Multiple Intelligences of Secondary School Students of Rajasthan State

MS. NAVAL GEETA
Research Scholar,
Department of Education
Calorx Teachers' University, Ahmedabad

DR. SANJAY M GUPTA
Research Supervisor,
Lecturer in Selection Grade
Department of Education
Calorx Teachers' University, Ahmedabad

1. Introduction

Intelligence was the aggregate or the global capacity of the individual to act purposefully, to think rationally and to deal effectively with the environment. In this technological and competitive world the performance of the individual as a person, as a citizen, as a worker and as a student largely depends upon the intelligences he possess. A child differs immensely in intelligence. Gardner multiple intelligence theory opened new vistas in education. The theory of multiple intelligence functions for organizing and synthesizing the educational innovations that have sort to break out of the narrowly confined approach to learning. This theory opens the doors to wide variety of teaching strategies that can be easily implemented in the Class Room. Every child was endowed with unique and diverse gifts and talents, there by enriching them in the process of solving the problems. Hence study on Multiple Intelligence was important for providing opportunities for problem solving in realistic situations, giving opportunities to design products using strengths and interest as a guide, providing opportunities to the students to acquire skills and information using multiple intelligence, planning learning experiences around abstract themes and bringing the students own culture and experiences into the curriculum while expanding from this base into the other related areas.

2. Statement of the Problem

The present study mainly focuses on the multiple intelligences of 9th standard school students in Rajasthan state with references to Gender, Educational Qualification, Working Status of Parents, Nature of Family (joint family and nuclear family), with and without Siblings and Size of Family (up to four members and more than four members). Thus, the title of the study: **Multiple Intelligences of Secondary Schools Students of Rajasthan State**

3. Significance of the Study

It was found that there is dearth of studies in the area of multiple intelligences. Hence, this study was the need of the hour. Development of any nation depends upon the quality of its human resource, and the quality of human resource depends upon the quality of education. This study helps to improve the quality of education and consequently the nation.

It helps teacher in planning and practicing learning experiences the way it is suitable to the learners' individuality. It helps to elevate the level of satisfaction of successful teaching. Multiple intelligence not only helps at teaching level rather provides guidelines for evaluation, feedback and follow up work in accordance with the individuality of learners. It makes learning pursuit more joyful rather than strenuous, hard hitting and burdensome. Consequently, it is compatible for proper mental and physical

development. That finally helps the learner to grow the entire personality in integrity with mind, body and spirit. This research directs curriculum developers for incorporating appropriated teaching strategies in curriculum as to address diversity of learners. This study shows the ways to researchers in future to work on natural potential of learners and help the parents in nurturing their children accordingly. This proposed research is applied in nature hence, by default the inferred generalization of this research are worth institutionalized everywhere whereas students are offered learning experiences across the boundaries of the nations and in every human and social endeavour beginning from family, school and college education, society, nation to all continents of the world at large. This research sets up the benchmark for policy decision for various Departments in sectors where human thinking and intelligences are directly being invested.

4. Objectives

1. To study the multiple intelligence of secondary schools students
2. To compare the multiple intelligences of secondary school students with respect to their siblings
3. To compare the multiple intelligences of secondary school students with respect to their size of the family

5. Hypotheses

5.1 Null Hypotheses for Objective 6 - Siblings

Ho1. There will be no significant difference between the mean scores of logical intelligence of standard 9th students with siblings and without siblings.

Ho2. There will be no significant difference between the mean scores of linguistic intelligence of standard 9th students with siblings and without siblings.

Ho3. There will be no significant difference between the mean scores of musical intelligence of standard 9th students with siblings and without siblings.

Ho4. There will be no significant difference between the mean scores of spatial intelligence of standard 9th students with siblings and without siblings.

Ho5. There will be no significant difference between the mean scores of bodily-kinesthetic intelligence of standard 9th students with siblings and without siblings.

Ho6. There will be no significant difference between the mean scores of interpersonal intelligence standard 9th students with siblings and without siblings.

Ho7. There will be no significant difference between the mean scores of intrapersonal intelligence of standard 9th students with siblings and without siblings.

Ho8. There will be no significant difference between the mean scores of naturalistic intelligence of standard 9th students with siblings and without siblings.

5.2 Null Hypotheses for Objective 7 – Size of Family

Ho9. There will be no significant difference between the mean scores of logical intelligence of standard 9th students with family up to 4 members and more than 4 members.

