Journal of Education and Practice
ISSN 2222-1735 (Paper) ISSN 2222-288X (Online)
Vol.5, No.2, 2014

The Effectiveness of the Modular Enrichment Activities Based on Gardner Multiple Intelligences and Sternberg Thinking Skills

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The research is financed by Universiti Utara Malaysia under LEADS grant (S/0: 12426)

Abstract
This study aimed to test the effectiveness of the modular enrichment activities which were developed based on multiple intelligences and thinking skills. The adoption of the four types of intelligence as introduced by Gardner (1983) consisted of verbal linguistic, logical mathematical, visual and kinesthetic intelligences. While the analytical, practical and creative thinking skills as raised by Sternberg (1985) in the triarchic theory of intelligence (Sternberg Triarchic Theory). A quasi-experimental research design was used which involved academically-gifted students from two Mara Junior Science Colleges (MRSMs) in Malaysia. Two instruments were used in this study, the Sternberg Triarchic Ability Test (STAT) and multiple intelligence test. ANCOVA analysis and Kruskal-Wallis H test were then employed to analyze the data. The findings suggested that the integration of Gardner's multiple intelligence and Sternberg's thinking skills through the modular enrichment activities stimulated the multiple intelligence profiles and the levels of the thinking skills of the treatment group significantly.
Keywords: Multiple intelligences, Thinking skills, Enrichment activities

1. Introduction

The various aspects of multiple intelligence and critical thinking reflect students' individual differences (Gardner, 1983; Harris, 2007; Sternberg, 1996). Gardner (1983) introduced the theory of multiple intelligences while Sternberg (1985) highlighted three aspects of thinking skills to reflect intelligence as a measureable entity in the context of everyday life. In Sternberg's triarchic theory of intelligence (1985), he associated gifted students with three aspects of thinking skills: analytical, practical, and creative thinking skills. To be successful, every student needs to balance up the three aspects of thinking skills and they should know where and when is the right time to use them. Both, the multiple intelligences and thinking skills, serve to give a wider scope to the gifted students to develop their potentials. For example, Gardner (1983) claimed that potentials could be viewed and measured in terms of the degrees of intelligence. Thus, through the multiple intelligence theory founded by Howard Gadner (1983), he claimed that each individual not only has a single intelligence, but at least eight types of intelligence at different levels. The intelligences consist of verbal linguistic, logical mathematical, visual spatial, kinesthetic, musical, interpersonal, intrapersonal, and naturalist intelligences. The literature and previous studies have shown that each type of intelligence can be developed within each individual student through learning activities in schools (Armstrong, 2000; Campbell, Campbell & Dickinson, 2004; Gardner, 1983, 1999; Hatch & Gardner, 1997; Kagan & Kagan, 1998). Armstrong (2000) suggested to teachers to vary their learning materials and activities according to the theory of multiple intelligences so that each individual student is exposed to various types of intelligence and at the same time give them the opportunity to develop their potentials based on the tendency of intelligence possessed. Thus, Gardner (1983) defined multiple intelligences as a medium to solve problems. Through students' multiple intelligences, they would act, think and make decisions in various ways to solve problems in their daily lives.

Meanwhile, Sternberg (1985) claimed that a success in a person's life depends not only on academic achievements alone but also on how each individual uses their thinking skills. Through triarchic intelligence theory, Sternberg (1996) explained that students think in three ways, namely by using analytical, creative, and practical thinking skills. The three different thinking skills reflect the different approaches the students employ in solving problems. Studies conducted show that the levels of the thinking skills vary and can be enhanced through learning activities (Sternberg & Grigorengko, 2000). Therefore, Sternberg (1996) suggested that the three types of thinking skills are applied in the students' learning activities. These three thinking skills are seen not only challenging the cognitive ability but also to help the students solve everyday's problems to guarantee a successful life.

