated 'F' value	Remarks at 5% level
Multiple intelligence	Between	568.08	2	281.54	2.85	Not Significant
	Within	29990.00	198	98.78		

(At 5% level of significance for 2,198 df, the table value of 'F' is 3.00)

It is inferred from the above table that there is no significant difference among government, aided and self financing school students in their Multiple Intelligence and hence the null hypothesis is accepted.

TABLE- 6

THE LEVEL OF MALE AND FEMALE STUDENTS IN THEIR ACHIEVEMENT

Sex	Low		Average		High	
	N	%	N	%	N	%
Boys	20	16.00	78	62.40	27	21.60
Girls	11	14.67	48	64.0	16	21.33

It is inferred from the above table that 16% of the boys have low, 62.4% average and 21.60% high levels of achievement. Among the girls 14.67% of students have low, 64% average and 21.33% high levels of achievement.

TABLE- 7

DIFFERENCE BETWEEN BOYS AND GIRLS STUDENTS IN THEIR ACHIEVEMENT IN SCIENCE

Category	Mean	SD	Count N	Calculated value 't'	Remarks
Boys	55.18	12.05	125	2.46	Significant
Girls	60.15	14.82	75		

(At 5% level of significance, the table value't' is 1.96)

Since the calculated value of 't' is greater than the table value for 198 degrees of freedom of 5% level, the hypothesis is rejected. Therefore there is significant difference between boys and girls students in their achievement in science.

TABLE - 8

DIFFERENCE BETWEEN RURAL AND URBAN STUDENTS IN THEIR ACHIEVEMENT IN SCIENCE

Category	Mean	SD	Count N	Calculated value 't'	Remarks
Rural	56.86	11.32	115	2.37	Significant
Urban	61.15	13.53	85		

(At 5% level of significance, the table value't' is 1.96)

Since the calculated value of 't' is greater than the table value for 198 degrees of freedom of 5% level, the hypothesis is rejected. Therefore there is significant difference between rural and urban students in their achievement in science.

TABLE- 9
DIFFERENCE BETWEEN TAMIL MEDIUM AND ENGLISH MEDIUM STUDENTS IN THEIR ACHIEVEMENT

Category	Mean	SD	Count N	Calculated value 't'	Remarks
Tamil Medium	59.83	12.73	105	0.84	Not Significant
English Medium	58.41	11.21	95		

(At 5% level of significance, the table value't' is 1.96)

It is inferred from the above table that there is no significant difference between Tamil medium and English medium students in their achievement in science and hence the null hypothesis is accepted.

TABLE- 10
DIFFERENCE AMONG GOVERNMENT, AIDED AND SELF FINANCING SCHOOL STUDENTS IN THEIR ACADEMIC ACHIEVEMENT

Variable	Source of variation	Sum of squares	Degrees of freedom	Mean square value	Calculated 'F' value	Remarks at 5% level
Achievement	Between	230.65	2	115.33	1.15	Not Significant
	Within	29669.35	198	99.90		

(At 5% level of significance for 2,198 df, the table value of 'F' is 3.00)

It is inferred from the above table that there is significant difference among government, aided and self financing school students in their achievement in science.

TABLE -11

THE CORRELATION VALUE BETWEEN MULTIPLE INTELLIGENCE AND ACHIEVEMENT IN SCIENCE AMONG HIGH SCHOOL STUDENTS

Category	Σx	Σy	Σx^2	Σy^2	Σxy	Calculated γ value	Remarks
Male	6203	46350	362439	17706074	2380849	0.480	Significant
Female	4161	28681	258935	11132953	1628868	0.553	Significant

(For 198 df, at 5% level of significance, the table value is 0.138).

It is inferred from the above table that there is significant relationship between Multiple Intelligence and male, female students of high school in their achievement in science.

FINDINGS

1. The level of multiple intelligence of high school students with reference to sex is average

2**.** There is no significant difference between boys and girls students in their multiple intelligence

3**.** There is significant difference between rural and urban students in their multiple intelligence

4. There is no significant difference between Tamil and English medium students in their multiple intelligence.

5. There is no significant difference among government, aided and self financing school students in their multiple intelligence.

