

A Study on The Multiple Intelligence Levels of Secondary School Students of Technical High School in Baramati.

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I. Abstract

According to Howard Gardner's theory of Multiple Intelligences there are seven forms of intelligences. There is a lack of data on multiple intelligences in Indian children. Hence, this study was conducted to assess different forms of intelligences in students and analyse these diverse intelligences. This study reveals that the average score of the Multiple Intelligences differs significantly. Also as compare to male students, female students have high average score in Musical, Bodily Kinesthetic, Spatial Visual, and Intrapersonal. Talking about multiple intelligences of students of the mentioned school, all Multiple Intelligences may be associated with each other. However out of seven Multiple Intelligences only four namely Linguistic, Musical, Spatial-visual and Intrapersonal depend on the Gender. In the statistical analysis we have found that there is maximum chance of students having high score in Spatial-Visual and Intrapersonal intelligences.

Keywords: Multiple Intelligences, Chi-Square test of independence, Kolmogorov-Smirnov test, Kruskal Wallis test.

1. Introduction

If any student wants to reach his or her goals, he or she should possess multiple Intelligence. The students differ immensely in intelligence. Intelligence refers to capacity to learn with speed and accuracy, basic understanding to solve problems and ability to adjust in the society. The role of Intelligence is single most effective predictor of the student achievement in the school. It plays an important role in life and contributes to the personal and social aspects. There is a specific need of Multiple intelligence to reason, plan, problem solving, think abstractly, comprehend complex ideas, learn quickly and learn from experience. Such a theory of multiple intelligence can benefit each individual of the society to shape his career based upon both his weak and strong intelligences to achieve happy and productive life.

II. What is Intelligence?

Intelligence is the ability to think, to learn from experience, to solve problems, and to adapt to new situations. Intelligence is important because it has an impact on many human

behaviours. Intelligence reflects a broader and deeper capability for comprehending our surroundings.

III. The Howard Gardner's theory of Multiple Intelligence

Howard Gardner first outlined his theory in his 1983 book "Frames of Mind: The Theory of Multiple Intelligences," where he suggested that all people have different kinds of "intelligences." Gardner has argued that intelligence is not unitary—that there is no “general intelligence” broadly construed—but rather that it is multiple. That is, there are “multiple intelligences.” These multiple Intelligences include: (i) linguistic—used in reading a book, writing a paper, a novel, or a poem, and understanding spoken words; (ii) mathematical—used in solving math problems, in balancing a cashbook, in solving a mathematical proof, and in logical reasoning; (iii) spatial intelligence—used in getting from one place to another, in reading a map, and in packing suitcases In the trunk of a car so that they all fit into a compact space; (iv) musical intelligence—used in singing a song, composing a sonata, playing a trumpet, or even appreciating the structure of a piece of music; (v) bodily-kinesthetic intelligence—used in dancing, playing basketball, running a mile, or throwing a javelin; (vi) naturalist intelligence—used in understanding patterns in nature; (vii) interpersonal intelligence—used in relating to other people, such as when we try to understand another person's behaviour, motives, or emotions; and (viii) intrapersonal intelligence—used in understanding ourselves; the basis for understanding who we are, what makes us tick, and how we can change ourselves, given our existing constraints on our abilities and our interests. Gardner's theory is based upon a variety of sources of evidence, among them neuropsychological as well as psychometric evidence. Gardner says that these differences "challenge an educational system that assumes that everyone can learn the same materials in the same way and that a uniform, universal measure suffices to test student learning. Indeed, as currently constituted, our educational system is heavily biased toward linguistic modes of instruction and assessment and, to a somewhat lesser degree, toward logical-quantitative modes as well." Gardner argues that "a contrasting set of assumptions is more likely to be educationally effective. Students learn in ways that are identifiably distinctive. The broad spectrum of students - and perhaps the society as a whole - would be better served if disciplines could be presented in a number of ways and learning could be accessed through a variety of means." In order to capture the full range of abilities and talents that people possess, Gardner theorizes that people do not have just an intellectual capacity, but have many kinds of intelligence, including musical, interpersonal, spatial-visual, and linguistic intelligences. While a person might be particularly strong in a specific area, such as musical intelligence, he or she most likely possesses a range of abilities. For example, an individual might be strong in verbal and musical intelligence.

Statement of The Problem

A study on multiple intelligence levels of secondary school students of Technical high school in Baramati.

Objectives: To study the multiple intelligence levels of Class 10 boys and girls in the Technical School of Baramati through the following objectives:

- To check whether multiple intelligences differ significantly.
- To check whether there is association between Multiple Intelligences.
- To check whether Multiple Intelligences are associated with Gender.
- To find the combination of multiple intelligences where students can have maximum score so that he or she will get an idea about their career direction.

