PROMOTING HIGHER ORDER THINKING SKILLS THROUGH OUTSIDE CLASSROOM STRATEGY IN LEARNING MATHEMATICS

Nor Delyliana Admon, Mohd Salleh Abu, Noor Azean Atan, Abdul Halim Abdullah, Mahani Mokhtar

INTRODUCTION

Mathematics is based on observations of assorted patterns with logically thinking that leads to various theories of abstract relations (Vale, 2012). The thinking process involves the skills of mathematical reasoning and creative thinking (Brodie, 2010). In Malaysia, mathematics education was introduced formally to each student since at early age. Mathematics has train them to think logically and systematically in solving problems and decision makings which can make them better in higher order thinking skills (HOTS).

However, the process of learning and teaching in Malaysia secondary schools are still conventional (Bakar & Hadi, 2011; Hamdi *et al*., 2012). Teachers are prefer to choose traditional methods in order to manage the students easily (Rozita Radhiah & Abdul Rasid, 2012). If these situation are still adopted in Malaysia schools, the HOTS will not expanding as our wish as in the Malaysia Education Blueprint 2013-2025 (Malaysia Education Blueprint, 2013).

In addition, most of the students think that mathematics is abstract (Pound, 2008). Therefore, according to research by Gainsburg (2008), they are an urgency of connecting mathematics in schools with real life situations. Outside classroom learning is a real learning where the students can involve and discover with their direct experience (Moffett, 2011). One of real life situations learning strategy is learning at outside classroom setting, which focusing on the use of learning techniques of 'hands-on ' and actively participating in the activity to gain knowledge (Waite, 2010). Students must put into practice 'in the real world' what they have theorized about. Beside that the learning can become inherently student-centered when moved from the boundaries of the classroom into the world at large.

Therefore in this study, the researcher plan to integrate the strategy of learning outside the classroom in Mathematics learning to give students the chances to relate their theoretical into practical in real life situation.

LEARNING MATHEMATICS IN MALAYSIA

Scenario of learning mathematics in Malaysia involves with students who get misconception or confusing of certain concept that have been learnt (Tarmizi, Tarmizi, & Mokhtar, 2010). It is because they think mathematics is abstract (Pound, 2008). Students who have difficulties in problem solving, normally do not master in basic arithmetic skills (Bryant *et. al.*, 2008).

The educational system in Malaysia is very exam-oriented, so that the mathematics teacher tend to 'teach to test' rather than 'teach to learn' (Saleh *et.al*., 2010). This is why teachers struggling to complete the syllabus before examination.

Furthermore, students in Malaysia are provoked with practice and drills technical questions. They also have mathematical word problem in solving the tasks given (Yein & Mousley, 2005). These situations make students tend to learn by memorizing to fulfill the school and parent's hope and less appreciation of learning in daily life (Harun & Salamuddin, 2010).

Besides that, issues on Malaysia achievement in Trends in International Mathematics and Science Study (TIMSS) and Programme for International Student Assessment (PISA) recently also shown that our students cannot master in higher order thinking skills. It caused by the format of PISA's questions is about applying the mathematical concept in real life situations. There are 40% involves with 'applying' and 25% is about 'reasoning' in TIMSS's question.

It is clear that these major elements in both assessments reflect the pattern of Malaysia students' thinking. Learning Mathematics is not just memorizing and do the exercises, but it needs to relate and apply the concepts into real life situations. Therefore, through outside classroom learning strategy, it provides student with real experience and helps them to appreciate the importance of mathematics in their everyday life (Moffett, 2011).

HIGHER ORDER THINKING SKILLS AND CREATIVE THINKING IN MATHEMATICS

Higher order thinking skills (HOTS) have been a part of important elements in the Malaysia curriculum (Malaysia Education Blueprint, 2013). Many researches had been done previously by researchers to support learning activities to support these skills among students (Acar, 2014; Harun & Salamuddin, 2010).

According to Rachel (2008), these higher order thinking skills also can be injected to diversify of teaching activities in and outside the classroom through creative activities (Rachel, 2008). Through these activities, students will experience the process and it supports the formation of higher-order thinking skills indirectly (Laisema & Wannapiroon, 2014). Based on Revised Bloom Taxonomy, creating process is at the highest cognitive level (Krathwohl, 2002). It gives chances for students to involve with stimulating the learning concept, encourage and develop the thinking abilities that promote HOTS. This is in line with the one of learning mathematics objective which to make students to think

from different angles (Yildiz & Karabiyik, 2012). It is obvious that HOTS can be generated when the process of learning and teaching (L&T) is well conducted.

