Faculty of Cognitive Sciences and Human Development

THE IMPACT OF PRIMARY STUDENTS' MULTIPLE INTELLIGENCES ON MOTIVATION IN THINKING MAPS CLASSOOM

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THE IMPACT OF PRIMARY STUDENTS' MULTIPLE INTELLIGENCES ON MOTIVATION IN THINKING MAPS CLASSROOM

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LIST OF ABBREVIATIONS

MI	Multiple Intelligences
TM	Thinking Maps
KUiTHO	Kolej Universiti Tun Hussein Onn
Pra-PISMP	Pra-Program Ijazah Sarjana Muda Pendidikan
MIPQ III	Multiple Intelligences Profiling Questionnaire III
IMMS	Instructional Material Motivation Survey
ESL	English as Second Language
SPSS	Statistical Package for the Social Sciences

THE IMPACT OF PRIMARY STUDENTS' MULTIPLE INTELLIGENCES ON MOTIVATION IN THINKING MAPS CLASSROOM

ABSTRACT

The implementation of Thinking Maps had been introduced in Malaysian schools since 2011. Hence, the present study served to investigate the impact of primary students' Multiple Intelligences and motivation in Thinking Maps classroom. The participants of the study were 100 Year 4 students in a Chinese medium school in Sri Aman. Students' MI profiles and motivational level were surveyed by using Multiple Intelligence Profiling Questionnaires III (MIPQ III) and Instructional Materials Motivational Survey (IMMS) respectively. Students were found to be intermediately motivated in Thinking Maps classroom. There were also significant differences found in Logical-Mathematical, Spatial and Bodily-Kinesthetic Intelligence between boys and girls. Additionally, Linguistic and Naturalist Intelligence could contribute partially in predicting students' motivation in Thinking Maps classroom. Other factors affecting students' motivation in Thinking Maps classroom include school climate, teacher's teaching experiences and knowledge about Thinking Maps. The study provides some insights into the effect of students' MI on motivation in Thinking Maps classroom. It is hoped to benefit all stakeholders as well as the students themselves to achieve effective learning.

(172 words)

IMPAK KECERDASAN PELBAGAI TERHADAP MOTIVASI MURID DALAM KELAS PETA PEMIKIRAN

ABSTRAK

Pengaplikasian Peta Pemikiran dalam PdP telah diperkenalkan di sekolah-sekolah Malaysia sejak Tahun 2011. Oleh itu, kajian ini bertujuan untuk mengkaji impak kecerdasasn pelbagai murid sekolah rendah terhadap motivasi mereka dalam kelas yang menggunakan peta pemikiran. Peserta kajian ini merupakan 100 murid Tahun Emapat di sebuah sekolah aliran Cina di Sri Aman. Profil Kecerdasan Pelbagai murid-murid ditinjau dengan menggunakan *Multiple Intelligence Profiling Questionnaires III (MIPQ III*) manakala motivasi murid dikenalpasti dengan menggunakan *Instructional Material Motivational Survey (IMMS)*. Motivasi murid-murid dalam kelas Peta Pemikiran didapati berada di tahap sederhana. Terdapat perbezaan ketara antara murid lelaki dan murid perempuan dalam Kecerdasan Ruang, Bodili-kinestetik dan logical-matematik. Selain itu, Kecerdasan Lingustik dan Naturalis merupakan sebahagian factor yang mempengaruhi tahap motivasi murid dalam kelas yang menggunakan Peta Pemikiran. Faktor-faktor lain yang menyumbang kepada tahap motivasi murid termasuklah iklim sekolah, pengalaman dan pengetahuan guru terhada Peta Pemikiran. Kajian ini membekalkan sedikit sebanyak tentang impak kecerdasan pelbagai murid terhadpa motivasi belajar dalam kelas Peta Pemikiran. Kajian ini diharapkan dapat memanfaatkan semua pihak yang berkaitan termasuklah murid-murid demi mencapai pembelajaran yang efektif.

(173 perkataan)

CHAPTER 1

INTRODUCTION

1.1 Introduction

Currently, the Ministry of Education had worked with the Agensi Inovasi Malayia (AIM) and come out with a program called "i-Think". This program utilizes eight types of thinking maps (TM), each illustrating a thought process reinforced with the vocabulary of that thought process and the students' previous usage of the map (Hyerle & Yeager, 2000).