Ho10. There will be no significant difference between the mean scores of linguistic intelligence of standard 9th students with family up to 4 members and more than 4 members.

Ho11. There will be no significant difference between the mean scores of musical intelligence of standard 9th students with family up to 4 members and more than 4 members.

Ho12. There will be no significant difference between the mean scores of spatial intelligence of standard 9th students with family up to 4 members and more than 4 members.

Ho13. There will be no significant difference between the mean scores of bodily-kinesthetic intelligence of standard 9th students with family up to 4 members and more than 4 members.

Ho14. There will be no significant difference between the mean scores of interpersonal intelligence standard 9th students with family up to 4 members and more than 4 members.

Ho15. There will be no significant difference between the mean scores of intrapersonal intelligence of standard 9th students with family up to 4 members and more than 4 members.

Ho16. There will be no significant difference between the mean scores of naturalistic intelligence of standard 9th students with family up to 4 members and more than 4 members.

6. Limitations and delimitations of the study

6.1 Limitations
The investigator developed a self-constructed multiple intelligences inventory for administering on secondary school students in Hindi language and the limitations of this tool were the limitation of this study.

6.2 Delimitations
The present study was delimited to standard 9th students of secondary schools in Jodhpur District in Rajasthan State.

7. Definitions of Key Terms
Multiple Intelligences: Multiple intelligences refer to the ways to adopt the situation by their own way. Every human being consists of any one or more of the intelligence among the identified eight categories. The eight multiple intelligences were interpersonal, intrapersonal, linguistic, logical, naturalistic, spatial, bodily-kinesthetic and musical intelligences. The total score of the students on different components included on Multiple Intelligence Inventory constructed by researcher refers to the multiple intelligences of the students.
Logical/Mathematical Intelligence: The ability to detect patterns, reason deductively and think logically.
Linguistic Intelligence: To effectively manipulate language to express oneself rhetorically or poetically. It also allows one to use language as a means to remember information.
Musical Intelligence: The ability to recognize and compose musical pitches, tones, and rhythm.
Musical Intelligence: The ability to recognize and compose musical pitches, tones, and rhythm.
Bodily/Kinesthetic Intelligence: The ability to use the body to express ideas feelings and to solve problems.
Interpersonal Intelligence: The ability to understand another person's feelings, motivations, and intentions and to respect effectively.
Intrapersonal Intelligence: The ability to know about and understand oneself and one's similarities to and differences from others.
Naturalist Intelligence: The ability to recognize and classify plants, minerals and animals.
Students: Students in the present study refers to the students of standard 9th, studying in English and Hindi medium secondary schools of Jodhpur district in Rajasthan state.
Siblings: It refers to whether student was living with sibling or without siblings
Size of family: It refers to whether students' family members were up to 4 members or more than 4 members.

8. Variables of the Study

8.1 Independent variables
1. Gender: Girls and Boys
2. Siblings: With and without siblings
3. Size of family: Family up to 4 members and more than 4 members

8.2 Dependent variables
1. Multiple Intelligences
2. Logical intelligence
3. Linguistic intelligence
4. Musical intelligence
5. Spatial intelligence

6. Bodily-Kinesthetic intelligence
7. Inter personal intelligence
8. Intra personal intelligence
9. Naturalistic intelligence

8.3 Control variables
1. Jodhpur city
2. Hindi and English medium
3. Standard 9th students
4. Co-education schools

9. Population of the Study
In the present study, the population encompassed all the 9th standard schools students of secondary schools of Jodhpur City in Rajasthan State.

10. Sample of the Study
In the present study, sample is selected by simple random sampling technique. Lottery method is used to identify proportionate numbers of schools from all the secondary schools included in the population. The sample encompasses 42 secondary schools in Jodhpur city. The total sample is 2228 which included 1148 boys and 1080 girls. List of schools included in the sample is as in Annexure-A.

11. Research Method
The method of research should be in such a way which leads to the solution of the research problem. For the present study, the researcher selected descriptive type of survey research, because it studied the current status of multiple intelligences of secondary school students in Jodhpur city.

