Psychometric Properties of Mymica Multiple Intelligence Instruments Among Delinquent Student in Primary School

Syuzianti Shaari[a], Mohd. Effendi @ Ewan Mohd. Matore[b], [a,b]Faculty Education, Universiti Kebangsaan Malaysia, Malaysia, E-mail: [a]syuziantishaari@gmail.com, [b]effendi@ukm.edu.my

The lack of empirical evidence on the psychometric testing among Multiple Intelligence instruments (MI) has become a serious problem in term of its application. Measurement instrument of MI in the context of delinquent student in primary schools or MyMICA, that has been tested by using Rasch Measurement Model, is believed to improve the validity and reliability of the items significantly. Hence, this research aims to investigate the properties of psychometric test items for MI instruments. That is the Malaysian Checklist for Adult (MyMICA) using the Rasch Measurement Model in the context of delinquent students in primary school. A total of 112 students from eight primary schools in Hulu Langat district, Selangor were involved in this study. Respondents were selected through the purposive sampling technique. The findings proved that a total of 62 items met the main assumptions of the Rasch Measurement Model which are i) item fit, ii) unidimensionality and iii) local independence. Whereas, 19 items have been omitted. The reliability index and the separation index for MyMICA instrument shows a high value. Therefore, this research shall be contributing significantly to the aspects of testing items for MI instruments by using the Rasch Measurement Model. Thus, MI instrument of MyMICA could be applied in the context of delinquent student in primary schools in Malaysia.

Key words: *Mymica Instrument of Multiple Intelligences, Delinquent Students, Primary School, Psychometric, Rasch Measurement Model.*

Introduction

Every individual is born with his or her own intelligence, whether naturally or learned. Around the year 1980 's, Howard Gardner of Harvard University, United States of America, introduced the Multiple Intelligence theory (KP). This theory contradicts with the assumption that intelligence of an individual is only instigated by one single factor only (Gardner, 1983). On the other hand, human intelligence can be improved from one level to a higher level through experiences, environment and education.

Gardner (1983) insists that each intelligence is separated, which means that an individual can be successful in a given field of expertise and at the same time fail in other intelligence disciplines.

The theory of MI proves that any individual has eight types of intelligence such as (a) Verbal-Linguistic (VL) –ability in speech and writing specific language and learn multiple languages, (b) Logical-Mathematical (LM) –ability to review the problem of rational, mathematical problem solving and researching the issue scientifically, (c) music (MZ) – ability in performing arts, composing song and able to appreciate the works of music, (d) Bodily-Kinesthetics (KB) –ability to efficiently leverage the movement of the entire body to settle an objective (e) Visual-Spatial (VR) ability to draw visually whether physically on paper or virtually on mind, (f) Interpersonal (IE) – skilful in understanding the feelings, motivations and habits of other individuals, and (g) Intrapersonal (IT) – capable of understanding oneself which could create its own identity (Siti Rahayah et al., 2008).

Gardner (1999) had redefined the meaning of intelligence by introducing the eighth intelligence, Naturalist (NA). NA is the capacity to identify and categorize the species of living thing in this environment. In addition, he had also identified the existence of the ninth intelligence which is called Spiritual Intelligence (SI) which was then replaced with the Existential Intelligence. Other titles given to award this type of intelligence was intelligence of big questions. However, Siti Rahayah, Rosseni, and Hafsa (2008) pointed out that Gardner has not yet to confirm this ninth intelligence. The Existential Intelligence described for individuals who reflect and think about the fundamental questions of existence (Gardner, 1999).

In Islam, the SI shows solid relationships between spiritual and religious concepts that can be realized in terms of faith, worship and morality (Tajulashikin & Nor Faizah, 2014). In other words, the quality of faith, worship, and morality of a person depending on how far the strength of individual SI relationship with religion. Human behaviour is a reflection of inner person's soul (Abdul Latif, 2012). Therefore, there is no renunciation that SI played a vital role in the field of education to form a noble personality or excellent conducts of a person.

Lately, student disciplinary issues have been rampant either at the national or international level, high school level or lower. The existence of disciplinary issues or delinquency among students is worrying all parties, especially the school administers and the parents. Those issues has led to impediments in achieving the Government's aspirations as enshrined in the national Philosophy of Education or *Falsafah Pendidikan Negara (FPK)* (Nurul Wahida & Wan Hishamudin, 2017).

A delinquent can be defined as a person (usually used for the younger generation) behaving badly, often in a way forbidden by law (Steel, 2012). Noresah (2015) define a delinquent as someone behaving in violation of the law that is not serious or committing actions contrary to norms of the society. In addition, Nurul Wahida and Wan Hishamudin (2017) state that the term is also found in the field of Criminology which relates to crime. In the context of education, especially in schools, this term refers to a juvenile offence or juvenile delinquency. In other words, juvenile delinquency can be defined as the involvement of children aged from 10 to 17 years old in activities outside the norms of a society. In this context of study, the researcher defined the delinquent students as the phase 2 students; Year 4, 5 until 6 in the primary school who are involved in conduct violations such as bullying, scolding teachers, playing truant and vandalism.