The eight TM are: (a) circle map-defining a concept in context, (b) bubble map-describing or characterizing a concept, (c) double-bubble map-comparing and contrasting, (d) tree map-classifying, (e) brace map-parts to whole comparison and analysis, (f) flow map-sequencing; (g) multi-flow map-showing cause and effect or problem and solution, and (h) bridge map-comparing through analogies (Hyerle, 1993).

Malaysia's educational goals are manifested in the National Educational Philosophy (NEP) with the ultimate aim of achieving the nation's vision to prepare children to become knowledgeable and skilled individuals to meet the challenges of the 21st Century. The emphasis is placed on science, technology and information technology, as well as inculcating good moral and work ethics.

Thus, i-THINK equips Malaysia's next generation of innovators to think critically and be adaptable in preparation for the future. The project helps schools impart thinking skills to

students, allowing them to be lifelong learners; great at solving problems and coming up with creative solutions.

1.2 Background of Study

In 2007, Malaysia was rated 20 for Mathematics and 21 for Science among 49 countries in the Trends in Mathematics and Science Study (TIMSS). Meanwhile, Program for International Student Assessment (PISA) reported that, among 74 countries in the world, Malaysia was rated 57 for Mathematics, 55 for Science and 52 for comprehension in Year 2009. These findings were supported by the need analysis done by 21 Centruy Schools (USA) and Kestrel Education (UK) consultant which was presented on 2 November, 2011. They reported that teachers and students in Malaysia lack of higher order thinking skills.

Program for creative and critical thinking skills (KBKK) was introduced since 1994. Teachers had been introduced to various thinking tools. However, studies showed that there were still lacks of higher order thinking skills incorporated in their teaching and learning activities. Most of the lessons were teacher-centred teaching for examination purposes. Hence, Ministry of Education (MOE) decided to launch a program that could produce creative and innovative students that could face the 21st Century challenges which poses higher order thinking skills.

On 27 July, 2011, a meeting was held between Agensi Inovasi Malaysia (AIM) and MOE. As a result, Program i-THINK was launched and 10 schools were selected as pioneer schools around Malaysia. The program was widen to 1000 schools in 2013 and will be carried out in all the schools in Malaysia in 2014.

1.3 Problem Statement

Ministry of Education (MOE) is currently working together with Agensi Inovasi Malaysia (AIM) to run a program called "i-THINK" which utilizes eight types of thinking maps to enhance students' higher order thinking skills. Previous studies (Ball, 1999; Blount, 2000; Edwards, 2011; Hickie, 2006; Manning, 2003 Weis, 2011) had yielded inconsistent results on the implementation of Thinking Maps on students' performance. Short duration of Thinking Maps implementation with strong variable which takes longer time to have an effect (i.e. student achievement), along with inconsideration of students' needs are some of the gaps found in these previous studies.

Howard Gardner's Multiple Intelligences (MI) Theory (1993) proposes that all of us have various levels of intelligence across nine intellectual areas. In practice, every student bears a collection of all nine intelligences each to varying degrees of strengths. Besides, gender also plays a role in the intelligences profile of the students as girls tend to be more linguistic intelligent and boys apt for mathematical intelligence. So, differentiation is important in the delivery of services to all students (Silverman, 2000). Moreover, owing to the short period of i-THINK program implementation, a weaker variable which needs shorter time to have an effect should be used to measure its effectiveness.

The use of thinking maps in "i-THINK" program focus only on the visual-spatial and linguistic intelligence areas. Hence, the impact of the program implementation on students' motivation is thus questioned, whether the program favours students with visual-spatial and linguistic intelligences compared to other students with different dominant intelligence.

Therefore, the purpose of the study was to investigate the effect of students' multiple Intelligence profile and their motivation level under "i-THINK" program.

1.4 Objectives of Study

The main objective of the study was to investigate the impact of students' Multiple Intelligences Profile on their motivational level in Thinking Maps classroom. The objective was broken into three specific objectives.

1.4.1 Research objective 1.

The first research objective was to determine the motivation level of the students in Thinking Maps classroom.

1.4.2 Research objective 2.

The second research objective was to determine if there is any mean scores difference in the students' MI by gender.