12. Research Tool
Any research includes collection of data and that data collection instrument was called as a tool. There were different types of tools used in various researches. It was necessary to select or construct best suitable tool of the research. As many tools were available for multiple intelligences in English, the researcher made an attempt to prepare the multiple intelligence inventory in the national language Hindi for local settings. The researcher prepared a self-constructed Multiple Intelligence Inventory with 5 point Likert type scale (1-Never, 2- Rarely, 3- Sometimes, 4-Usually, 5-Always). The inventory was constructed following the below steps:

a) Content analysis
The researcher referred many research articles, reference books, websites previously constructed tools and tools construction guidelines for the components of Multiple Intelligences.

b) Item construction and editing
The researcher visited experts and prepared and framed items on Multiple Intelligences. Some primary statement was also collected from students by providing them open ended questionnaire. The statements were then edited in accordance to Gardner's theory and classified into eight different intelligences.

c) Construction of primary form of Multiple Intelligences Inventory
The primary form of Multiple Intelligences Inventory with 128 items were prepared and arranged logically in the inventory. There were 16 items for each multiple intelligences. The inventory was constructed with five point scales such as Never, Rarely, Sometime, Usually, Always. The marking of the five points was respectively 1, 2, 3, 4 and 5 for Never, Rarely, Sometime, Usually and Always, respectively. The primary form of the inventory was enclosed in Appendix B.

d) Expert opinion
Expert opinions were obtained on the primary form of Multiple Intelligences Inventory. There feedback and opinions and suggestions were incorporated wherever required.

e) Construction of second form of Multiple Intelligences Inventory

Based on the suggestions from experts, items were constructed and edited. The inventory was provided to some selected students for pilot study. In order to test whether the items are accepted or to be rejected from the final Inventory, Piloting and Item analysis was under taken. For this purpose the inventory was administered on 352 students of standard IX. Out of it, all 27% of top (95 students) and 27% (95 students) of the bottom scorers were compared on mean scores of each item that led to the 't' value of each items.

f) Finalization of Multiple Intelligences Inventory

The responses of the students which were related to the degree of relevance were removed and 12 items for each Multiple Intelligence were selected for the final form of the Multiple Intelligence Inventory. Thus there were 96 items in the final multiple intelligence inventory. The final draft of the tool was as in Appendix E.

13. Data Collection

Collection of data is the most important part in survey type of research. For data collection researcher went to the selected secondary schools of Jodhpur district and took permission from the principal. To collect data from the secondary school students, the self-constructed multiple intelligence inventory, consisting 96 items were prepared by the researcher. Researcher took permission from the schools where were selected as sample and as per the appointment date data were collected. The tool was distributed to all the students of the selected school. Respondent were given sufficient time to fill up the scale. The information of students related to their gender and other personal details were also included in the tool. A total of 2228 students gave response to 96 items on the Multiple intelligences inventory. The response was given in the form of encircling mark around each response was numbered according to the degree of relevance of each item.

14. Data Analysis

It was very important to analyze the data using different statistical techniques for making the data comprehensive. The researcher should keep his objective and the nature of data while selecting proper statistical techniques for analyzing his data. For the present study, collected data was entered in MS Excel worksheet and classified on the basis of variables, objectives and hypotheses. Then the total score was calculated for each student and were subjected to further statistical analysis. Descriptive statistical techniques-Mean, Standard Deviation and SE_D were calculated for all the variables. Student' t-test was employed to test the hypotheses.

15. Major Findings of the Study

Following were the major findings of the study:

1. It was also found that there was no effect of siblings on the logical, linguistic, musical, spatial, bodily-kinesthetic, interpersonal and intrapersonal intelligences. It means there was no real difference found between students with siblings and without siblings in these multiple intelligences. However, effect of siblings' was found in naturalistic intelligences. Students without siblings showed higher level of naturalistic intelligences than students with siblings.

2. It was also found that there was no effect of size of family of the students on the logical, linguistic, musical, spatial, bodily-kinesthetic and intrapersonal intelligences. It means there was no real difference found between students of family up to 4 members and students of family more than 4 members in these multiple intelligences. However, size of family of the students' effect was found in naturalistic intelligences. Students of family more than 4 members showed higher level of naturalistic intelligences than students of family up to 4 members.