In identifying MI, there are several instruments which are in line to the context and culture in Malaysia. The instruments are *Inventori Kecerdasan Pelbagai (IKP)* (Ibrahim, 2007), *Inventori Kecerdasan Pelbagai (IKeP*) (Kementerian Pendidikan Malaysia, 2017) and Malaysia Adolescense Multiple Intelligences Test (MAMIT) (Rizal & Hairul Nizam, 2007). However, these instruments do not measure the MI of the students at primary school level, with ages from 10 years old. Due to the absence of appropriate instruments, the researcher uses an instrument which is also based on the theory of MI namely, Malaysian Multiple Intelligences Checklist for Adult (MyMICA).

Literature Review
The History of Multiple Intelligences

The theory of intelligence begun to exist in modern psychology at the end of the 19th century. The concept of human intelligence is very much influenced by modern psychology. Early theories of human intelligence were first introduced by Francis Galton (Cohen & Swerdlik, 2009). However, those theories of human intelligence were unable to reach a human affective domain because the theories were only limited to operational functions of cognitive ability. Spearman (1904) stated that the intelligence concept was based on the theory of Two Factors, namely the 'g' factor (general) and 's' (specific). The 'g' factor refers to human intelligence due to the hereditary factors. Since 'g' factor does not reflect the

human intelligence in total, this concept is improved with the introduction of 's' factor, that human intelligence is only due to a factor. In other words, 's' factors complements 'g' factors (general) in describing the intelligence of the individual holistically. Siti Rahayah, Rosseni, and Hafsa (2008) explain that the theory describes that all human intelligence capabilities have duplication called 'g' factor.

Gardner disputed the concept of intelligence which is only limited to the cognitive domain. Hence, he had introduced a theory in 1983 known as the theory of MI. Initially, MI theory explained that each individual possesses seven types of intelligence which are Verbal-Linguistic (VL), Logical-Mathematics (LM), Visual-Spatial (VR), Bodily-Kinesthetics (KI), Music (MZ), (IE), Interpersonal and Intrapersonal (IT). Then, in 1999, Gardner introduced an eighth intelligence, namely Naturalist (NA) and followed by the ninth intelligence which is Spiritual Intelligence (SQ). Nevertheless, Gardner (2000) had later rejected SI as one type of intelligence because of the view that the essence of intelligence is the ability to do measurements which involves cognitive activities. As such, he replaced SI with Existential Intelligence. He also called this intelligence as 'intelligence of big questions'.

The Definition of Multiple Intelligences

Each type of intelligence within MI theory has its own meaning. Gardner (1983) defined Verbal-Linguistic intelligence as the ability in speech, writing, remembering facts, trusting other individuals and communicating using a language. Logical-Mathematical intelligence is the capacity to use numbers effectively, intelligently argue, understand the group of basic number, causation and the ability to forecast an incident. Visual-Spatial intelligence means the ability to identify and sketch shapes, space, colour and line and show the idea of visual and space graphically. Bodily-Kinesthetics intelligence is the ability to use limbs for expressing ideas, feelings and problem solving including physical skills such as coordination, flexibility, speed and balance. Music intelligence means the ability to trace a rhythm and song, know, differentiate or change the rhythm and tempo of the melody. While Interpersonal Intelligence is defined as the capacity to realize the feelings, motivation, attitudes or desires of others as well as the skills to act effectively against other individuals. Intrapersonal intelligence is the capacity to understand oneself in terms of strengths, weaknesses, needs, skills, either different or the same as the other person and capable of controlling feeling and behaved politely. The eighth intelligence that is Naturalist Intelligence is the capacity to recognize and categorize plants, mineral resources, and animals as well as the ability to identify cultural artefacts in terms of clothing and food (Gardner, 1993). Spiritual Intelligence is the internal strength of the individual which involves soul, heart, feelings, and faith. SI leads to consistent good practices based on the Shari'a of Allah (SWT) and the noble moral character. High SI person is able to appreciate life with the adoption of Islamic atmosphere (Elmi & Zainab, 2014).

Instrument of Multiple Intelligences

In identifying multiple intelligence, various types of measurement instruments have been developed by previous researchers such as Hillside Assessment of Perceived Intelligences (HAPI), Teele Inventory for Multiple Intelligences (TIMI), Multiple Intelligences Development Scale (MIDAS) and Malaysian Multiple Intelligence Checklist for Adolescence (MyMICA). HAPI instrument was built in 1991 by Shearer from the United States. Initially, the instruments of multiple questions was developed to assess the strengths and weaknesses of cognitive pre-trauma for individuals experiencing brain injury based on the theory of MI (Shearer, 1991). As such, the respondent can be assisted by other individuals, such as close friend or family member upon completing this instrument.