6. The level of achievement in science of high school students with reference to sex is average.

7. There is significant difference in achievement of high school students with reference to sex.

8. There is significant difference in achievement of high school students with reference to nativity of the student.

9. There is no significant difference between Tamil and English medium students in their achievement.

10. There is no significant difference among government, aided and self financing school students in their achievement

11. There is significant relationship between Multiple Intelligence and achievement with reference to sex.

Discussion

There is no significant difference between male and female students in their Multiple Intelligence. This may be due to the fact that today the boys and girls have proper education and widows their ability to do things on their way and to be self-sufficient. Particularly, in Tamil Nadu the boys and girls are well educated and they are aware of the importance advancement taking place in the society. Now girls also have sample opportunity to interact with the external world and hence they are at par with boys in intelligences. There is significant difference between rural and urban students in their Multiple Intelligence. Urban students were better than rural students. This may be due to the fact that the facilities and opportunities provided in urban students.

There is significant difference among boys and girls students in their academic achievement. Girls were better than boys this may due their hardworking nature towards the achievement without any distraction. There is significant difference between rural and urban high school students in their achievement urban students have high. This may be due to the fact that urban students have complete infrastructural facilities for their studies. Even in their home too, the parents are ready to offer separate study room with necessary facilities like study table with chair, lightings, reference books etc.

The study reveals that there is significant positive correlation between Multiple Intelligence and achievement in science of high school students. The level of Multiple Intelligence highly influences or affects the achievement high school students. In total the investigator has comes out with a conclusion that Multiple Intelligence has significant impact on the academic achievement of high school students.

Conclusion

It is very important to know how to use multiple intelligence theory in various kinds of schools or for various populations. Let us see different types of intelligence and the core components of it, followed by the ways of improving various types of intelligence of the students by inculcating some aspects in teaching – learning process.

REFERENCES

Gardner, Howard. (1983). *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic.

Armstrong, T. (1993). *7 Kinds of Smart: Identifying and Developing Your Many Intelligences*,

New York: Plume.

Gardner, Howard. (1993). *Multiple Intelligences: The Theory in Practice*. New York: Basic.

Gardner, Howard. (2000). *Intelligence Reframed: Multiple Intelligences for the 21st Century*.

Mayer.D.John, Salovey Peter, Caruso.R David, Sitarenios Gill, (2001) "Emotional Intelligence as a standard   Intelligence", Emotion, vol.1, No.3.232-242, American Psychological Association.

Panda, B.N. & Mohanty, R.C. (2003). How to Become a Competent/Successful Teacher. New Delhi, Discovery Publishing House.

Dash Devendra Nath & Behera Narayan Prashad.(2004) "Teacher Effectiveness in Relation to their Emotional Intelligence", Journal of Indian Education, November 2004. NCERT, New Delhi.

Dass Surendra, (2004) "Emotional Supremacy" Edutracks-April-2004. Neelkamal Publications Pvt. Ltd, Hyderabad.

Gopinath. L. (2004) "Emotional Intelligence in Children", New Frontiers in Education Vol. XXXIV (I), New Delhi.

Patra, Swati. (2004) "Role of Emotional Intelligence in Educational Management", Journal of Indian Education, May 2004. NCERT, New Delhi.

Pradhan Ravindra Kumar, Bansal Dolly & Biswal.R.K.(2005) "Emotional Intelligence and Personal Effectiveness", Journal of Community Guidance and & Research, November-2005. NCERT, New Delhi.

Dhull Indira,(2005) "Emotional Intelligence its Significance for School-Teachers", Edutracks**-**July-2005. Neelkamal Publications Pvt. Ltd, Hyderabad. New York: Basic.

Kumar K.B.S. (2005). Emotional Intelligence Research Insights. Hyderabad, ICFAI University Press.

Patil Ajaykumar Bhimrao,(2006) "Emotional Intelligence among Students Teachers in relation to sex, faculty and academic achievement," Edutracks-March-2006. Neelkamal Publications Pvt. Ltd, Hyderabad.