

DO AGE AND SEX OF SCHOOL STUDENTS MAKE SIGNIFICANT DIFFERENCE IN THEIR MULTIPLE INTELLIGENCES?

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ABSTRACT

Multiple Intelligences are a new Educational Theory proposed by Howard Gardner in 1983. Multiple Intelligences describe an array of different kinds of intelligences exhibited by human beings. This theory consists of verbal-linguistic, logical and mathematics, visual and spatial, bodily kinesthetic, musical-rhythmic, intra-personal, inter-personal, natural and existentialist intelligences. According to Gardner, each individual manifests varying levels of these different intelligences, and thus each person has a unique cognitive profile. Recently, there are numerous researches which are being conducted in the area of multiple intelligences. The present study was carried out to find out the difference in multiple intelligences between male and female and between different age groups among school students by employing survey method. The data was collected using Multiple Intelligences Inventory from 463 school students from seven different schools in and around of Coimbatore, out of which 224 are girls and 239 are boys. The collected data were scrutinized and analyzed with the help of SPSS and statistical techniques like central tendency and independent sample t-test were worked out for meaningful findings and conclusion. Finally, the study concludes that the variables age and sex of the selected school students does make significant difference, except some core intelligences.

Keywords: Age and Multiple Intelligences, Sex and Multiple Intelligences, Multiple intelligences and School Students, Demographic Factors and Multiple Intelligences.

INTRODUCTION

Multiple Intelligences are an educational theory, developed by Howard Gardner that describes an array of different kinds of "intelligences" exhibited by human beings. Howard Gardner claims that all human beings have multiple intelligences. These multiple intelligences can be nurtured and strengthened, or ignored and weakened. He believes each individual has nine intelligences. Gardner originally identified seven core intelligences viz., linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal and intrapersonal. In 1999 he added an eighth, namely naturalistic intelligence, and indicated that investigation continues on whether there is an existential intelligence. The following are the meaning for nine core multiple intelligences:

- *Verbal - Linguistic Intelligence:* The ability to read, write and communicate with words,

- *Logical-Mathematical Intelligence:* The ability to reason and calculate, to think things through in a logical, systematic manner.
- *Visual-Spatial Intelligence:* The ability to think in pictures, visualize a future result. To imagine things in the mind's eye.
- *Musical Intelligence:* The ability to make or compose music, to sing well, or understand and appreciate music.
- *Bodily-Kinesthetic Intelligence:* The ability to use the body skillfully to solve problems, create products or present ideas and emotions.
- *Inter-personal (Social) Intelligence:* The ability to work effectively with others, to relate to other people, and display empathy and understanding, to notice their motivations and goals.
- *Intra-personal Intelligence:* The ability for self-analysis and reflection to be able to quietly contemplate and

assess one's accomplishments, to review one's behavior and innermost feelings, to make plans and set goals, the capacity to know oneself.

- *Naturalistic Intelligence*: The ability to recognize flora and fauna, to make other consequential distinctions in the natural world and to use this ability productively.
- *Existential Intelligence*: The ability to tackle deep questions about human existence, such as the meaning of life, why we die, and what our role is in the world. This intelligence seeks connections to real world and allows learners to see their place in the big picture and observe their roles in the classroom, society and the world or the universe.

Scope, Background and Significance of the Study

Gardner's multiple intelligence theory opened new vistas for educational researchers. Gardner (1983, 1999) argued that despite the success of standard IQ in predicting ability in school subjects, it did not highlight the potential or competence of an individual in particular fields of expertise. But multiple intelligences are providing multiple ways for learning. Gardner's theory of multiple intelligences identifies nine subtypes of intelligence that every normal individual should develop to some extent. Generally, intelligence refers one's own ability to accommodate him / her to the situation. But multiple intelligences refers how or the way to adapt to the situation. According to Gardner, every human being consist of anyone or more of the intelligences among the identified nine categories and hence, all are intellectuals. More so, since multiple intelligences provide multiple ways for learning, it is easy for both students and teachers for teaching and learning a concept or unit through anyone of the subtypes of multiple intelligences which is more appropriate for them.