The TIMI Instrument was built in 1992 by Teele, Deputy Dean and Director Centre for Advanced Studies, University of California. This instrument has been used in over 1000 schools in the United States and seven other countries (Teele, 1996). TIMI instruments can be used for children as early as three years of age as well as adults, to understand how a person is studying. Meanwhile, the MIDAS instrument consists of seven main scales and 24 subscales which provides a summary of information on the intelligence of a person (Shearer, 1997). These instruments have been included in the curriculum of the exploration career college for four years. The study found that this instrument has been able to assist students in increasing self-awareness and in choosing an appropriate career.

MyMICA instrument is Malaysia's first instruments assessing the views and the tendency of respondents towards oneself's multiple intelligence (Siti Rahayah et al., 2008). It was developed by several researchers from Universiti Kebangsaan Malaysia (Siti Rahayah, Noriah, & Abdul Ghafur, 2006). MyMICA is 5 points Likert scale instruments, comprising nine constructs that contains 81 items in total. MyMICA is a culture fair instruments which meets the context of Malaysians of different races and religions. On the other hand, HAPI, TIMI and MIDAS instruments were developed by Western scholars which are based on socio-culture of Western society and definitely different from the Malaysian local culture. Based on this factor, the researcher chooses to adopt the instrument of MyMICA in the study of MI on the delinquent student in primary schools.

Literature Review on the Multiple Intelligence Instrument

Some studies have been conducted in relation to psychometric properties of multiple intelligence instrument either in foreign countries or in Malaysia. Shearer (1997b) carried out a research on 2241 primary school students, aged 8-14 years using instruments MIDAS-KIDS that contains 80 items. The results show that the value of the coefficient of reliability of this instrument is between 0.83-0.91. Therefore, this instrument is a valid instrument as

well as reliable. Similarly, the testing of a MIDAS-TEEN instruments had been modified and administered over 1809 secondary school students between the ages of 14-18 years (Shearer, 1997a). This instrument shows the good psychometric properties when the value of the coefficient of reliability is between 0.85-0.90 (Branton & Jones, 1994).

Jamaris (2014) on the other hand developed an instrument known as Formal Multiple Intelligences Assessment Instruments (FMIAI) with the value of the coefficient of correlation between 0.568-0.817. This instrument is valid and was used to identify eight types of multiple intelligences for 60 Indonesia children between the ages of 4-6 years. Veljko and Mirjana (2016) test IPVIS-OS instrument on 1262 students aged from 10 to 15 years old in 22 schools in Serbia. Overall, this instrument evidencing the ability to evaluate multiple intelligences among teenagers as having high reliability Cronbach's Alpha ($\alpha = 0.946$).

In Malaysia, such studies have been carried out by Ibrahim (2007) by developing and validating *Instrumen Kecerdasan Pelbagai (IKP).* Rusminah (2008) on the other hand, focuses the research on the psychometric characteristics of MyMICA instruments. Siti Rahayah et al. (2010) carried out a research on the constructs validity of the online version of Malaysian Multiple Intelligences Checklist for Adults (e-MyMICA) instruments. This instrument consists of 81 items as representing nine multiple intelligence constructs and five points Likert scale. Findings having examined using Rasch Measurement Model show that the reliability value of the items > 0.8 is suitable and able to measure the variables to be measured.

All these findings prove that the instruments used are valid and reliable because it has high reliability values. However, there are differences in terms of sampling in the process of testing items of the instruments. The testing items in this research is only carried out to the ordinary student and rarely to the delinquent students. This proves that there is a need to test the psychometric properties of MI instruments focusing on the delinquent students.

Problem Statement

Assessment of multiple intelligence is believed able to provide empirical information about the various types of students' abilities of various patterns of intelligence. This information is significant to help the related institutions to have more clear understanding about the strengths and weaknesses of the students and formulate the best ways to polish the strengths and to overcome the weaknesses.

Wan Hasmah dan Nur Munirah (2015) pointed out that schools in the United States which implement MI in the teaching and learning have gained positive results. Gardner (1983) was of the view that each individual possesses other intelligence and not just subject to cognitive

intelligence only. In Malaysia, previous researches were focusing more on intelligence study in particular students without giving emphasis to certain groups of students who need specific measurement of aspects of MI itself. (Arbaiyah, 2006; Ibrahim, 2007; Noorzalina, 2007; Rusminah Musliman, 2008; Nor Mazni, 2013; Rosyafinaz, 2014).

In Malaysia, one of the target groups who is often marginalised is the student with bad discipline, especially in primary schools. Students in primary school require more attention from the aspect of the emphasis on MI because their potential are easily shaped at a young age. However, negative perceptions towards the delinquent students makes them look bad and foolish (Mohd. Nuri et al., 2016). This is contrary to the view put forward by Gardner (1983) that every individual has their own special intelligence. In fact, the student with bad discipline who is known as a delinquent student, if their MI is identifiable, will be able to sharpen and developed to an optimal level.