1.4.3 Research objective 3.

The third research objective was to determine if students' MI profile can predict their motivation scores in TM classroom.

1.5 Research Questions

There were three research questions generated from the research objectives.

1.5.1 Research question 1.

The first research question was: What is the motivation level of the students in Thinking Maps classroom?

1.5.2 Research question 2.

The second research question was: What is the difference in the mean scores in the students' MI profile by gender?

1.5.3 Research question 3.

The third research question was: Can students' MI profile predict their motivation scores in TM classroom?

1.6 Research Hypotheses

The research questions hypotheses are formulated based on research questions.

1.6.1 Research hypothesis for research question 1.

The first research question required no hypothesis.

1.6.2 Research hypothesis for research question 2.

The null hypothesis formulated from the second research question of the study was: There is no difference in the mean scores of the students' MI by gender.

1.6.3 Research hypothesis for research question 3.

The null hypothesis formulated from the third research question of the study was: MI profile is independent of students' motivation scores.

1.7 Conceptual Framework

The conceptual framework of the research is show in *Figure 1.1*.

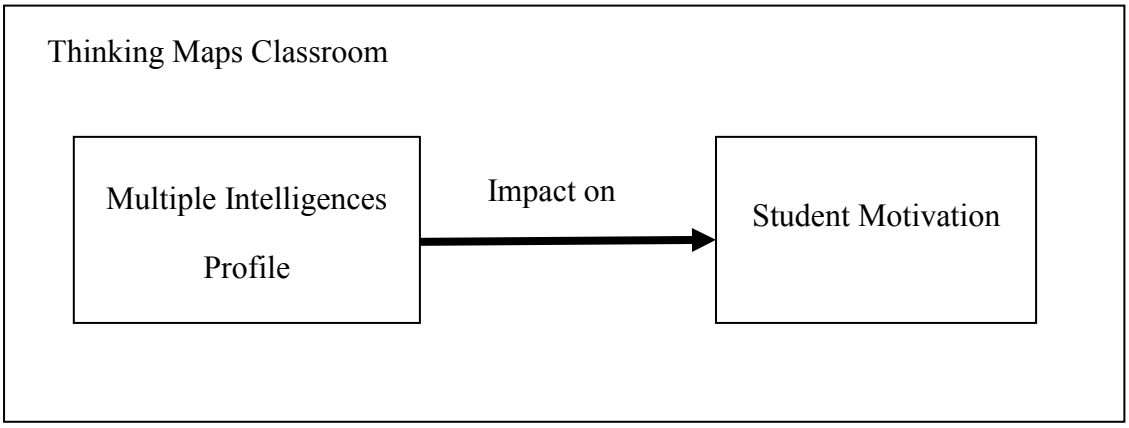

Figure 1.1. The conceptual framework of the study.

1.8 Significance of Study

This study contributes to the knowledge in the field by providing indigenous research data regarding students' intelligence profile and motivation in Thinking Maps classroom. It also serves to raise awareness of educators, curriculum developer and other stakeholders on the possible influence of students' intelligence profile and students' motivation in Thinking Maps classroom. Besides, the methodology and instruments adopted in this study seem to propose possible methods for future research as well. Also, this study suggests the revision of the government policy on the implementation of i-THINK program.

1.9 Limitations of Study

There were limitations in this study. The study was confined to primary schools students only. It was only narrowed down to Year Four students, involving only one school which had implemented i-THINK program for two years. The population under study was limited to Sri Aman district, the second division of Sarawak, Malaysia. The sample size of the present study was limited to 100 students and the study was limited in its design, method, measuring devices and statistical techniques.

1.10 Definitions of Key Terms

For the purpose of this study, some key terms were defined operationally and conditionally. First of all, Thinking Maps are operationally defined as eight specific visual patterns to help learners visualize their thinking and make their thoughts concrete (Hyerle &

Yeager, 2000). These Thinking Maps are conditionally defined as the maps used in i-THINK program implemented in Malaysian schools.

Secondly, Multiple Intelligences (MI) is operationally defined as the capacity to solve problems from different aspects or areas. Gardner (1983) has identified nine intelligence areas: Linguistics, Logical-mathematical, Spatial, Bodily-kinesthetic, Musical, Interpersonal, Intrapersonal, Naturalist, and Existential Intelligence. Conditionally, MI is the ability of the Year Four students to solve problems from different aspects or areas.