Research reviews suggest significant gender and age differences in intelligence. Anastasi (1958), Tyler (1965), and Maccoby (1966) have reported male performance increased with age on tests of mathematical reasoning compared to females. Hogan (1978) reported that in a review of 11 studies more than half of the studies demonstrated significant differences between male and

female self-estimates of IQ levels. Hogan argued that women tend to be perceived as less intelligent than men. Beloff (1992) conducted a study of Scottish students, it was noted that women underestimated while men overestimated their own intelligence along spatial and logical components. Even the estimates of parental, grandparental, and sibling IQ favored males as brothers, fathers, and sons as more intelligent than sisters, mothers, and daughters respectively (Byrd and Stacey, 1993; Furnham and Rawles, 1995; Furnham et al., 1999b).

Similarly, there are a few research reviews suggesting sex and age differences in multiple intelligences also. For instance, Furnham, A et.al. (1999), reported in their study that only one (mathematical/logical) showed a significant sex difference, with males believing that they had higher scores than females. Furnham, A and Fukumoto, S (2008) conducted a study on 198 Japanese Parents (both father and mother) own and their children's estimation of intelligence and multiple intelligences. The results indicated that males (fathers) rated their own overall general intelligence and Gardner's seven multiple intelligences significantly higher than females (mothers). Further significant difference in sex was found among children when parents rated their sons and daughters.

Yuen and Furnham, A (2006) reported that there was sex difference in eight of the 10 multiple intelligences except verbal and interpersonal. Further it is noted that male participants gave higher scores than female participants. Furnham, Emma and Salima (2002) investigated on 156 British adult participants who were asked to rate themselves on multiple intelligences and found that men's were significantly higher than women's. In the same study, it is found that sons had significantly higher than their daughters when parents are asked to estimate their children's multiple intelligences. Furnham and Akande (2004) conducted a study on 421 parents from four South African countries (Namibia, South Africa, Zambia and Zimbabwe) who were asked to estimate their own and their children's multiple intelligences and it was found that females gave higher self-estimates than males on all seven multiple intelligences and the same was reflected in the estimation of their children: females gave higher

scores than males. Loori (2005) found differences in multiple intelligences between male and female students learning English as a second language at higher institutions in USA.

Thus, the previous researches show that multiple intelligences are influenced by certain demographic, socio-economical, psychological and technological factors. There are numerous studies that are being conducted in the area of multiple intelligences in relation to these factors. In the present study, the investigators consider the influence of demographic factors viz., sex and age on multiple intelligences among school students. Further, in the present investigation only eight subtypes of multiple intelligences such as verbal or linguistic, logical-mathematical, visual or spatial, bodily-kinesthetic, musical, inter-personal, intra-personal and naturalistic intelligences are considered.

Design of the Study

Since the major objectives of the study is to find out the significant difference in multiple intelligences based on age and sex of the school students, the normative survey research design is adopted. The data was collected from 463 school students who were studying 8th, 10th and 12th from Matriculation, Govt. Aided and Govt. Higher Secondary Schools out of which 224 boys and 239 girls.

Tools Used for the Study

The following tools were developed and validated by the investigators to collect the data from the selected school students.

1. General Information proforma (English version)
2. Multiple Intelligence Test Battery (English version)

Multiple Intelligence Test Battery

The Multiple Intelligences Test Battery is in English version, which is developed and standardized by the investigators to measure eight subtypes of multiple intelligences of the school students whose ages are between 11 to 18 years. This test battery was standardized using Item Analysis technique to scrutinize the items and split-off method to find out the reliability as well as validity. This test battery consists of 76 items. Each item carries a rating viz., Always (3), Sometimes (2) and Never (1). There is no time limit to

complete this, however the students were asked to try to complete fast and not to spend more time to complete the test.

Validity and Reliability of the Tool

The test battery was standardized using Item Analysis technique to scrutinize the items. The investigators prepared the items based on MI theory. In the beginning, 95 items are generated. Then after having a thorough discussion with some experts, a few items were deleted and finally it came down to 90 items that are given to the students for the purpose of reliability and validity. The data was collected from 90 samples from 8th, 10th and 12th standard students. The split-off method was adopted. After the analysis, the r-value 0.7 and above of the items are considered for final data collection. Some items which were having 0.5 to 0.6 were reworded and rephrased and finally the test battery consisted of 76 items in eight dimensions of multiple intelligences (Table 1).

The maximum possible score is 228 and the minimum possibility is 76.

Results and Interpretations

Hypothesis 1:

There will be a significant mean score difference in Multiple intelligences between male and female students.

