

A Comparative Analysis on Multiple Intelligences Between Science Technology and Social Sciences Students at Universiti Teknologi MARA

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Abstract

This paper describes the comparison of multiple intelligence indexes between science technology students and social science students at Universiti Teknologi MARA. The multiple intelligence indexes were based on Howard Gardner's MI Model and Walter Mackenzie's Questionnaires. It was found that science social students attained higher MI index as compared to science technology students. The multiple intelligence profiling represents a significant departure from the traditional view of intelligence between these two groups. It is hoped that the indexes could offer a key consideration to match the learning strategies approaches by giving some insights about students' strength and weakness.

Keywords: Multiple intelligence, Multiple intelligence profiling, learning strategies.

Introduction

Multiple intelligence(MI) was first articulated by Howard Gardner in 1983. He opposed the idea that human intellectual could only be based on a single measured IQ number as every normal individual has varying degrees of each of those intelligences which combined to reflect the personalities of the individual. Thus, Gardner proposed that human intellectual capacities consist of nine intelligences areas which include linguistic, musical, logical-mathematical, spatial, bodily-kinesthetic, interpersonal, intrapersonal, naturalist and existential(Gardner, 1983).

The intelligences are located in different areas of the brain and can work independently or simultaneously together. The Linguistic intellectual component is the type of intelligence that focused on well-developed verbal skills and sensitivity to the sounds, meanings and rhythms of words while Logical-Mathematical intelligence is associated with analytical and mathematical thinking that is capable of recognizing

logical or numerical patterns. Other intelligence compartment is the visual- spatial intelligence that relates to capability to visualize accurately and abstractly; Musical intelligence is the ability to produce and appreciate rhythm and music. Bodily-Kinesthetic Intelligences is another compartment which associates with body movement and the ability to handle objects skilfully. Interpersonal intelligence and Intrapersonal intelligence is the ability to capture and response appropriately with people around them and the ability of being aware of one's inner feelings, believe, values and thinking process respectively. Naturalist Intelligence is a much later component added by Gardner that is the ability to recognize and categorize objects in nature. The latest addition is the Existential Intelligence that inclines towards spiritual sensitivity to tackle question like meaning about human existence and life.

It has been long established that the logical and mathematical intelligence and linguistic intelligence is the dominated components of intelligence testing. MI

has much change that notion with various findings that advocate that intelligence is multidimensional (Saban, 2009). While there may be some noteworthy critics on MI, MI still has had utility in education (Smith, Mark K., 2002, 2008). Reports on successful implementation of MI had popularize MI and it is here to stay and foreseen to keep on expanding its borders across many other areas. Multiple intelligent could enlighten a more inclusive pedagogy as it consider a wider overview of intelligences and permits students to learn through their own varying intelligence strength and not marginalized by the linguistic and mathematical intelligence that we are used to (Saban, 2009). Thus MI profiling could help both students and educators on how best approaches to learning could be done to achieve optimum knowledge transfer.

This study attempts to determine students' MI profile from the social science(SS) and science technology(ST) schools in Universiti Teknologi MARA. It also seeks to find out whether are there any differences in multiple intelligence indexes between the SS and ST students and also between the genders from the two areas.

Methodology

Participants

A total of 61 students from the social science(SS) and science technology(ST) of Universiti Teknologi MARA participated in this study. 30 students from the fourth semester Bachelor of Business Administration (Human Resource Management) program and 31 students from the third semester Bachelor of Civil Engineering faculty took part in this study.

Questionnaire

A set of questionnaire consisted of 90 questions with a Likert scale type were administered. The questionnaires were developed based on Howard Gardner's MI Model and Walter Mackenzie's Questionnaires. Each multiple intelligence components have 10 questions that are distributed throughout the questionnaire so that they are not clustered together. Respondents were required to choose their rating from 1(mostly Disagree), 2 (Slightly Disagree), 3(Slightly Agree to 4(Mostly Agree).

Implementation

A group of students from the Bachelor of Business Administration (Human Resource Management) program in UiTM Melaka was chosen to represent the social science sector and 31 students from the third

semester Bachelor of Civil Engineering in Shah Alam were selected to represent the science technology sector. The questionnaire was administered to students in class and they were given 40 minutes to answer the questionnaire. The lecturers were at hand to clarify any doubts with regards to the questions.

Data Analysis and Results

Gender Demographic Profile

There were 5 male and 25 female SS students that took part in this study and from the science technology sector, 24 male students and 7 female students were involved. The percentage of the gender breakdown is as shown in Table 1.