2.. Background

In Malaysia, academically gifted students are valuable assets to the country. Because they have an outstanding

academic ability, it is actually a waste if their potentials are not polished to the fullest. In appreciation of this valuable asset, MARA Junior Science Colleges (MRSM) provide enrichment programs aimed to broaden the students' experience and to uncover their potentials which usually could not be sharpened through the regular curriculum. Through the enrichment programs, the students are exposed to a variety of enrichment activities which could maximize their potentials and challenge their abilities. According to Siti Zaharah (1975) MRSM students were classified as academically gifted students as they were only accepted into this education system through the support of excellent examination results in the Primary School Assessment Test (UPSR) and Lower Secondary Assessment (PMR). Thus, the enrichment programs are implemented to provide additional activities designed to give challenges to their cognitive abilities and to polish their potentials (Callahan 1981; Indebir, 2000). However, Renzulli (1977) claimed that such enrichment programs should be systematically implemented and be beneficial to the students especially the academically-gifted students. This is because if the activities are not planned carefully, there is a possibility that they would turn out to be just fun activities without taking into account the needs and differences of the students' potentials. In this regard, this study has been carried out through structured enrichment activities in the form of modules. In addition, the enrichment activities included in each module are based on two main aspects namely multiple intelligences and thinking skills. To stimulate the developments of both aspects, each activity is a problem-solving activity. Through the problem-solving activities, the students could be encouraged to use their multiple intelligences and to test their analytical, creative and practical thinking skills. A problem-solving based activity is an activity related to thinking skills (Jawhara, 1995). Therefore, this study focuses on two main objectives:

2.1 Evaluating the effects of implementing the enrichment activity module on the students' multiple intelligences.
2.2 Evaluating the effects of implementing the enrichment activity module on the analytical, practical, and creative thinking skills.

3. Definition

The definitions of the four types of multiple intelligences used in the study are as follows:

3.1 Verbal linguistic intelligence is related to language, including words, writing or reading and listening skills. Students who possess this intelligence use language to obtain information or knowledge.
3.2 Mathematical intelligence is related to science and mathematics. Students will be able to calculate, reason out and solve problems involving numbers and numbering systems.
3.3 Visual spatial intelligence is the ability to think in visual images. Students are able to produce world-view space before being transferred to mental images, designs, patterns, shapes, and colors.
3.4 Kinesthetic intelligence is the ability to use the body and hands well.

The definitions of the three aspects of thinking skills used in the study are as follows:

3.5 Analytical thinking skills are applied when students analyze, evaluate, decide, compare and contrast, explain the causes and effects, examine holistically, make assumptions, predictions and inferences, and synthesize a problem.
3.6 Creative thinking skills involved when students perform activities such as creating, discovering, exploring, testing and imagining.
3.7 Practical thinking skills involved when students apply the knowledge and information, implement solutions, and relate problems to the real life.

4. Research Methodology

This study used a quasi-experimental design which included the pre-test and pos-ttest (Creswell, 2005; Campbell & Stanley, 1963). Both groups had been given the pre-test and post-test. The treatment group went through the enrichment activities based on the multiple-intelligence concept and thinking skills whereas the controlled group underwent the conventional enrichment activities. The study covered two MRSMs involving 57 Form Four students where 29 and 30 students represented the controlled and treatment groups respectively. The instruments used for the pre- and post-test were a test of multiple intelligence and STAT test. The multiple-intelligence test was adapted from McKenzie (2000) and translated into Malay. The translated version had been used in previous studies (Nurulwahida, 2005; Zaidatun, 2002), which had a high reliability value of .80. Whereas the translated version of the STAT test was quoted from a study by Syarifah Amnah (2009) which had a reliability value of .67 for the essay writing section and .67 based on KR20 indeces for the objective section.

5. Research Findings

5.1 Homogeneity Test

Levene test, a homogeneity test, was carried out on the four pre-profiling of the multiple intelligence test and the three aspects of thinking skills. Results of the Levene test were as follows starting with verbal linguistic intelligence [F(1.57)= .082, p>.05, mathematical intelligence [F(1.57) = .138, p>.05, visual space intelligence [F(1,57)= 1.07, p>.05] and kinestatic intelligence [F(1,57)=.992,p>.05]. The Levene test results on the pretest for the four types of the multiple intelligences discovered that they were not significant; the null hypothesis failed to be rejected. This showed that multiple intelligence profiles of both groups were similar at the outset. While the Levene test results on the pre-test of the thinking skills were as follows starting with analytical thinking skills [F(1,57)= .237, p>.05], practical thinking skills [F(1,57)=1.64, p>.05], and creative thinking skills [F(1,57)=10.01, p<.05]. The Levene test results on the pre-test of the analytical and practical thinking skills did discover that they were not significant, the null hypothesis failed to be rejected. This indicated the thinking skill levels of both groups were similar at the outset. Only the creative thinking skills showed the difference in the early stages. However, this decision did not preclude the treatment given since at the end of the treatment, samples were given a post-test.