16. Discussion of the Findings

In the present study, there was no effect of gender on the linguistic spatial, bodily-kinesthetic, interpersonal and intrapersonal intelligences were seen. However, according to the mean scores

obtained from the multiple intelligence inventory, girls had higher level in musical and naturalistic intelligences, whereas the boys had higher levels in logical intelligence. This findings is supported and confirmed by the research studies conducted by Study of Derya Göğebakan (2003), Hassan Pasha Sharifi (2005), Loori, A(2005), Rio Sumarni Shariffudin, Lee M.F and Fakulti (2008), Kirsi Tirri & Petrinokelainen(2008), Ramzi Nasser, Sushila Singhal and Kamal Abouchedid (2008), Aysel Saricaoglu and Arda Arikan (2009), Ranade, M. (2005), Gurpreet Kaur and Sudha Chhikara (2008), Ashok G Chanchu (2012), Pooja Sharma (2014) but contradicted by Ramzi Nasser, Sushila Singhal and Kamal Abouchedid (2008). As per Ramzi Nasser, Sushila Singhal and Kamal Abouchedid (2008), Logical – Mathematical Intelligence of Lebanese male students were higher than the female students, where as in the Indian sample, the Females scored higher on Logical – Mathematical Intelligence than the male and the present study was conducted on Indian sample.

Based on these results, a teacher should adopt such a technique in teaching learning process so that girls can improve their logical intelligences and other intelligences which girls were lacking. Girl and boys students must be inspired to take participants in sports events, in order to increase their bodily-kinesthetic intelligence. Similarly, teaching learning process should be modified for boys' students so that they improve in their naturalistic and musical spatial intelligences which they were lacking.

From the study it was found that Logical intelligences of students of graduated parents were higher than the students of non-graduate parents. This findings is supported and confirmed by the research studies conducted by Krishna Joshi (2014), Niharika Patel (2014), Girishkumar Govindan (2014), Chandan Majee (2014) and Vandana Kshatriya (2014). However, in the present study, naturalistic intelligence and linguistic intelligences were found higher in students of non-graduated parents than students of graduated parents. The above previous studies results were contrast to the present study results. As a researcher looking at the findings it can be concluded that the environment affects the level of various intelligences of learners. Hence proper steps taken can help to enhance the intelligences of learners. Teachers should identify the intelligence tendencies of the learners and should offer variety in teaching learning experiences to address the need of learners with different potential.

17. Educational Implications

Following implication can be drawn from the present study:

- The results of the present study guides teachers in modifying their methodology of teaching in order to make teaching more effective and learner centered. Teacher can use these results to create interest among students.
- The results of the present study guide students in modifying their intelligences and use of these intelligences in academics. It helped them in building their carrier according to their area of their interest.
- The results of the present study help in setting up proper curriculum for the students. It helps in analysing our present school and college curriculum with respect to the types of intelligences so that broad aims of education can be accomplished and learners can be developed in accordance with their natural endowments.
- The findings of the study also provide base to teacher education institutions and school administrators to provide relevant training to pre service and in-service teachers respectively. This will help to teach learners in according to their strength and enhance minimize their weaknesses.
- This study provides ground to understand students' learning tendencies. This study will also help to think on separate teaching learning methodology to facilitate natural development of students to their fullest potential and society as a whole.

18. Suggestions for further Research

Following were the suggestions made for the future research.

- This research can further be done at primary school students.
- This research can further be done at upper primary and higher secondary school students.
- Comparison between CBSE, state board of education and ICSE board can be done.
- Comparison between students studying in government and private schools can be done.
- Experimental research can be done based on all eight intelligences.
- An exploratory research on teaching strategies of teachers with respect to the Multiple Intelligences of students can be conducted.
- Research on the current practices of teacher education institutions with respect to Multiple Intelligences can be conducted.
- Development and testing the effectiveness of teaching strategies with respect to enhancing various intelligences of students at school level can be carried out.
- Construction and Standardization of Multiple Intelligence Battery for Assessment of Multiple Intelligences of Students.
- The present study was conducted for Jodhpur city of Rajasthan. Similar studies can be undertaken for other districts of Rajasthan and other states of India too.

19. Conclusion

The present study was conducted to explore the multiple intelligences of the secondary schools students of Jodhpur city of Rajasthan State. The findings were obtained from the data collection using survey research method. There were very few researchers in the field of Multiple Intelligence best of the knowledge of the researcher and considering this fact, the researcher tried to find the knowledge that was useful to all in the field of education. This attempt of researcher was considered useful if any of the findings of the study were used to improve present scenario of the education system.

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