Table 1: Demographic Profile According to Gender

	Male	Female	Total
Social Science	5	25	30
Science Technology	24	7	31
Total	29	32	61

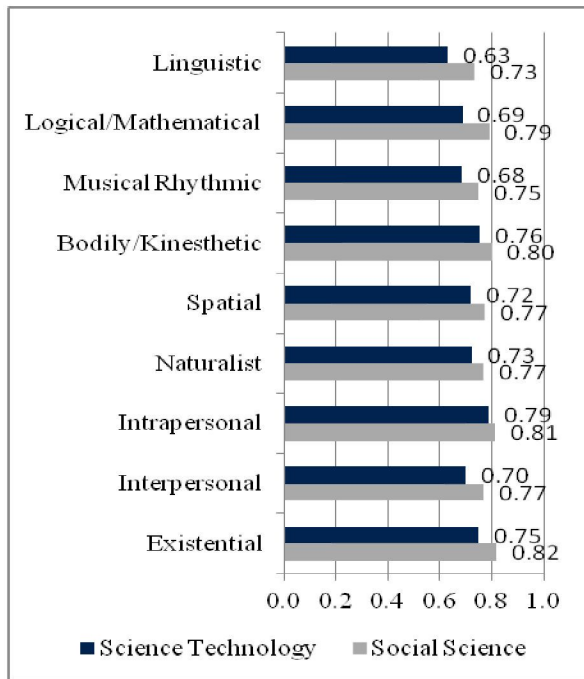
It is usual to have more female students in the science social sector as compared to the science technology sector. There are only 20% male students and 80% female students in this class of the Bachelor of Business Administration (Human Resource Management) program in UiTM Melaka while the participating ST students whom are from Shah Alam's Bachelor of Civil Engineering program have 77.5% male and 22.5% female students.

Multiple Intelligence(MI) Index Score

The mean MI score for each class was computed. Indexes of the multiple intelligence components were automatically calculated in Excel and graph form of MI was also shown. Every individual score was then consolidated to obtain the class group strength. The average index for MI components of the SS and ST group are as shown in Figure 1. The figure shows the Existential Intelligence mean index for Social Science students has the highest mean MI index attained at 0.82 as compared to Science Technology students at mean index of 0.75. The Science Technology students' highest mean index is Intrapersonal Intelligence at 0.79 against Social Science students at 0.81. Other intelligence composites are Interpersonal Intelligence indices for SS students stands at 0.77 versus 0.70 for ST students, Naturalist Intelligence at 0.77 for SS students and 0.73 for ST

students, Spatial Intelligence is 0.77 for SS students against 0.72 for ST students, Kinesthetic Intelligence index attained is at 0.8 for SS students and 0.76 for ST students, Musical Rhythmic Intelligence at 0.75 for SS students and 0.68 for ST students. The lowest index score is the Linguistic Intelligence at 0.73 for SS students and 0.63 for ST students.

Figure 1: Preferences/Personal Potential According to the Gardner's Multiple Intelligences Model Of Social Science and Science Technology Students



The ranking of the multiple intelligence indexes for both the SS students and ST students are as shown in Table 2 respectively.

Table 2: Multiple Intelligence Rank for SS and ST students

Rank	1	2	3	4	5	6	7	8	9
Social Science	Ext	Itra	Bod	Lgc	Spt	Nat	Iter	Msc	Lig
Science Tech.	Itra	Bod	Ext	Nat	Spt	Iter	Lgc	Msc	Lig

Itra= Intrapersonal Bod= Bodily/Kinesthetic
 Ext= Existential Nat= Naturalist
 Spt= Spatial Iter= Interpersonal
 Lgc= Logical/Mathematical Msc= Musical Rhythmic
 Lig= Linguistic

It is interesting to note that both students group have the same intelligence components in their top three composites that are Existential, Bodily/ Kinesthetic and Intrapersonal with a varying ranking that are; the Existential for SS students and Intrapersonal for ST students for highest mean index score. It seems that SS students are more inclined to have spiritual intelligence. The next common components shared by both group are Naturalist, Spatial, Logical/Mathematical and Interpersonal Intelligence

The SS students attained higher indices in the descending order of Logical Intelligence, Spatial Intelligence and Naturalistic Intelligence as opposed to the ST students in the order of Naturalistic, Spatial and Interpersonal. Both groups attained Musical Rhythmic and Linguistic Intelligence rank as the least. The lowest ranking for linguistic component is in agreement with findings by Salehi & Germai(2012) for Iranian engineering students.