Table 2 shows the mean score difference in multiple intelligences between boys and girls among the selected school students. According to the results of independent sample 't'-test, except intra-personal and verbal or linguistic intelligences, the other six intelligences viz.,

| Sl.No. | Sub Test | No of items |
|--------|-----------------------------------|-------------|
| 1 | Verbal/Linguistic Intelligence | 10 |
| 2 | Logical/Mathematical Intelligence | 10 |
| 3 | Visual/ spatial Intelligence | 10 |
| 4 | Bodily/Kinesthetic Intelligence | 10 |
| 5 | Musical/Rhythmic Intelligence | 10 |
| 6 | Interpersonal Intelligence | 9 |
| 7 | Intrapersonal Intelligence | 10 |
| 8 | Naturalistic Intelligence | 7 |

Table 1. Multiple Intelligences Test Battery

| Variable | Category | N | Mean | Std Deviation | t- test | df | Level of significance |
|--------------------------------------|----------|-----|-------|---------------|---------|-----|-----------------------|
| Verbal or Linguistic Intelligence | Male | 224 | 17.71 | 2.77 | 0.279 | 461 | Not significant |
| | Female | 239 | 17.64 | 2.59 | | | |
| Logical or Mathematical Intelligence | Male | 224 | 15.27 | 2.61 | 3.156 | 461 | 0.01 |
| | Female | 239 | 16.06 | 2.77 | | | |
| Visual or Spatial Intelligence | Male | 224 | 17.97 | 3.70 | 2.109 | 461 | 0.05 |
| | Female | 239 | 18.64 | 3.19 | | | |
| Bodily or Kinesthetic Intelligence | Male | 224 | 18.30 | 2.86 | 2.134 | 461 | 0.05 |
| | Female | 239 | 18.91 | 3.21 | | | |
| Musical or Rhythmic Intelligence | Male | 224 | 17.93 | 3.69 | 4.163 | 461 | 0.01 |
| | Female | 239 | 19.37 | 3.72 | | | |
| Inter personal Intelligence | Male | 224 | 13.29 | 2.65 | 2.581 | 461 | 0.05 |
| | Female | 239 | 13.90 | 2.43 | | | |
| Intra personal Intelligence | Male | 224 | 16.67 | 2.58 | 0.050 | 461 | Not significant |
| | Female | 239 | 16.66 | 2.95 | | | |
| Naturalistic Intelligence | Male | 224 | 9.96 | 2.18 | 2.051 | 461 | 0.05 |
| | Female | 239 | 10.37 | 2.10 | | | |

Table 2. Mean score difference in Multiple Intelligences between male and female students.

logical or mathematical, visual or spatial, bodily kinesthetic, musical, interpersonal and naturalistic intelligence are statistically significant at 0.05 and 0.01 level. Hence, it is concluded that the factor sex does not make any significant differences in intrapersonal and verbal /linguistic intelligences.

Hypothesis 2:

There will be a significant mean score difference in Multiple Intelligences between age group 11-14 years and 15-19 years students.

Table 3 shows the mean score difference in multiple intelligences between the age group 11-14 years and 15-19 years among the selected school students. As per the results obtained from independent sample t-test, it is noted that verbal/linguistic intelligence and musical intelligence are statistically significant at 0.01 level and intra personal intelligence is statistically significant at 0.05 level, whereas the remaining intelligences are not

significant at 0.05 level. Hence it is concluded that the factor age does not make any significant difference in the mean scores obtained by the samples in various subtypes of multiple intelligences except verbal/linguistic, bodily kinesthetic and intra-personal intelligences.

Conclusion

From the results and interpretations of the present study, it is observed that the factors age and sex play a vital role in multiple intelligences. Most of the previous studies showed the gender difference on some types of multiple intelligences. Furnham, 2000 and 2001; Furnham and Baguma, 1999; Furnham et.al., 1999c conducted and found the gender difference in spatial and logical components of multiple intelligence. In the present investigation, the independent sample t-test showed the same including other components of multiple intelligences but not in verbal and intra-personal components. Further, the previous researches like