In conjunction to that, in January 2011, the Ministry of Education (MOE) has changed the Primary School Integrated Curriculum (KBSR) to the Primary School Standard Curriculum (KSSR). Innovation and creativity are parts of new elements incorporated with KSSR. The public knows that innovation and creativity can be injected when the students practice their knowledge in their everyday life. The ability to apply knowledge, skills and values in making of reasoning and reflection for problem solving, decision making, innovative and able to create something are the elements in the HOTS (MOE, 2013).

According to (Aizikovitsh & Amit, 2011), a conducive learning environment is essential for applying creative thinking. When this happens, an opportunity for the students to think at higher level will happen by itself. Therefore, it is important to apply creative thinking skills more serious and explicit in schools through creative and attractive learning activities, thus students will generate the higher order thinking skills.

THE POTENTIAL OF OUTSIDE CLASSROOM LEARNING STRATEGY IN ENHANCING HIGHER ORDER THINKING SKILLS IN LEARNING MATHEMATICS

Learning outside the classroom essentially can be defined as use of resources out of the classroom to achieve the goals and objectives of learning (Knapp, 2010). Outside classroom learning is any structured learning experience that takes place beyond the classroom environment. The learning process is involves through what the students do, encounter and discover. It is also provides direct experience and the students need to be active in the learning process (Moffett, 2011).

From this mathematics learning experiences, it enhances the process of thinking through the tasks or problems given. Discussion among the students while solving the problems or

activities require the mathematical reasoning and creative thinking (Milrad, 2010). It is supported by the research in 2012, where outside classroom learning may enhance the student's reasoning (Sollervall *et. al*., 2012). This indicates that different method from the traditional is needed to help students develop positive attitudes towards mathematics (Ifamuyiwa & Akinsola, 2008).

Reading books need to be supported with experiences, so students can understand the content more easily. Theoretical figures 'learning by doing' by John Dewey Decimal (1939) says there is a need and close relationship between actual experience and learning. In addition, learning becomes more meaningful due to the atmosphere and situation in contrast to the classroom environment. This raises the atmosphere more cheerful and happy in students (Waite, 2010).

Learning mathematics outside the classroom has the potential to facilitate students to understand the concept of mathematics (Fägerstam & Samuelsson, 2012). It is also provides students practically involve with the learning process through the solving problem tasks given (Fägerstam, 2014).

The potential for learning outside the classroom is seen to enhance mathematics learning process more effectively (Fägerstam & Samuelsson, 2012). In addition, it is important for students to make the relationship between learning with creative thinking. Creative will not happen if they just use paper (Pound, 2008). Meaningful learning can be achieved through authentic activities. This will brings the experiences with real life situations involved indirectly. Learning through the outside classroom strategy may give the opportunity for student to enhance the higher order skills.

A study of learning outside the classroom for secondary schools mostly to the subject of geography, biology and environmental education (Rickinson et. al., 2004; Hamilton – Ekeke, 2007; Ballantyne Packer, 2009; Rozenszayn Ben-Zvi Assaraf 2010). However, study of learning outside the classroom for subjects of mathematics in secondary schools is little (Fägerstam & Samuelsson, 2012).

With the significant potential can be obtained from the

outside classroom learning strategy, this research aims to look at the extent to think creatively may be enhance in high school students in Malaysia for Mathematics.

CONCLUSION

This conceptual paper present that outside classroom learning strategy will promote the higher order thinking skills in learning mathematics. Higher order thinking skills should become as an identity of Malaysia students in order to fulfill Malaysia Education Blueprint 2013-2025 (Malaysia Education Blueprint, 2013). This hope will become reality when the learning process involve with real life situation. Therefore, for Mathematics which always claim as abstract subject will totally change as the students' experience learning themselves. Conjunction to that, outside classroom learning will be a strategy for the students to 'feel' the mathematics.

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Student	:	Nor Delyliana Binti Admon				
Email	:	hailiana0211@gmail.com				
Phone No	:	019-7777490		**Student ID No**	:	PP133043
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Supervisor	:	Dr Noor Azean Atan				
Email	:	azean@utm.my				
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