Further analysis of the differences in the MI indexes between the SS students and the ST students is shown in Table 3. The Linguistic and Logical Mathematics intelligences show the largest indexes difference of 0.1, with the SS students attained higher index than ST students. This opposed general perceptions that ST students are more mathematical inclined compared to SS students. The least difference is Intrapersonal intelligence component at 0.02.

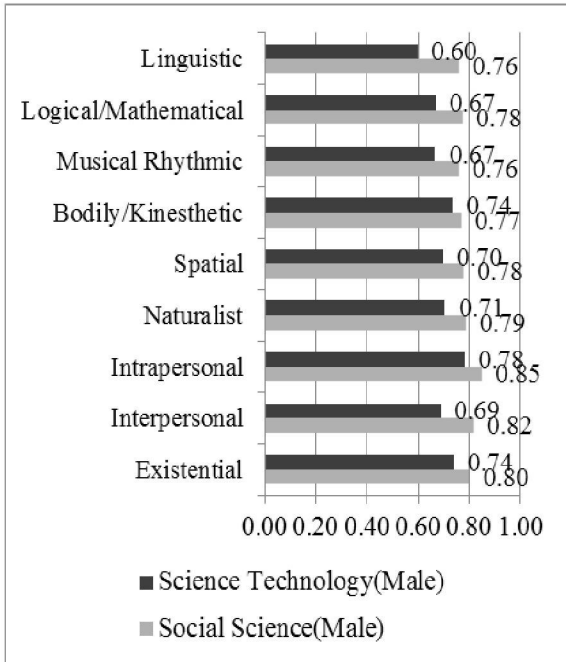
Table 3: MI Index Differences Between SS and ST Students

MI index	Ext	Iter	Itra	Nat	Spt	Bod	Msc	Lig	Lig
SS	0.82	0.77	0.81	0.77	0.77	0.80	0.75	0.79	0.73
ST	0.75	0.70	0.79	0.73	0.72	0.76	0.68	0.69	0.63
Difference	0.07	0.07	0.02	0.04	0.05	0.04	0.07	0.10	0.10

MI Index Score for Male Students

Figure 2 shows the MI index for male students from both of the science social and science technology schools. The ST male students attained lower index as compared to the SS male students in all aspects of the MI. The highest index attained by SS Male students is Intrapersonal intelligence as compared to Existential component attained in the SS group. On the other hand, the highest MI index attained by ST male students is Intrapersonal intelligence at 0.78.

Figure 2: Bar graph of MI index for SS(Male) And ST(Male)



The highest difference is for linguistic intelligence at 0.16 and the smallest difference is for Bodily/Kinesthetic intelligence. The difference is detailed as in Table 4.

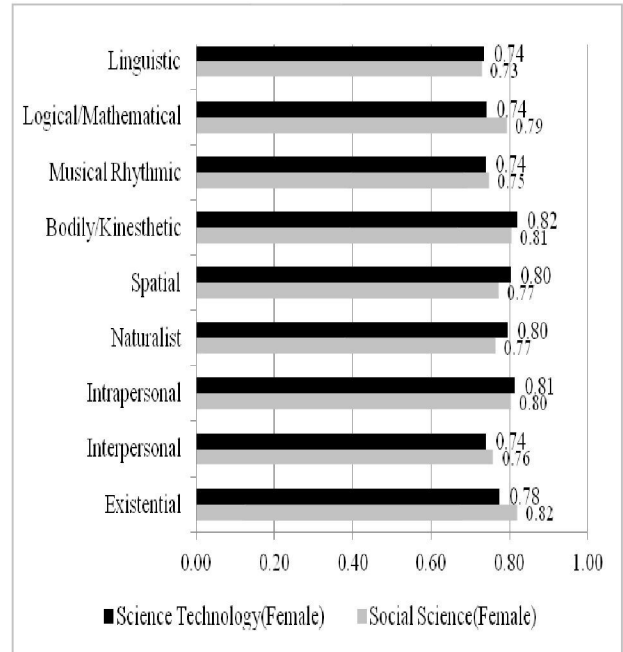
Table 4: Difference in MI Index Attained by SS Male and ST Male Students

MI index	Ext	Iter	Itra	Nat	Spt	Bod	Msc	Lig	Lig
SS (Male)	0.80	0.82	0.85	0.79	0.78	0.77	0.76	0.78	0.76
ST (Male)	0.74	0.69	0.78	0.71	0.70	0.74	0.67	0.67	0.60
Difference	0.06	0.13	0.07	0.08	0.08	0.03	0.09	0.11	0.16

MI Index Score for Female Students

The difference in the MI score attained by the female SS and female ST students is shown in the bar graph of Figure 3. The difference was found to have less margin difference as compared to their male counterparts. The highest MI index attained by SS female students is Existential at 0.82 while the ST female students obtained highest mean of 0.82 in the bodily/kinesthetic.