Materials and methods: The present study undergoes with primary data collection through Howard Gardner's Questionnaire. The Technical Highschool, Baramati (District: Pune, State: Maharashtra, Country: India) is chosen for the study. This study focused on Multiple Intelligences among the class 10 students of the school. The data has been collected from 488 students through the questionnaire.

As mentioned above Howard Gardner's Questionnaire (young people's version) is used for the study. It has total 35 different questions in which there are five questions on seven multiple Intelligence. Each question has four different scores 1=Mostly Disagree, 2 = Slightly Disagree, 3 = Slightly Agree, 4 = Mostly Agree. The questionnaire was filled by the students in Month of February 2020.

The Questionnaire included questions regarding following seven Multiple Intelligences:

1. Linguistic intelligence ("word smart")
2. Logical-mathematical intelligence ("number/reasoning smart")
3. Spatial intelligence ("picture smart")
4. Bodily-Kinesthetic intelligence ("body smart")
5. Musical intelligence ("music smart")
6. Interpersonal intelligence ("people smart")
7. Intrapersonal intelligence ("self-smart")

Data Coding: Low Score : 0 to 7, Medium Score : 8 to 14, High Score : 15 to 20

Softwares used: MS-Excel, MS-Word, R-Software.

Questionnaire used was developed by Howard Gardner to identify the students' multiple intelligences. It consisted of 35 statements, each statement refers to some kind of intelligence discovery and necessary to respond all items. In the questionnaire, multiple intelligence level considered to constitute seven different kinds of intelligences. Questionnaire is a four-point Likert scale, self-rating questionnaire. Each statement had 4 responses. The students were asked to give scores with response such as Mostly disagree (1), Slightly Disagree (2), Slightly Agree (3), Mostly Agree (4). Target population was students of Technical Highschool, Baramati (Dist. Pune) The research was conducted using random sampling method.

Statistical techniques used: Descriptive Statistics, Kolmogorov Test, Chi-square test.

Results:

From Table 1, students average score is high in Linguistic i.e. 15.9385 and Logical Mathematical i.e. 15.2930 as compare to other Multiple Intelligences. From Table 2, average score in Music for male students is 13.2580 and for female students is 14.6966 whereas average score in Bodily Kinesthetic for male students is 15.5064 and for female students is 15.9101, average score in Spatial visual for male students is 13.9387 and for female students is 14.5955, and average score in Intrapersonal for male students is 13.8741 and for female students is 14.6629. From TABLE 4, Kruskal-Wallis test when used to test significance of the average scores of Multiple Intelligence; it gives p-value as 0.00000163336. From Table 5, when we perform Chi Square test for association between any two multiple intelligences all p-values were very small which shows all associations are significant. From Table 6, when we perform Chi square test for association between any one multiple intelligences and Gender all p-value were very small which shows all associations are significant. From Table 7, the joint probability distribution shows 63% of students have high score in Spatial-Visual and Intrapersonal intelligences. From Figure 1,

female students are dominating in all Multiple Intelligence scores except in Logical Mathematical.

Conclusions:

- There is significant difference in the averages score of the Multiple Intelligences.
- As compare to male students' female students have high average score in Musical, Bodily Kinesthetic, Spatial visual, and Intrapersonal.
- All Multiple Intelligences may be associated with each other.
- There is maximum chance of students having high score in Spatial-Visual and Intrapersonal intelligences.
- As there is maximum chance of students high score in Spatial-Visual and Intrapersonal intelligences thus, according to Gardner's theory the students have career choices as Philosopher, Writer, Psychologist, Counsellor, Scientist, Architect, Artist, Engineer.

Acknowledgement: Howard Gardner's Questionnaire (young people's version)

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TABLE 1: DESCRIPTVE STATISTICS OF MUTIPLE INTELLIGENCES SCORE (FOR ALL STUDENTS)

Domain	N	Mean	SD	Min	Max
Linguistic	488	15.9385	2.6158	8	20
Logical mathematical	488	15.2930	2.7802	5	20
Musical	488	13.0860	2.7075	6	20
bodily kinesthetic	488	14.5553	2.6512	5	20
spatial-visual	488	13.9590	2.6355	6	20
Interpersonal	488	12.5020	2.4204	4	18
Intrapersonal	488	14.0717	2.8974	5	13

CONCLUSION: Students average score is high in Linguistic and Logical Mathematical as compare to other Multiple Intelligences.