| Variable | Category (Age in years) | N | Mean | Std Deviation | t- test | df | Level of significance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------------|-------------------------|-----|-------|---------------|---------|-----|-----------------------|--------------------------------------|---------|-----|-------|------|-------|-----|-----------------|---------|-----|-------|------|------------------------------------|---------|-----|-------|------|-------|-----|-----------------|---------|-----|-------|------|------------------------------------|---------|-----|-------|------|-------|-----|-----------------|---------|-----|-------|------|----------------------------------|---------|-----|-------|------|-------|-----|-----------------|---------|-----|-------|------|-----------------------------|---------|-----|-------|------|-------|-----|-----------------|---------|-----|-------|------|-----------------------------|---------|-----|-------|------|-------|-----|-----------------|---------|-----|-------|------|---------------------------|---------|-----|-------|------|-------|-----|-----------------|
| Verbal or Linguistic Intelligence | 11 - 14 | 208 | 18.04 | 2.55 | 2.701 | 461 | 0.01 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 15 - 19 | 255 | 17.37 | 2.74 | | | | Logical or Mathematical Intelligence | 11 - 14 | 208 | 15.51 | 2.54 | 1.221 | 461 | Not significant | 15 - 19 | 255 | 15.82 | 2.85 | Visual or Spatial Intelligence | 11 - 14 | 208 | 18.55 | 3.30 | 1.297 | 461 | Not significant | 15 - 19 | 255 | 18.13 | 3.58 | Bodily or Kinesthetic Intelligence | 11 - 14 | 208 | 18.71 | 3.08 | 0.610 | 461 | Not significant | 15 - 19 | 255 | 18.54 | 3.05 | Musical or Rhythmic Intelligence | 11 - 14 | 208 | 19.36 | 3.58 | 3.557 | 461 | 0.01 | 15 - 19 | 255 | 18.12 | 3.84 | Inter personal Intelligence | 11 - 14 | 208 | 13.54 | 2.47 | 0.500 | 461 | Not significant | 15 - 19 | 255 | 13.66 | 2.63 | Intra personal Intelligence | 11 - 14 | 208 | 16.95 | 2.62 | 1.966 | 461 | 0.05 | 15 - 19 | 255 | 16.44 | 2.88 | Naturalistic Intelligence | 11 - 14 | 208 | 10.18 | 1.97 | 0.027 | 461 | Not significant |
| Logical or Mathematical Intelligence | 11 - 14 | 208 | 15.51 | 2.54 | 1.221 | 461 | Not significant | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 15 - 19 | 255 | 15.82 | 2.85 | | | | Visual or Spatial Intelligence | 11 - 14 | 208 | 18.55 | 3.30 | 1.297 | 461 | Not significant | 15 - 19 | 255 | 18.13 | 3.58 | Bodily or Kinesthetic Intelligence | 11 - 14 | 208 | 18.71 | 3.08 | 0.610 | 461 | Not significant | 15 - 19 | 255 | 18.54 | 3.05 | Musical or Rhythmic Intelligence | 11 - 14 | 208 | 19.36 | 3.58 | 3.557 | 461 | 0.01 | 15 - 19 | 255 | 18.12 | 3.84 | Inter personal Intelligence | 11 - 14 | 208 | 13.54 | 2.47 | 0.500 | 461 | Not significant | 15 - 19 | 255 | 13.66 | 2.63 | Intra personal Intelligence | 11 - 14 | 208 | 16.95 | 2.62 | 1.966 | 461 | 0.05 | 15 - 19 | 255 | 16.44 | 2.88 | Naturalistic Intelligence | 11 - 14 | 208 | 10.18 | 1.97 | 0.027 | 461 | Not significant | 15 - 19 | 255 | 10.17 | 2.28 | | | | | | | | |
| Visual or Spatial Intelligence | 11 - 14 | 208 | 18.55 | 3.30 | 1.297 | 461 | Not significant | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 15 - 19 | 255 | 18.13 | 3.58 | | | | Bodily or Kinesthetic Intelligence | 11 - 14 | 208 | 18.71 | 3.08 | 0.610 | 461 | Not significant | 15 - 19 | 255 | 18.54 | 3.05 | Musical or Rhythmic Intelligence | 11 - 14 | 208 | 19.36 | 3.58 | 3.557 | 461 | 0.01 | 15 - 19 | 255 | 18.12 | 3.84 | Inter personal Intelligence | 11 - 14 | 208 | 13.54 | 2.47 | 0.500 | 461 | Not significant | 15 - 19 | 255 | 13.66 | 2.63 | Intra personal Intelligence | 11 - 14 | 208 | 16.95 | 2.62 | 1.966 | 461 | 0.05 | 15 - 19 | 255 | 16.44 | 2.88 | Naturalistic Intelligence | 11 - 14 | 208 | 10.18 | 1.97 | 0.027 | 461 | Not significant | 15 - 19 | 255 | 10.17 | 2.28 | | | | | | | | | | | | | | | | | | | | |
| Bodily or Kinesthetic Intelligence | 11 - 14 | 208 | 18.71 | 3.08 | 0.610 | 461 | Not significant | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 15 - 19 | 255 | 18.54 | 3.05 | | | | Musical or Rhythmic Intelligence | 11 - 14 | 208 | 19.36 | 3.58 | 3.557 | 461 | 0.01 | 15 - 19 | 255 | 18.12 | 3.84 | Inter personal Intelligence | 11 - 14 | 208 | 13.54 | 2.47 | 0.500 | 461 | Not significant | 15 - 19 | 255 | 13.66 | 2.63 | Intra personal Intelligence | 11 - 14 | 208 | 16.95 | 2.62 | 1.966 | 461 | 0.05 | 15 - 19 | 255 | 16.44 | 2.88 | Naturalistic Intelligence | 11 - 14 | 208 | 10.18 | 1.97 | 0.027 | 461 | Not significant | 15 - 19 | 255 | 10.17 | 2.28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Musical or Rhythmic Intelligence | 11 - 14 | 208 | 19.36 | 3.58 | 3.557 | 461 | 0.01 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 15 - 19 | 255 | 18.12 | 3.84 | | | | Inter personal Intelligence | 11 - 14 | 208 | 13.54 | 2.47 | 0.500 | 461 | Not significant | 15 - 19 | 255 | 13.66 | 2.63 | Intra personal Intelligence | 11 - 14 | 208 | 16.95 | 2.62 | 1.966 | 461 | 0.05 | 15 - 19 | 255 | 16.44 | 2.88 | Naturalistic Intelligence | 11 - 14 | 208 | 10.18 | 1.97 | 0.027 | 461 | Not significant | 15 - 19 | 255 | 10.17 | 2.28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inter personal Intelligence | 11 - 14 | 208 | 13.54 | 2.47 | 0.500 | 461 | Not significant | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 15 - 19 | 255 | 13.66 | 2.63 | | | | Intra personal Intelligence | 11 - 14 | 208 | 16.95 | 2.62 | 1.966 | 461 | 0.05 | 15 - 19 | 255 | 16.44 | 2.88 | Naturalistic Intelligence | 11 - 14 | 208 | 10.18 | 1.97 | 0.027 | 461 | Not significant | 15 - 19 | 255 | 10.17 | 2.28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Intra personal Intelligence | 11 - 14 | 208 | 16.95 | 2.62 | 1.966 | 461 | 0.05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 15 - 19 | 255 | 16.44 | 2.88 | | | | Naturalistic Intelligence | 11 - 14 | 208 | 10.18 | 1.97 | 0.027 | 461 | Not significant | 15 - 19 | 255 | 10.17 | 2.28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naturalistic Intelligence | 11 - 14 | 208 | 10.18 | 1.97 | 0.027 | 461 | Not significant | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 15 - 19 | 255 | 10.17 | 2.28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 3. Mean score difference in Multiple intelligences between age group 11-14 years and 15-19 years students.