MI profiles are the intelligence areas that a person is in favour of. Conditionally, MI profiles are the distribution of intelligences that Year Four students have and they are measured by using questionnaire.

Motivation is operationally defined as "the amount of effort a person is willing to exert in pursuit of a goal" (Keller, 2006, p.3). It is conditionally defined as the force or influences that cause Year Four students to study. Motivation is measured by using questionnaire.

1.11 Summary

The researchers had described the background, objectives, significance and limitations of the study. Definitions of terms were also explained clearly. The next chapter would touch on the main issue, theory and related past researches of the study.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The review is focused on literature covering topics related to Multiple Intelligences, students' motivation and Thinking Maps. Online library databases and on-campus library were used to locate books and journals relevant to the topic. Websites and brochures from Ministry of Education were also used and cited to find information on i-THINK program which utilizes eight Thinking Maps. Bibliographies and references sections of books and journals also contributed valuable resources to the corpus building of the literature.

The first section of the literature is on Thinking Maps and its underlying theories. Previous researches on Thinking Maps were also looked into and gaps were identified, which led to the present study. The second section discussed on the motivation and its underlying theories. The third section is focused on Multiple Intelligences. The last section of the literature review talked about the previous researches on motivation and Multiple Intelligences since researches on the impact of Multiple Intelligences and student motivation in Thinking Maps classroom.

2.2 Thinking Maps

Graphic representations are often used in education for analyzing, researching, organizing, and learning (Clarke & Paivio, 1991). They create meaningful associations and understandings by organizing information and linking ideas and concepts (e.g., using space,

graphics, and words) (Marzano, 2010). There are several commonalties among various types of graphic representations, such as to differentiate ideas and concepts (Clark & Paivio, 1991), to trigger prior knowledge and to evaluate students' understandings or misunderstandings (Reese, 2004), to acquire basic knowledge and develop higher order thinking skills (McMackin & Witherell, 2005, 2010) as well as to regulate students' own learning (Fealy, 2010). Despite common characteristics, various types of graphic representations with different purposes exist. They can be categorized as brainstorming webs, graphic organizers, concept maps, and thinking maps (Hyerle, 2009).

After practicing different types of graphic representations in teaching and training for many years, David Hyerle (1996) created a set of eight thinking-process maps, incorporating various types of graphic representations. Each thinking map (Appendix A) is represented by a different cognitive skill, namely (a) circle map-defining a concept in context, (b) bubble map-describing or characterizing a concept, (c) double-bubble map-comparing and contrasting, (d) tree map-classifying, (e) brace map-comparing and analyzing parts to whole comparison and analysis, (f) flow map-sequencing; (g) multi-flow map-showing causes and effects or problems and solutions, and (h) bridge map-comparing through analogies (Hyerle, 1993). These thinking maps are consistent yet flexible, with developmental, integrative, and reflective attributes that can be used interdependently as a tool to transform knowledge into learning (Hyerle, 2008, 2009) across content areas, and age levels.

2.2.1 Conceptual Framework of Thinking Maps

2.2.1.1 Dual-coding theory.

Paivio (1971, 1991) developed the theory of dual-coding for learning which assumes that memory consists of two separate, but interrelated systems for information processing. One is verbal or linguistics and the other is non-verbal or nonlinguistic. Verbal system processes information as words and sentences while visual system represents information by using images. Information received can be coded in both systems, or dual-coded, even though they can be activated independently. Undoubtedly, dual coded information is much easier to retain and retrieve owing to the availability of two mental representations (i.e., verbal and visual) compared to one. The more individuals use both nonlinguistic (i.e., imagery) and linguistic representations; the recall of knowledge is greater.

Thinking maps provide visual images which can be linked to verbal information. Students' thinking is transmitted into visual images when students verbalize their thinking, either externally or internally. By combining linguistic with nonlinguistic representations of what is to be learned, cognitive development and comprehension will be enhanced. Furthermore, the creation of nonlinguistic representations explicitly increases and stimulates brain activity (Gerlic & Jausovec, 1999).