One of the popular MI measurements in Malaysia is the MyMICA instrument, by Siti Rahayah et al. (2006). Previous researches about MyMICA instruments did not much highlight the function of its measurement items in measuring MI of delinquent student. Even the MyMICA instrument itself was developed to test the validity and reliability of the respondents of all types of students; unconditional of troubled or not troubled discipline students. Lack of focus on the aspects of strengths and weaknesses of this measurement item led to the need for MyMICA item testing in general and selecting items which are suitable for measuring MI of delinquent student in primary school. Testing against these measurement items contribute to the adaptability of MyMICA items among delinquent students especially in primary school.

Testing of these items requires a new psychometric items theory compared to classical test theory that only includes the ability of the respondents only. Limitations of the Classical Test Theory can be overcome with the use of Response Theory Item by Rasch Measurement Model for one logistic parameter that consider the ability of the respondent and the difficulty level of the items (Mohd Effendi @ Ewan & Ahmad Zamri, 2015). Some previous research that uses the MyMICA instrument, but does not use Rasch Measurement Models, such as Hafsa (2006), Siti Rahayah, Roseni, and Hafsa (2008), Awang (2011) and Siti Rahayah et al (2011). Whereas the study which is carried out by Rusminah (2008) applied the Rasch Measurement Model in testing MyMICA instruments but not in the context of delinquent students.

The use of the Rasch Measurement Model in testing MI measurement items are expected to be able to upgrade the aspects of MyMICA (validity and reliability). Specifically, it will enhance the ability of measurement items for the use of delinquent student in primary school to become more valid and reliable. Hence, this research aims to explore the properties of

psychometric testing for MI instruments among delinquent students in primary school using the Rasch Measurement Model. This research is useful in providing empirical information for adoption of MyMICA items for the students of different context; age and stream.

.

Methodology
Research Design

This research applies a survey design cross-section type with quantitative approach. This type of survey design spread over to collect data from a sample that has been fixed in advance, at a specific time (Noraini, 2013). Therefore, the design of the type of cross-section is in accordance with the requirements of researchers who would like to test the psychometric feature of MyMICA instruments of multiple intelligence against delinquent students. The period of data collection study takes more than one day up to a few weeks. Survey also implemented to develop, revise and test measurement tools (Hanizah, 2007). Survey is a research method involving the collection of data from a population for understanding a current situation relating to population for one or more variables (Noraini, 2013).

Populations and Samples

The population of this study is 17,712 students, consisting of secondary and primary school students of Hulu Langat district (KPM 2018). Due to the lack of research on the primary school student using MyMICA instruments, the researcher targets streamline the sample of level II students; Year 4, 5 and 6. Therefore, the researcher applies purposive sampling techniques, focusing on the level II student with discipline record only. This type of sampling is based on the knowledge of the researchers and the specific purpose of the research (Noraini, 2013). The sample of this study has been endorsed by counsellors and discipline teachers of the schools involved. Students are also under guidance and counselling as well as in the school discipline records. Therefore, a total of 112 students from eight primary schools are involved in the study. The number of this sample meets the ideal number of samples between 108 and 243 (Linacre, 1994). The selection of the school is simple and random.

Instrumentation

This study uses MI instrument, Malaysian Multiple Intelligence Checklist for Adolescence (MyMICA) (Siti Rahayah et al., 2006). Since the sample is primary students aged 10 years to 12 years, the researcher adapts and adopt the instruments in terms of its content according to the level of the students and based on the views of experts. For the purpose of validity of the content, the researcher has appointed three professional experts and three lay experts. Professional expert consists of lecturers in the field of measurement and evaluation,

educational psychologist and language. While the lay experts are counsellors and language teachers.

The set of questionnaires of the MyMICA instrument is based on a 5 points Likert scale, for example (1 = strongly disagree to 5 = strongly agree) (Vagias, 2006). This instrument is written in Malay which is the official language and the main language used in most schools in Malaysia. This instrument consists of three parts. Part A is the part of the identification ability or tendency of students based on types of intelligence. This part provides indications or early information about the kinds of intelligence that is owned by students. There are nine MI constructs comprising 28 dichotomous items that need to be marked by students in this section.

Part B is the part of MI questionnaires comprising nine constructs, namely VL, LM, MZ, KB, VR, IE, IT, NA and SI. Each construct consists of nine items that need to be answered by the respondent on the basis of the score available. Part C is the demography part comprises six items on gender, race, year, class category, school category and academic achievement. Respondents are required to mark (x) on each item except the sixth item in which students should indicate the latest achievement grade for six exam paper, namely Malay Language (Comprehension), Malay Language (Writing), English (Comprehension), English (Writing), Mathematics and Science.