Figure 3: Bar graph of MI index for SS(Female) And ST(Female)



The difference between the female SS and female ST students ranges from 0.01 to 0.05 with the highest differences for Existential and Linguistic components. The differences of the MI index between the female SS and ST students are summarized in Table 5.

Table 5: Difference in MI Index Attained by Female SS and Female ST Students

MI index	Ext	Iter	Itra	Nat	Spt	Bod	Msc	Lig	Lig
SS (Female)	0.82	0.76	0.80	0.77	0.77	0.81	0.75	0.79	0.73
ST (Female)	0.78	0.74	0.81	0.80	0.80	0.82	0.74	0.74	0.74
Difference	0.05	0.02	0.01	0.03	0.03	0.01	0.01	0.05	0.01

Discussions

Traditionally, SS students would typically be perceived to have more Linguistics Intelligence while ST students would be thought to be more inclined to have more Mathematical intelligence (Salehi & Gerami, 2012). However, in this study, the SS students seem to attain higher mean multiple intelligence indexes in all intellectual composites including the Logical/Mathematical intelligence index as compared to the ST students. Perhaps the ST students self-perceived themselves at a lower level than their SS counterparts.

The high SS students MI index perhaps indicate that their multiple intelligences are at par with their SS counterparts. It is also noted that the higher MI index of the SS students could be are very much contributed by the female students. Female students are said to be more focused in achieving their personal goals while male students are generally more mathematically inclined than female students (Saban, 2009). This can be seen from the small margin of index differences of both female students in the SS and ST groups. The small number of male SS students and female ST students could also contribute to lopsided MI index.

Profiling MI index could be used to establish the intelligence strength of a particular class thus is able to help educators to maximize learning by considering the students' preferences. For example, the approach that could be considered for ST students that show high intrapersonal intelligence is to get the students to focus on what personal goals that they can achieve from the learning instructions, what strength they anticipate to use to solve problems and what course of action that they would undertake to solve that problem. It is worth to note that intrapersonal intelligences subscale is closely related to spatial and logical mathematical intelligences(McNamee et. at., 2009).

Other interesting finding that needs further exploration is the Existential intelligence area which is ranked high in both groups. Various literature reviews do not cover this component. It seems that this component deem to be dealing with personal spirituality is privileged to the privacy of the human mind and not visible(Banalan, 2013). However, the approach for Existential intelligence actually could be applied in numerous ways. The spiritual conscience that God exist and Allah brought us to existence and guided us to our purpose of living that is to worship Him :-

“And I did not create the jinn and mankind except to worship Me”.

- *Al Quran (51:56)*

would ultimately get the students to focus on learning and acquiring knowledge and applying them to solving problems with high sense of right and wrong, for the betterment of mankind and its surrounding nature. It is suggested that, students who possess existential intelligence type tend to prefer group thinking, preaching and worshiping learning styles. Thus, the lecturer or instructor should understand and try out the best teaching method to suit with the existential styles. Some theorist suggested that existential students prefer to individual freedom and instructor should create opportunities for the students to make choices that would shape what the students learn.

The MI index between the SS and ST female students in this study did not differ very much as compared to the index gap between SS male and ST male students. However, further study need to be done and more other faculties should be included. Based on the three top highest MI mean, lecturers could consider varying the approach that associated with real life situations environment (Bodily/Kinesthetic), or connecting moral values (Existential), or achieving high professional status (Intrapersonal).

Conclusions

The multiple intelligence profiling from the MI test is able to give some insights about students' strength, weakness and potentials which could help educators to translate it into approaches in learning strategies and incorporate it into curriculum. MI has its potential usage for students too, as it could help students identify their own learning preferences. In this study, the MI test revealed that our conventional perceptions on science social and science technology intelligence traits maybe incorrect after all.

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