TABLE 2 (AVERAGE SCORE FOR ALL MULTIPLE INTELLIGENCES)

DOMAIN	MALE	FEMALE
Linguistic	13.52580645	14.70224719
Logical mathematical	14.92903226	14.4494382
Musical	12.99354839	15.26966292
Bodily kinesthetic	13.69677419	14.15730337
Spatial-visual	14.8516129	15.64044944
Interpersonal	14.84516129	15.58988764
Intrapersonal	14.99354839	15.79775281

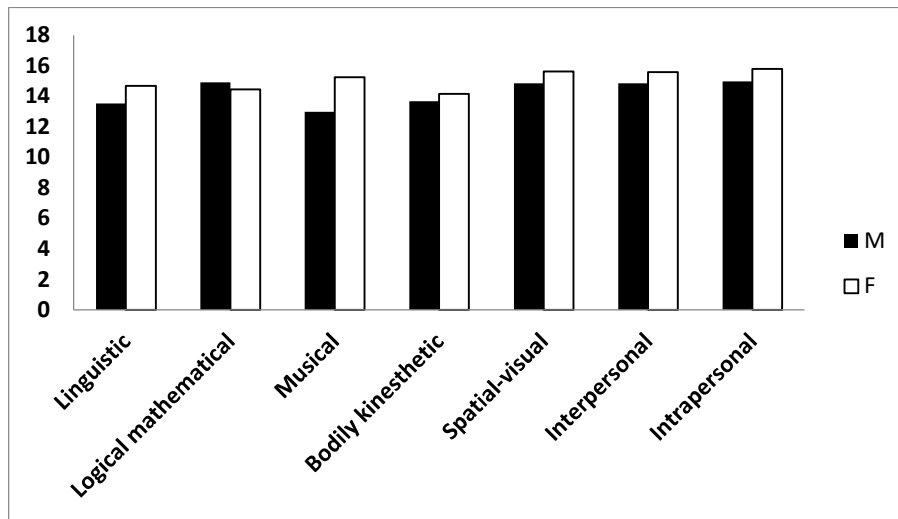


FIGURE 1 Genderwise average score in multiple intelligences

TABLE 3 : GENDERWISE DESCRIPTIVE STATISTICS

Domain	Mean		S D		Min		Max	
	Male	Female	Male	Female	Male	Female	Male	Female
Linguistic	14.0935	14.5955	3.1245	2.7768	5	7	20	20
Logical mathematical	14.5645	14.9831	2.9461	2.9100	5	6	20	20
Musical	13.2580	14.6966	3.1689	2.9242	5	5	20	20
bodily kinesthetic	15.5064	15.9101	2.7741	2.5093	5	8	20	20
spatial-visual	13.9387	14.5955	2.7115	2.3226	6	8	20	20
Interpersonal	14.0774	14.8033	3.2126	2.7474	4	7	20	20
Intrapersonal	13.8741	14.6629	2.8301	2.5107	5	6	20	20

TABLE 4: Kruskal-Wallis test to test significance of the average scores of Multiple Intelligence:

<p>H₀: Average scores of Multiple Intelligences are not significant Against H₁: Average scores of Multiple Intelligences are significant Kruskal-Wallis chi-squared = 129.51, df = 6, p-value 0.00000163336</p>

TABLE 5 : Association between the Multiple Intelligences:

Domain	p-value
Linguistic And Logical mathematical	0.000000000504
Linguistic And Musical	0.000000000022
Linguistic And Bodily kinesthetic	0.0000003043
Linguistic And Spatial- visual	0.0005149
Linguistic And Interpersonal	0.000000009186
Logical mathematical And Musical	0.00003651
Logical mathematical And Bodily kinesthetic	0.00002083
Logical mathematical And Spatial- visual	0.000000002832
Logical mathematical And Interpersonal	0.000000000022
Musical And Bodily kinesthetic	0.000000002213
Musical And Spatial- visual	0.001953
Musical And Interpersonal	0.00000005619
Bodily kinetic And Spatial- visual	0.0007236
Bodily kinetic And Interpersonal	0.0000000000022
Spatial- visual And Interpersonal	0.0000000000211

TABLE 6: Association between the Multiple Intelligences and Gender

Domain	Linguistic	Logical mathematical	Musical	Bodily kinesthetic	Spatial-visual	Interpersonal	Intrapersonal
p-value	0.000201	0.05819	8.7E-08	0.2609	0.0003611	0.1149	0.00

TABLE 7 : Joint Probability distribution of Multiple Intelligences according to High, Low and Medium scores:

	Linguistic	Logical mathematical	Musical	Bodily kinesthetic	Spatial-visual	Interpersonal	Intrapersonal
High	0.4508	0.5697	0.46106	0.4262	0.62296	0.5881	0.6496
Low	0.0246	0.0082	0.03893	0.01844	0.00616	0.0041	0.0102
Medium	0.5246	0.422	0.5	0.5553	0.37091	0.4078	0.3407