2.2.1.2 Brain-based learning.

Caine and Caine (1997) had summarized twelve principles of brain-based learning research. These principles are found to support the use of thinking maps since the maps illustrate concretely abstract ideas to the students. The maps are meaningful as the patterns are repeated consistently with each illustrating a thoughtful process reinforced with the

vocabulary of that process and the students' previous usage of the maps (Hyerle & Yeager, 2000). To illustrate, students will construct their own thinking maps with the information they gather, subsequently they have a sense of belonging towards the maps. Therefore, as a result of students having ownership of the maps, their brains tend to store information in short-term memory (Kotulak, 1996). In order for information to be stored in long-term memory, the use of Thinking Maps helps students to analyze the materials. Subsequently, the neural networks are strengthened as more dendrites are grown when the neural connections branched out bits of information relating to each other and to other types of information (Hyerle & Yeager; Danielson, 2002). In a research done by Marzano (2003), it has been shown that using thinking maps repeatedly helps students to integrate and retain knowledge permanently.

Moreover, the brain begins to recognize patterns automatically when a network of neurons is established for specific purpose with repeated firings (Sylwester, 1995). When patterns for each type of thinking are established with repeated usage across content areas, the brain will recognize the patterns automatically (Hyerle & Yeager, 2000). Furthermore, students strive for meaningfulness (Caine & Caine, 1994). Hence, perception and construction of patterns or relationships by the brain help enhance understanding thus make sense of the world.

Besides, the brain is essentially curious and is always striving to make connections between the new and the old (Wolfe & Brandt, 1998). Thinking Maps provide the experiences that allow students to perceive the patterns that connect (Hyerle, 1996). Each of the maps, in different ways, linking bits of information into a holistic system, supports patterning and the networking of information, assists in organizing information into

knowledge from different sources, and supports searching for meaning within prior knowledge.

2.3 Previous Research on Thinking Maps

The web page for Designs for Thinking, http://www.mapthemind.com/, (Hyerle's homepage) mentions a few research projects using Thinking Maps and students' performance. The present study investigated upon the motivation level, rather than students' performance, since Thinking Maps instruction has been introduced to Malaysian's schools for two years. While the study covered only the first few years of the implementation of Thinking Maps, a longer time is required to build the power needed to affect such a strong variable which takes longer time to have an effect, as in the case, the student achievement (Banerji & Malone, 1993). The is because Thinking Maps instruction involves instructional change, which is an ongoing process and often required five to six years and sometimes more to be effective (Fullan & Stiegelbauer, 1991; Speck, 1996).

Nonetheless, there were two studies which inspected Thinking Maps in relation to motivation (Edwards, 2011; Manning, 2003). Manning (2003) examined the use of thinking maps for two years on reading comprehension among learning disabled students via Massachusetts Comprehensive Assessment System (MCAS) reading scores, figured out that their reading comprehension scores, concept attainment, reflective thinking, recall, retention, writing (quantity and quality), creativity, motivation, as well as cooperative learning skills were increased.

Likewise, Edwards (2011), using mixed method research design, investigated whether teachers in a large urban Midwestern district, which implemented Thinking Maps Program for 5 years, used Thinking Maps with students in elementary school general education and special education classrooms and the use of Thinking Maps with boys in second grade, fourth grade, and a learning disabled classroom. Survey of Teachers' Perceptions of Thinking Maps were given to 105 teachers and data collection of male students was extensive over five consecutive months, which included: (a) observational field notes recorded in a journal and on a digital recorder, (b) interviews of teachers and male students, (c) audiocassette and digital taped recordings to back up interviews, and (d) an attitude survey. Students' samples of Thinking Maps, which were hand-drawn to facilitate understanding of the text, were also examined. Most teachers reported that thinking Maps is effective common visual language that helped develop critical thinking skills. They believed that Thinking Maps assisted students with recalling of details and gaining a deeper meaning from literature. Besides, thinking Maps had a positive effect on the attitudes of the boys overall and promoted an understanding of written text. This doctoral study yielded important information about strategies to promote reading comprehension and motivation to read in urban elementary school males.

On the other hand, Howard Gardner (1993) had proposed nine intelligences people possess to learn predominantly. Hence, schools should incorporate all the intelligences into lessons to cater all the students. However, thinking maps are more suited to spatial intelligence and visual learners compared to other learning styles and intelligences. Hence, students' preferred intelligences should be considered when implementing thinking maps instruction. However, no research on Thinking Maps and Multiple Intelligences could be found by the researcher.