Procedure for Analysing Data

In order to apply Rasch Models of Measurement, the data is analyzed using the software program Winsteps 3.63.0. This measurement model is a measurement model that exists as a result of the consideration to the ability of candidates or respondents who answer the questionnaires, tests or instruments, as well as the difficulty for each item tests (Rasch, 1980). Using this measurement model, the researcher has achieved high reliability values to test reliability. Reliability test items and the respondent also proved that the set of questionnaires are valid and reliable to measure MI. One of the advantages of this modelling method is the ability to recognize the mismatched items and respondents (Siti Rahayah et al., 2010). For example, the smart students should be able to answer simple questions. The Rasch Measurement model can identify the level of difficulty of the items and the ability of the respondents (Bond & Fox, 2015). By the results obtained in relation to the reliability and validity of the content of this instrument, it is acceptable to answer the questions of the study.

Since this study aims to test the properties of psychometric instruments, three main assumptions in the Rasch Measurement Model, that are item fit, unidimensionality and local independence are considered. The value of item fit allows the researcher to decide the appropriateness of the items (Wright & Masters, 1982). Unidimensionality refers to items in

the instrument is capable of measuring a single ability (Wright & Masters, 1982). The assumption of unidimensionality is very important because this assumption must be complied with to ensure analysis using Rasch Measurement Model can be used in the study (Mohd Effendi, Ewan & Khairani, 2015). The assumption of local independence refers to items in the same constructs, do not have response which correlates each other (Mohd Effendi & Ewan, 2015).

Findings and Discussion

This study takes into account three key assumptions of the Rasch Measurement Model for the selection of an item that are, item fit, unidimensionality and local independence.

Item Fit

The first assumption in Rasch Measurement Model is item fit. This assumption takes into account the value of Infit Outfit Mean-Square Analysis (MNSQ) which is able to identify whether the data matches or contrasts with Rasch Measurement Model (Siti Rahayah, 2008). The value of item fit allows the researcher to determine the suitability of an item (Wright & Masters, 1982).

Table 1: Example of MyMICA Item Measurement for 9 Construct MI

No Measure	Total			Mnsq		Pt-
Item Exp.	Score	Measure	S.E.	Infit	Outfit	Corr.
3 .40	363	.22	.07	.87	1.49	.26
40 .28	481	-.57	.10	1.35	1.20	.37
29 .35	428	-.16	.08	1.32	1.30	.28
13 .41	349	.29	.07	1.29	1.30	.35
5 .35	422	-.12	.08	1.29	1.24	.36
20 .38	387	.09	.07	1.28	1.25	.31

73 .34	438	-.22	.08	1.27	2.0	.42	
28 .39	373	.16	.07	1.26	1.24	.38	
50 .38	386	.09	.07	1.15	1.24	.32	
41 .32	450	-.31	.09	1.24	1.14	.44	
70 .40	351	.28	.07	1.21	1.21	.28	
26 .41	332	.38	.07	1.17	1.14	.26	
9 .36	414	-.07	.08	1.14	1.17	.22	
77 .32	454	-.34	.09	1.06	1.17	.23	
1 .32	450	-.31	.09	1.15	1.16	.29	
14 .39	381	.12	.07	1.13	1.15		.34
2 .39	381	.12	.07	.86	1.15	.26	
55 .33	447	-.29	.08	1.12	1.10	.33	
19 .38	396	.04	.08	1.11	1.07	.36	
21 .37	410	-.05	.08	1.09	1.08	.31	
62 .37	402	.00	.08	.98	1.08	.26	
78 .27	487	-.63	.10	1.07	1.02	.36	
32 .42	271	.72	.08	1.05	1.07	.40	

Table 1 shows some examples of MyMICA items MI instruments based on the nine constructs. MNSQ value recorded is from 0.75 to logits logits for total 1.35 62 items. These values have fulfilled the appointment of MNSQ at the range of acceptance between 0.6 to 1.40 (Bond & Fox, 2015). Therefore, the data available corresponds to Rasch Measurement Model. The value of Zstd is also important in strengthening Misfit items. Zstd value received is between-2.0 to + 2.0 (Bond & Fox, 2015). However, the Zstd can be ignored if MNSQ is accepted (Linacre, 2012). The value of the item polarity indicating early detection to the validity of the constructs are also found between the logits to 0.22 0.50 logits. These values meet the point biserial which includes values from 0.20 logits 0.60 logits for tested well and verify that all items fit measure what is to be measured by certain constructs (Bond & Fox, 2015).

Unidimensionality

The second assumption is unidimensionality. This assumption refers to items that tend to measure only one constructs. It can be fulfilled with Rasch Principal Components Analysis (PCA). Item Response theory can be applied to test the psychometric characteristics of the instrument when this assumption is met (Mohd. Effendi@Ewan & Ahmad Zamri, 2015). Four aspects are studied on unidimensionality. Firstly, the variance explanation of a residual PCA by contrast. Secondly, the level of interference on items being measured or unexplained variants in a contrast. Thirdly, compliance rate for the minimum ratio of 3:1 between the variance measurement, and the fourth is the Eigen value.