5.2 The Effects of the Enrichment Activity Module on the Multiple Intelligence Profile

The effectiveness of the enrichment activity module to the two study groups was viewed from the four types of intelligence profiles and three aspects of thinking skills. ANCOVA analysis was used to analyze the effects of the treatment on the verbal linguistic, visual spatial, kinesthetic intelligences and analytical thinking skill profiles. For logical mathematical intelligence and practical and creative thinking skills, the non-parametric test of Kruskal-Wallis H test was applied since the three variables failed to meet the conditions of using the ANCOVA analysis due to the significant Levene test results. **Table 1** discusses the data analysis on the effects of the module on the students' verbal linguistic intelligence profile.

5.2.1 The ANCOVA Result of the Verbal Linguistic Intelligence

Table 1: The ANCOVA Analysis Result of the Verbal Linguistic Intelligence

Dependent Variable: The Post-test of the Verbal Linguistic Intelligence

Resources	Total of Squares Type III	df	Square Mean	F	Sig.
Corrected Model	8211.157[a]	2	4105.579	21.664	.000
Shortcuts	5776.667	1	5776.667	30.482	.000
Linguistic Intelligence Profile Pre-test	6430.647	1	6430.647	33.933	.000
Sample Group	6132.028	1	6132.028	32.357	.000
Error	10612.571	56	189.510		
Total	275300.000	59			
Total Corrected	18823.729	58			

a.R Square = .436 (Modified R Square = .416)

The descriptive statistical result shows that the mean for the post-test of the verbal linguistic intelligence of the treatment group surpasses the controlled group's (the mean for the post-test of the verbal linguistic intelligence: treatment group = 71.33, control group = 60.34). Based on **Table 1**, the ANCOVA test result shows that there is a major effect of the independent variable of the sample group which is significant towards the post-test of the dependent variable of the verbal linguistic intelligence [F (1,56)= 32.36, p<.05]. In addition, there is a significant major effect on the pre-test of the controlled variable towards the post-test of the dependent variable of the verbal linguistic intelligence [F (1,56)=33.93, p<.05].

Based on the result, the researchers reject the null hypothesis. Furthermore, the pair comparison test result of the post-test of the verbal linguistic intelligence indicates that after controlling the Type I error using Bonferroni method, the pair comparison of the treatment-controlled group (the mean difference of the post-test of the verbal linguistic intelligence profile = 24.06, p<.05) generates a significant result. The result of this analysis confirms that in the study population, there is a major effect of the independent variable of the sample group on the dependent variable of the post-test after controlling the pre-test of the controlled variable of the verbal linguistic intelligence. This significantly indicates that the post-test score of the verbal linguistic intelligence of the

treatment group surpasses of the controlled group. The finding suggests that the implementation of the enrichment activities through the multiple intelligence and thinking skill modules gives a better and significancant impact on the verbal linguistic intelligence among the MRSM students. In addition, **Table 2** discusses the data analysis which shows the effect of the module on the students' logical mathematical intelligence.

5.2.2 Result of the Kruskal-Wallis H of the Logical Mathematical Intelligence

The aim of the Kruskal-Wallis analysis is to ascertain whether there is any significant difference between the logical mathematical intelligence of the controlled and treatment groups. The Levene test result [F (1,57) = 4.79, p<.05] shows that it is significant; the nul hypothesis is rejected. This shows that there is a difference in terms of the variance in the dependent variable post-test of the mathematical intelligence profile across each category of the independent variable of the sample group. The survey data fail to comply with the ANCOVA test. Therefore, the researchers use the Kruskal-Wallis H test. The Kruskal-Wallis H test is used when the independent variable has two categories (Chua, 2008). Refer **Table 2** for the Kruskal-Wallis H test result.