Furnham et.al. (1999); Chan (2006); Furnham and Fukumoto (2008); Yuen and Furnham (2006); Furnham, Emma and Salima (2002); Furnham and Akande (2004) and Loori (2005) indicated that the factor sex makes significant difference in multiple intelligences. Similarly, in the present study, the factor sex makes significant difference in multiple intelligences but except intra-personal and verbal or linguistic intelligences.

But the factor age is not like as sex, because it does not make significant difference in many of the subtypes of multiple intelligences except verbal/linguistic, bodily kinesthetic and intra-personal intelligences. But this is true because generally these variables depend upon the individuals external exposures whereas the remaining subtypes like logical or mathematical, visual or spatial, musical, inter-personal and natural intelligences depend upon the internal forces or inner drives of the individual and probably they will not be changes based on the

chronological ages. Finally, it is concluded that the factor sex makes significant difference in subtypes of multiple intelligences viz., logical or mathematical, visual or spatial, musical, inter-personal, bodily kinesthetic and natural intelligences and does not make difference in verbal or linguistic and intra-personal intelligences among the selected school students. The factor age does make significant difference only in verbal or linguistic, musical and intra-personal intelligences but not in other types viz., logical, visual or spatial, bodily kinesthetic, inter-personal and natural intelligences among the selected school students.

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