Table 2: Standardized Residual Variance (in Eigen value units)

	Empirical			Model
Total raw variance in observations	79.3	100.0%		100.0%
Raw variance explained by measures	17.3	21.8%		22.5%
Raw variance explained by persons	3.5	4.4%		4.5%
Raw variance explained by items	13.8	17.4%		17.9%
Raw unexplained variance (total)	62.0	78.2%	100.0%	77.5%
Unexplained variance in 1st contrast	4.8	6.1%		7.8%
Unexplained variance in 2nd contrast	3.2	4.1%		5.2%
Unexplained variance in 3rd contrast	2.9	3.7%		4.7%
Unexplained variance in 4th contrast	2.6	3.3%		4.3%
Unexplained variance in 5th contrast	2.6	3.3%		4.3%

Table 2 is a measurement of the PCA which shows clearly the gross variance was 21.8 %. This value is clearly seen to be very close to the expected model of about 22.5 %. This value fulfills the instrument requirements by at least 20%, that has been obtained in consideration of Rasch most minimal requirements (Conrad et al., 2012). Unexplained variance in 1st contrast is 6.1 %, in which values less than 10% is evidence to the compliance on unidimensionality (Linacre, 2007; Eakman, 2012). Table 2 shows the value of eigen is 4.8 in which eigen values that are less than 5 means the second dimension in MyMICA instruments does not exist clearly (Linacre, 2005). Therefore, the items of MyMICA instruments was in compliance with the assumption of unidimensionality.

Local Independence

The third assumption is local independence. This item is considered to have local independence when there does not exist a correlation between the other items in the similar constructs (Balsamo, Giampaglia, & Saggino, 2014). In theory, the relationship between different items must be low (Omum, Dunlap, & Shore, 2008).

Table 3: Standard Correlation of Residual Values

Correlation	Item Number	Construct	Item Number	Construct
.47 Mathematics	A2	Logic Mathematics	A3	Logic
.42	F5	Interpersonal	F9	Interpersonal
.41 Mathematics	A1	Logic Mathematics	A2	Logic
.36	C3	Visual-Spatial	C4	Visual-Spatial
.36	I6	Spiritual	I7	Spiritual
.36	I6	Spiritual	I9	Spiritual
.35	I4	Spiritual	I6	Spiritual
.33	D8	Music	E4	Music
-.35	C2	Visual-Spatial	F9	Visual-Spatial
-.35	D4	Music	H6	Music

Table 3 shows 10 items have the standard correlation of residual values between -0.33 to 0.47. Correlation value less than 0.70 is in compliance with local independence assumptions. (Linacre, 2012). This shows all the items is not in touch with response from other items in the same constructs (Balsamo, Giampaglia, & Saggino, 2014). In other words, the ability of the individual reactions of an item is not influenced by the reaction of the other items of the same constructs.

Dropping Items

The findings prove that 19 items out of 81 items tested are dropped. The items were Item 4, 6, 7, 8 for logic mathematic construct, Item 10, 11, 15 for verbal linguistics construct, Item 33, 34 for music construct, Item 37, 38, 39, 42, 44, 45 for bodily-kinesthetic construct, Item 53 for interpersonal constructs, Item 63 for intrapersonal constructs, Item 64 for naturalist constructs and Item 74 for spirituality construct. The dropping of these items because the items did not comply with the value of MNSQ and polariti items. Whereas the remaining items are Item 1, 2, 3, 5, 9 (mathematical logic), Items 12, 13, 14, 16, 17, 18 (verbal linguistics), Items 28, 29, 30, 31, 32, 35, 36 (music), Item 40, 41, 43 (bodily-kinesthetic), Items 46, 47, 48, 49, 50, 51, 52, 54 (interpersonal), Item 55, 56, 57, 58, 59, 60, 61, 62, (intrapersonal), Items 65, 66, 67, 68, 69, 70, 71, 72 (naturalist) and Item 73, 75, 76, 77, 78, 79, 80, 81 (spirituality).

Conclusion

This study showed that the MyMICA items are also suitable in the context of primary schools and does not conflict with the principal assumptions of this model. A total of 62 MyMICA items were proven, possessing outstanding psychometric properties of item measurement based on the Rasch Measurement Model analysis. Thus, the researcher can use MyMICA to identify the patterns of MI among delinquent students in primary schools. The school in particular and counsellors can use this instrument in measuring students' MI, as MyMICA has a high validity and reliability value, after going through the Rasch Measurement Model. Indirectly, this research contributed to the diversity of MI surveying tools for the purpose of replication in a new context of the delinquent students in primary schools. With this, the future programmes dealing with delinquent students can be arranged and formulated more effectively through the analysis of weaknesses and strengths of the students, under the nine MI constructs of MyMICA. Teachers could arrange a more effective approach during the process of teaching and learning so that potential delinquent students can be developed to the optimal level. Suggested improvements for this research are to carry out research through the analysis on Differential Item Functioning (DIF). This analysis can help in ensuring either a test score is influenced by different sources of variation in different samples.