Table 2: Result of the Kruskal-Wallis H of the Logical Mathematical Intelligence

Test statistics[a,b]

	Post-test of the Mathematical Logic Intelligence
Chi-Square	6.64
df	1
Asymp. Sig.	.010

a. Kruskal Wallis Test
b. Grouping Variable: Group

Result of the Kruskal-Wallis H test shows that there is a significant difference between the controlled and treatment groups [x^2 (1, N=59) = 6.64, p<.05]. The mean data also clearly show that the logical mathematical intelligence of the treatment group (mean = 35.52) is higher than the controlled group (mean = 24.29). The lowest mean value of the controlled group shows its logical mathematical intelligence is lower than the treatment group. The result shows that the implementation method of the modular enrichment activities based on multiple intelligences and thinking skills gives a better and significant impact on the logical mathematical intelligence scores of the MRSM students.

5.2.3 The ANCOVA Result of the Visual Spatial Intelligence

Table 3: The ANCOVA Analysis Result of the Visual Spatial Intelligence

Independent Variable: The Post-test of the visual spatial intelligence

Resources	Total of Squares Type III	df	Square Mean	F	Sig.
Corrected Model	6711.447[a]	2	3355.723	20.777	.000
Shortcuts	5500.347	1	5500.347	34.056	.000
Visual Spatial Profile Pre-Test	4538.963	1	4538.963	28.104	.000
Sample Group	5946.923	1	5946.923	36.821	.000
Error	9044.486	56	161.509		
Total	321900.000	59			
Total corrected	15755.932	58			

a.R Square = .426 (Modified R Square = .405)

Descriptive statistical result shows that the mean post-test of the visual spatial intelligence of the treatment group surpasses the controlled group's (mean post-test of the visual spatial intelligence: treatment group = 78.0, control group = 65.86). Based on **Table 3**, the result of the ANCOVA test shows that there is a significant main effect of the independent variables of the sample group towards the independent variables of the post-test of the visual spatial intelligence [F(1,56)= 36.82, p<.05]. In addition, a significant main effect of the visual spatial profile pre-test of the controlled variable exits with the independent variable post-test of the visual spatial intelligence [F(1,56)=28.10,p<.05]. Based on the results, the researchers reject the null hypothesis. In addition, the results of the comparison test of the visual spatial intelligence post-test show that after controlling Type I error using the Bonferroni method, the pair comparison treatment-controlled group (the difference in the mean post-test of the visual spatial intelligence = 24.7, p <.05) obtains significant results. Results of this analysis confirm that in the population there is a major effect on the sample group of the independent variable towards the dependent variable of the visual spatial intelligence post-test after controlling the controlled variables of the visual spatial

intelligence pre-test. This indicates a significant post-test score of the visual spatial intelligence for the treatment group surpasses the controlled group. The results suggest that the implementation of the enrichment activities through a module based on multiple intelligences and thinking skills gives a better and significanct impact on the visual spatial intelligence of the MRSM students. Furthermore, **Table 4** discusses the data analysis of the impact of the module on the students' kinesthetic intelligence.

5.2.4 The ANCOVA Result of the Kinesthetic Intelligence

Table 4: The ANCOVA Analysis Result of the Kinesthetic Intelligence

Dependent Variable: The Kinesthetic Intelligence Post Test

Resources	Total Squares Type III	df	Mean Square	F	Sig.
Corrected Model	11336.375[a]	2	5668.187	35.259	.000
Shortcuts	4345.386	1	4345.386	27.030	.000
Kinesthetic Intelligence Profile Pre-Test	7764.748	1	7764.748	48.300	.000
Sample Group	8790.969	1	8790.969	54.684	.000
Error	9002.609	56	160.761		
Total	317900.000	59			
Total corrected	20338.983	58			

a.R Square = .557 (Modified R Square = .542)