REFERENCE

Abdul Latif Abdul Razak. (2012). The Islamic worldview on the preservation and restoration of mental health. *The Islamic Worldview, Ethics and Civilization: Issues in Contemporary Interdisciplinary Discourse* (p. 77–96). Kual Lumpur: IIUM Press.

Arbaiyah Md Zin. (2006). Tinjauan kecerdasan pelbagai di kalangan pelajar Tingkatan 4. Tesis Sarjana, Fakulti Pendidikan, Universiti Kebangsaan Malaysia.

Awang Abdullah. (2011). Profil kajian kecerdasan pelbagai dan gaya pembelajaran dalam kalangan pelajar Tingkatan Enam. Tesis Sarjana, Fakulti Pendidikan, Universiti Kebangsaan Malaysia.

B. D. Wright & G. N. Masters. (1982). *Rating Scale Analysis Rasch Measurement.* Chicago: MESA Press.

Balsamo, M., Giampaglia, G. & Saggino, A. (2014). Building a new Rasch-based self-report inventory of depression. *Neuropsychiatric Disease and Treatment* 10: 153–165. doi:10.2147/NDT.S53425

Bond, T. G. & Fox, C. M. (2015). Applying the Rasch Model:Fundamental Measurement in the Human Sciences. *International Journal of Testing*. Vol. 1. doi:10.1207/S15327574IJT013&4_10

Branton, S. & Jones, J. (1994). The validation of the Hillside assessment of perceived intelligences (HAPI): A measure of Howard Gardner´s Theory of Multiple Intelligences 1–20.

Cohen, R. & Swerdlik, M. (2009). *Psychological Testing and Assessment: An Introduction to Tests and Measurement*. 7th Edition. McGrawHill. doi:13: 9780767421577

Elmi baharuddin & Zainab Ramli. (2014). Definisi dan Konsep Kecerdasan Ruhaniah Menurut Perspektif Sarjana Islam. *Jurnal Penyelidikan Islam JAKIM* 26: 49–61.

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

Howard Gardner. (2000). Commentary A Case Against Spiritual Intelligence. *International Journal* 10(1): 27–34. doi:10.1207/s15327582ijpr1001_3

Hanizah Hamzah. (2007). Kebezaan Kefungsian item berkaitan gender (gender related differential item functioning) dalam peperiksaan matematik peringkat kebangsaan: kewujudan dan perkaitan dengan jenis item. Tesis Sarjana. Fakulti Pendidikan, Universiti

Kebangsaan Malaysia.

Howard Gardner. (1983). *Frames of Mind: A Theory of Multiple Intelligencs*. New York: Basic Books.

Howard Gardner. (1999). *Intelligence Reframed*. New York: Basic Books.

Hussein Haji Ahmad & Mohammed Sani Ibrahim. (2016. *Transformasi Pendidikan Nasional: Antara Aspirasi dan Anjakan*. Kuala Lumpur: Penerbit Universiti Malaya.

Ibrahim Mohamed Zin. (2007). Membina dan mengesahkan instrumen pentaksiran kecerdasan pelbagai. Tesis Dr. Fal. Fakulti Pendidikan, Universiti Kebangsaan Malaysia.2-12-

Kemeterian Pendidikan Malaysia. (2017). *Pelaporan Pentaksiran Sekolah Rendah*. Kuala Lumpur.

Linacre, J. M. (2012). A User's Guide to WINSTEPS: Rasch Model Computer Programs. Chicago: MESA Press.

Linacre J. M. (1994). Sample size and item calibration or person measure stability. *Rasch Measurement Transactions* 7(4): 328.

Mohd Effendi @ Ewan Mohd Matore & Ahmad Zamri Khairani. (2015). Pengujian ciri psikometrik item USMEQ-I dalam kalangan pelajar politeknik menggunakan Model Rasch. *Jurnal Teknologi* 75(1): 251–257. doi:10.11113/jt.v75.3901

Mohd Effendi @ Ewan Mohd Matore. (2015). *Pembinaan instrumen kecerdasan cabaran (IKBAR) bagi pelajar politeknik menggunakan Model Rasch*. Tesis Dr. Fal. Universiti Sains Malaysia.

Noraini Idris. (2013). *Penyelidikan dalam Pendidikan*. Edisi Ke-2. Shah Alam: McGrawHill - Education (Malaysia) Sdn. Bhd.

Nor Mazni Mohamad Aini. (2013). Pemeriksaan ciri-ciri psikometrik IKEM-P menggunakan Model Rasch. Tesis Sarjana, Fakulti Pendidikan, Universiti Kebangsaan Malaysia.

Noresah Baharom. (2015). *Kamus Dewan*. Edisi ke-6 . Kuala Lumpur: Bahasa dan Pustaka.

Nuri, M., Turiman, Mohd, Hj Hamzah & Ismi Arif. (2016). Fenomena delinkuen *dalam* kalangan remaja yang berisiko di sebuah sekolah menengah kebangsaan agama di luar bandar Malaysia. *Jurnal Kemanusiaan , Iss. 2* Vol. 14(2): 10–34.

Nurul Wahida Lah Omar & Wan Hishamudin Wan Jusoh. (2017). Cara Pelaksanaan

Tindakan Guru Terhadap Pelajar Delinkuen di Sekolah Menengah di Terengganu (2003): 277–280.

Rasch G. (1980). Weblogs Models for Some Intelligence and Students Test. Chicago: The University of Chicago Press.

Rizal Ariffin & Hairul Nizam Ismail. (2007). Konsep Keadilan dalam Teori Kecerdasan Pelbagai Menurut Perspektif Islam. *Pendidikan Psikologi* 7(2): 66–73.

Rosyafinaz Mohamat. (2014). Kebolehpercayaan dan kesahan konstruk Indeks Keusahawanan Remaja Malaysia (EIYM) dengan menggunakan Model Rasch. Tesis Sarjana, Fakulti Pendidikan, Universiti Kebangsaan Malaysia.

Rusminah Musliman. (2008). Kebolehpercayaan dan kesahan konstruk instrumen kecerdasan pelbagai Malaysia (MyMICA). Tesis Sarjana, Fakulti Pendidikan, Universiti Kebangsaan Malaysia.

Shearer, C. B. (1997b). Reliability , Validity and Utility of a Multiple Intelligences Assessment for Career Planning. *105th Annual Meeting of the American Psychological Association*, hlm. 1–27. Chicago.

Shearer, C. B. (1997). Reliability, validity and utility of a multiple intelligences assessment for career planning. *105th Annual Meeting of the American Psychological Association*. 1–27. Chicago.

Shearer Branton. (1991). An investigation into the validity. reliability and clinical utility of the Hillside Assessment of Perceived Intelligences. Union Institute, Cincinnati.

Siti Rahayah Ariffin, Bishanani Omar, Anita Isa, & Sharida Sharif. (2010). Validity and reliability Multiple Intelligent item using Rasch measurement model. *Procedia - Social and Behavioral Sciences* 9: 729–733. doi:10.1016/j.sbspro.2010.12.225

Siti Rahayah Ariffin, Ida Kamalawati Abu Bakar, Mohd Sahardi Che Harun & Anita Isa. (2010). Verification of multiple intelligences construct validity in an online instrument. *Procedia - Social and Behavioral Sciences*. Vol. 9, 1894–1899.

Siti Rahayah Arifin, Roseni Arifin & Hafsa Mohamed Makki. (2008). Faktor kontribusi

kecerdasan pelbagai dalam kalangan pelajar remaja. *Jurnal Pendidikan* 35–46.

Siti Rahayah Ariffin, Noriah Mohd. Ishak. & Abdul Ghafur Ahmad. (2006). Manual penggunaan instrumen multiple intelligences. Selangor.

Siti Rahayah Arifin, Roseni Arifin & Hafsa Mohamed Makki. 2008. Faktor kontribusi kecerdasan pelbagai dalam kalangan pelajar remaja. *Jurnal Pendidikan* 35–46.

Spearman, C. (1904). General intelligence: Objectively determined and measured. *The American Journal of Psychology* 15(2): 201–292. doi:10.2307/1412107

Steel, M. (Ed.). (2012). New Oxford Dictionary, hlm. Edisi ke-2. Shah Alam: Oxford Fajar.

Tajulashikin Jumahat & Nor Faizah Abdullah. (2014). Perbandingan konsep kecerdasan spiritual dari perspektif Islam dan barat: Satu penilaian semula. *Proceeding of the International Conference on Arabic Studies and Islamic Civilization iCasic 2014*. 589–599.

Teele, S. (1996). Redisigning the educational system to enable all students to succeed. *National Association of Secondary School Principals, NASSP Bulletin* 80: 65–75.

Vagias, Wade, M. (2006). *Likert-Type Scale Response Anchors*. Clemson International Institute of Tourism & Research Development. Department of Parks. Recreation and Tourism Management. Clemson University.

Veljko Aleksic & Mirjana Ivanovic. (2016). Psychometric evaluation of the reliability of IPVIS-OS multiple intelligences assessment instrument for early adolescents. *Journal of Educational Sciences & Pyschology* 6(68): 21–34.

W. Van Ornum, L. L. Dunlap, and M. F. Shore. (2008). *Psychological Testing Across the Life Span*. Upper Saddle River, New Jersey: Pearson Education.

Wan Hasmah Wan Mamat & Nur Munirah Teoh Abdullah. 2015. *Kecerdasan Pelbagai*. Edisi Ke-2. Kuala Lumpur: Dewan Bahasa dan Pustaka.

Wright, B. D. & Masters, G. N. (1982). *Rating Scale Analysis Rasch Measurement*. Chicago: MESA Press.