The descriptive statistical result shows that the post-test mean of the kinesthetic intelligence for the treatment group surpasses the controlled group (post-test mean of kinesthetic intelligence: the treatment group = 78.66, controlled group = 63.10). Based on **Table 4**, the ANCOVA test results show that there is a significant main effect of the independent variable towards the dependent variable of the pre-test of the kinesthetic intelligence [F(1,56)= 54.68, p<.05]. In addition, there is a significant major effect of the pre-test of the controlled variable towards the post-test of the independent variable, the kinesthetic intelligence [F (1,56) = 48.30, p <.05]. Based on those results, the researchers reject the null hypothesis. Furthermore, the comparison test result of the paired post-test kinesthetic intelligence shows that after controlling the Type I error using Bonferroni method, the treatment-controlled group comparison (the post-test mean difference of the kinesthetic intelligence = 27.54, p<.05) obtains a significant result. The result of this analysis confirms that in the population under study, there is a major effect of the independent variable of the sample group on the dependent variable of the post-test of the kinesthetic intelligence after controlling the controlled variable of the pre-test of the kinesthetic intelligence. This provides a significant indication to show that the post-test score of the kinesthetic intelligence of the treatment group surpasses the controlled group. The result suggests that the implementation of the modular enrichment activities based on multiple intelligences and thinking skills gives a better and significant result to the kinesthetic intelligence of the MRSM students. Furthermore, **Table 5** discusses a data analysis showing the impact of the module on the level of the MRSM students' analytical thinking skills.

5.3 The Effects of the Enrichment Activity Module on the Thinking Skills Profile

5.3.1 The ANCOVA Result of the Analytical Thinking Skill

Table 5: The ANCOVA Analysis Result of the Analytical Thinking Skill

Dependent Variable: The post-test of the analytical thinking skill

Resources	Total Squares Type III	df	Mean Square	F	Sig.
Corrected Model	531.575[a]	2	265.787	22.146	.000
Shortcuts	484.160	1	484.160	40.342	.000
Analytical Thinking Skill Profile Pretest	65.915	1	65.915	5.492	.023
Sampel Group	511.099	1	511.099	42.586	.000
Error	672.086	56	12.002		
Total	18803.000	59			
Total Corrected	1203.661	58			

a.R Square = .442 (Modified R Square = .442)

The descriptive statistical result shows that the post-test mean of the analytical thinking skill of the treatment group overcomes the controlled group's (the post-test mean of the analytical thinking skills: treatment group = 20:03, controlled group = 14:41). Based on **Table 5**, the ANCOVA test result shows that there is a significant main effect of the independent variable of the sample group on the dependent variable of the post-test of the analytical thinking skill [F (1,56) = 42.58, p<.05]. In addition, there is a significant effect of the controlled variable of the pre-test on the independent variable of the post-test of the analytical thinking skill [F (1,56) = 5:49, p<.05]. Based on those results, the researchers reject the null hypothesis. Furthermore, result of the post-test of the paired comparison test for the analytical thinking skill shows that after controlling Type I error using the Bonferroni method, the paired comparison of the treatment-controlled groups (difference in post-test mean of the analytical thinking skill = 5.96, p<.05) generates a significant result. Result of this analysis confirms that in the study population there is a major effect of the sample group independent variable on the dependent variable post-test of the analytical thinking skills after controlling the controlled variable pre-test of the analytical thinking skill. This is a significant indication showing that the post-test score of the analytical thinking skill of the treatment group overcomes the controlled group's. The result suggests that the implementation of the modular enrichment activities based on the multiple intelligences and thinking skills would give a better and significant result to the level of the analytical thinking skill of the MRSM students. Furthermore, **Table 6** and **7** show the Kruskal-Wallis H data analysis which shows the effects of the modules on the practical and creative thinking skills of the MRSM students.

5.3.2 The Result of the Kruskal-Wallis H for the Practical Thinking Skill

The Kruskal-Wallis analysis aims to ascertain whether there is any significant difference between the levels of the practical thinking skill of the controlled and treatment groups. Result of the Levene test [F(1,57)=7.21, p<.05] shows that it is significant, the null hypothesis is rejected. This shows that there is a difference in terms of the variance in the dependent variable of the post-test score of the practical thinking skill across all categories of the independent variable of the sample group. The data fail to comply with ANCOVA test so the researchers use the Kruskal-Wallis H test. Kruskal-Wallis H test is used when the independent variable has two categories (Chua, 2008). Refer **Table 6** for the result of the Kruskal-Wallis H test of the practical thinking skill.

Table 6: Result of the Kruskal-Wallis H of the Practical Thinking Skill

Test statistics[a,b]

	Practical Thinking Skill Post-test
Chi-Square	37.46
df	1
Asymp. Sig.	.000

a. Kruskal Wallis Test
b. Grouping Variable: Group

The Kruskal-Wallis H test result shows that there is a significant difference between the controlled and treatment groups [x^2 (1, N=59) = 37.46,p<.05]. The data mean also clearly demonstrates the practical thinking skill of the treatment group has the highest value (mean= 43.42) followed by the controlled group (mean= 16.12). The controlled group has the lowest mean showing that the practical thinking skill of this group is lower than the treatment group's. The result shows that the method of implementing the modular enrichment activities based on multiple intelligences and thinking skills would give a better and significant impact on the practical thinking skill score of the MRSM students.

5.3.3 The Result of the Kruskal-Wallis H of the Creative Thinking Skill

The Kruskal-Wallis analysis H aims to ascertain whether there is a significant difference between the level of the creative thinking skill of the controlled and treatment groups. The Levene test result shows that it is significant, the null hypothesis is rejected. This shows that there is a difference in terms of the variance of the post-test score of the dependent variable of the creative thinking skill across all categories of the independent variable of the sample group. Since the data fail to comply with the ANCOVA test, the researchers have to use the Kruskal-Wallis H test. Kruskal-Wallis H test is used when the independent variable has two categories (Chua, 2008). Refer **Table 7** for the result of the Kruskal-Wallis H test of the creative thinking skill.

Table 7: Results of the Kruskal-Wallis H of the Creative Thinking Skills

Test statistics[a,b]

	Creative Thinking Skill Post-test
Chi-Square	35.67
df	1
Asymp. Sig.	.000

a. Kruskal Wallis Test
b. Grouping Variable: Group

The result of the Kruskal-Wallis H test shows that there is a significant difference between the controlled and treatment groups [x^2 (1, N=59) = 35.67, p<.05]. The mean data also clearly show that the creative thinking skill of the treatment group have the highest value (mean= 43.08) followed by the controlled group (mean= 16.47). The controlled group has the lowest mean showing that the creative thinking skill of this group is lower than the treatment group's. The result shows that the method of implementing the modular enrichment activities based on the multiple intelligences and thinking skills would give a better and significant impact on the creative thinking skill score of the MRSM students.

6. Discussion and conclusion

The overall findings of this study indicate that verbal linguistic, logical mathematical, visual spatial and kinesthetic intelligences of the MRSM students could be enhanced through enrichment activities.The enrichment activities based on problem solving could also stimulate them in applying their analytical, practical and creative thinking skills. The proof is the students' thinking skill levels in the treatment group have increased compared to of the controlled group. The design of the enrichment activities based on problem solving is indeed a useful medium to stimulate the application of the thinking skills.

This is because when the students get involved in the problem-solving based activities actually they are being exposed to the thinking skills (Newell & Simon, 1972; Orlich, 1990). Adopting Gardner's multiple intelligences and Sternberg's thinking skills may be regarded as a medium to identify the students' potentials and abilities to think through the enrichment activities. Applying the concept of multiple intelligences gives ideas for teachers to develop more enrichment activities which have the characteristics of the verbal linguistic, logical mathematical, visual spatial, kinesthetic, musical, interpersonal, intrapersonal, and naturalist intelligences.

To make the enrichment activities more useful the application of the analytical, practical and creative thinking skills gives the students the opportunity to challenge and enhance their cognitive abilities. Besides enjoying varities of activities, they are exposed to various potentials within themselves. Their strengths or potentials are a gift of God to be polished and nurtured so that they are always there to guarantee academically and daily successful lives. Moreover, the results of this study do guide in implementing the enrichment activities in MRSM to vary the activities with a focus on the multiple intelligences and thinking skills so that the conventional enrichment activities are able to stimulate both aspects of the MRSM students.

For a start, the researchers just focus on the effects of the application of the modular enrichment activities on the four types of intelligence profiles. Findings showing significant different effects on verbal linguistic, mathematical logic, and kinesthetic are a good sign that the multiple intelligence profiles can be increased through systematic and well-organized enrichment activities in the form of modules. The findings of this study suggest that other applications of intelligence such as musical, interpersonal, intrapersonal, and naturalist can be done by MRSM teachers to improve the intelligence profiles of the students through the enrichment activities. The results of this study have proven that the students' multiple intelligences and thinking skills could be developed and it depends on how serious the educators want to apply both through the learning activities.

References

Armstrong, T. (2000). *Multiple intelligences in the classroom.* Virginia, USA: Association of Supervision And Curriculum Development.

Callahan, C.M. (1981). *Superior abilities: Handbook of special education.* Englewood Cliffs, New Jersey. Prentice Hall.

Campbell, L., Campbell, B., & Dickinson, D. (2004). *Teaching & learning through multiple intelligences (3rd ed.)* United States of America: Allyn and Bacon.

Campbell, D. T., & Stanley, J. C. (1963). *Experimental and quasi-experimental design for research.* Boston: Houghton Mifflin Company.

Chua Yan Piaw. (2008). *Asas statistik penyelidikan: Analisis data skala ordinal dan skala nominal.* McGraw-Hill (Malaysia) Sdn. Bhd.

Creswell, J.W. (2005). *Research designs: Qualitative, quantitative, and mixed method approaches (2nd ed.).* Thousand Oaks, CA: Sage.

Gardner, H. (1983). *Framed of mind: The theory of multiple intelligence*. New York. Basic Books.

Gardner, H. (1999). *Intelligences reframed: Multiple intelligences for the 21st century.* New York. Basic Books.

Harris, S. M. (2007). An historical investigation: Educating the gifted learner in the American educational system. Unpublished doctoral dissertation, Bowie State University.

Hatch, T. & Gardner, H. (1997). If Binet had looked beyond the classroom: The assessment of multiple intelligences. In B. Torff (Ed.), *Multiple intelligences and assessment: A collection of articles (pp. 5-24).* United States. IRI/SkyLight Training and Publishing, Inc.

Inderbir Kaur (2000). Adaptation of gifted students to the system of education in Malaysia secondary schools. Unpublished doctoral dissertation, University of Cambridge.

Jauharah Tak (1995). *Penyelesaian masalah dan pemikiran kreatif dalam pendidikan*. Kuala Lumpur: Dewan Bahasa dan Pustaka, Kementerian Pendidikan Malaysia.

Kagan, S. & Kagan, M. (1998). *Multiple intelligences: The complete MI book.* San Clemente, CA: Kagan Cooperative Learning.

McKenzie, W. (2000). Multiple intelligences survey. *http: surfaquarium.com/MI/inventory.htm.*

Newell, A., & Simon, H. A. (1972). *Human problem solving*. Englewood Cliffs, NJ: Prentice-Hall.

Nurulwahida Azid @ Aziz (2005). Hubungan pola kepelbagaian kecerdasan Gardner dengan aktiviti schoolwide enrichment model (SEM) di kalangan pelajar Maktab Rendah Sains MARA. Tesis Sarjana Pendidikan. Tidak diterbitkan. Universiti Teknologi Malaysia.

Orlich, D.C. (1990). *Teaching strategies. A guide-better instruction.* M.A: Hearh Lexington.

Siti Zaharah Sulaiman (1975). MARA Junior Science College: Students selection and its implication for educational system development in Malaysia. Unpublished doctoral dissertation, Cornell University.

Sternberg, R.J. (1985). *Beyond IQ: A triarchic theory of human intelligence*. New York: Cambridge University Press.

Sternberg, R.J. (1996). *Successful intelligence: How practical and creative intelligence determine success in life*. New York: Simon & Schuster.

Sternberg, R. J. & Grigorenko, L. E. (2000). The triarchic reading study. In E. J. Gubbins & D. Siegle, (Eds.), Storrs C.T. National Research Center on the Gifted and Talented.

Syarifah Amnah Binti Syed Ahmad (2009). Sumbangan peramal kognitif dan bukan kognitif terhadap pencapaian akademik dalam kalangan pelajar di sebuah institusi pengajian tinggi awam. Tesis Doktor Falsafah. Tidak diterbitkan. Universiti Sains Malaysia.

Renzulli, J.S. (1977). *The enrichment triad model: A guide for developing defensible programs for the gifted and talented.* Mansfield Center, CT: Creative Learning Press.

Zaidatun Tasir (2002). Reka bentuk perisian multimedia berasaskan kecerdasan pelbagai pelajar. Tesis Doktor Falsafah. Tidak diterbitkan. Universiti Teknologi Malaysia.