THE EFFECTS OF CHARACTER STRENGTHS LEARNING ON STUDENTS' MATHEMATICS ACHIEVEMENT, CHARACTER STRENGTHS, CLASSROOM ENGAGEMENT AND WELL-BEING

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ABSTRACT

This study aims to determine the effects of character strengths learning in teaching and learning of mathematics towards students' achievement and develop the character strengths so that students are engaged in classroom and to achieve well-being. The quasi experimental non-equivalent control group pre-post-test design was employed on two form two intact classes from a secondary school in Keningau, Sabah. Both classes were randomly selected and divided into treatment (CSL) involving 33 students and control (CT) group involving 32 students. Transformation topic was selected to be taught and the experiment process took up around five weeks to complete. There were four instruments involved which are the Transformation Achievement Test, Character Strengths Measure, Classroom Engagement Measure and Well-being Measure. The collected data were analysed using descriptive statistics such as mean, standard deviation, frequency and percentages as well as inferential statistics namely the independent sample t-test, ANCOVA and paired sample t-test. The results showed that there was a significant difference in the mean of mathematic achievement between CSL and CT group in the post-test after controlling the pre-test mathematics score. However, there was no significant result indicating differences on students self-report on their character strengths, classroom engagement, and well-being. In conclusion, this study indicated that incorporating character strengths into teaching and learning mathematics was effective at improving students' mathematics achievement. However, it does not reveal to improve students' perception on their character strengths, classroom engagement and well-being. The implication of this study is that incorporating the teaching and learning of character strengths into mathematics classroom can be beneficial to educator and student as it helps them to improve academic achievement, and it also provided valid evidence that character strengths approach is superior to conventional teaching strategy.

KESAN PEMBELAJARAN KEKUATAN KARAKTER TERHADAP PENCAPAIAN MATEMATIK, KEKUATAN KARAKTER, PENGLIBATAN KELAS DAN KESEJAHTERAAN PELAJAR

ABSTRAK

Kajian ini bertujuan menentukan kesan pembelajaran kekuatan karakter dalam pengajaran dan pembelajaran matematik terhadap pencapaian pelajar dan membina kekuatan karakter tersebut agar pelajar lebih melibatkan diri dalam pembelajaran di dalam kelas, dan mencapai kesejahteraan. Reka bentuk kuasi eksperimen kumpulan kawalan tidak setara ujian pra dan pasca digunakan bagi dua buah kelas tingkatan dua daripada sebuah sekolah menengah di daerah Keningau, Sabah. Kedua-dua kelas dipilih secara rawak dan dibahagikan kepada kelas rawatan (CSL) melibatkan 33 orang pelajar dan kelas kawalan (CT) melibatkan 32 orang pelajar. Topik Transformasi dipilih untuk diajar dan proses eksperimen mengambil masa selama hampir lima minggu. Terdapat empat instrumen yang terlibat iaitu Ujian Pencapaian Transformasi, Pengukuran Kekuatan Karakter, Pengukuran Penglibatan dalam Kelas dan Pengukuran Kesejahteraan. Data dianalisis menggunakan statistik diskriptif seperti min, sisihan piawai, frekuensi dan peratusan selain statistik inferens termasuklah ujian-t sampel bebas, ANCOVA dan ujian-t sampel berpasangan. Dapatan kajian menunjukkan bahawa terdapat perbezaan yang signifikan bagi skor min pencapaian matematik di antara kumpulan CSL dan CT bagi ujian pasca. Walau bagaimanapun, tidak terdapat perbezaan signifikan bagi kekuatan karakter, penglibatan dalam kelas dan kesejahteraan. Kesimpulannya kajian ini memberi indikasi bahawa suntikan kekuatan karakter dalam pengajaran dan pembelajaran matematik adalah berkesan dalam meningkatkan pencapaian matematik pelajar. Walau bagaimanapun, kajian ini tidak berjaya membuktikan bahawa ia berupaya meningkatkan persepsi pelajar ke atas kekuatan karakter, penglibatan dalam kelas dan kesejahteraan. Implikasi kajian ini ialah suntikan kekuatan karakter dalam pengajaran dan pembelajaran dapat memberi manfaat kepada pendidik dan pelajar kerana mampu meningkatkan pencapaian akademik, serta memberi bukti sah bahawa pendekatan kekuatan karakter adalah lebih baik daripada strategi pengajaran konvensional.

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LIST OF ABBREVIATIONS

ANCOVA	Analysis of Covariance
CEM	Classroom Engagement Measure
CSL	Character Strengths Learning
CSM	Character Strengths Measure
CT	Conventional Teaching
EDA	Exploratory Data Analysis
ETP	Economic Transformation Programme
EPRD	Educational Planning and Research Division
GPA	Grade Point Average
GTP	Government Transformation Programme
JPN	State Educational Department
KBSM	New Curriculum for Secondary School
KBSR	New Curriculum for Primary School
KIPP	Knowledge is Power Program
KSSM	Secondary School Standard Curriculum
KSSR	Primary School Standard Curriculum
MOE	Ministry of Education
NKEA	National Key Economic Areas
NKRA	National Key Result Areas
PANAS	Positive and Negative Affects Schedule
PISA	Programme for International Student Assessment

PMR	Lower Certificate Examination
PPD	*Pejabat Pelajaran Daerah*
SLSS	Students' Life Satisfaction Scale
SPM	Malaysian Certificate of Education
SPSS	Statistical Package for Social Science
SRP	Lower Certificate of Education
TAT	Transformation Achievement Test
TIMSS	Trends in International Mathematics and Science Study
VIA	Value in Action
WBM	Well-being Measure
ZPD	Zone Proximal Development

APPENDIX LIST

Appendix

CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter introduces the study in terms of background of the study, problem statement, purpose of the study, research question, research hypothesis, significance of the study, limitations and operationl definitions of related variables of this study.

1.1 Study Background

In 1991, the fourth Prime Minister, Tun Dr Mahathir Mohamad proposed a Vision 2020 (V-2020). Malaysia has reached a crucial moment of becoming a fully developed country by the year 2020, as aimed in V-2020. A number of national development plans and policies were introduced by government in order to achieve a

developed nation status. In 2009, the Government Transformation Programme (GTP) was introduced which in line with the focus of V-2020; to make Malaysia a fully developed nation. Education is one of the seven National Key Result Areas (NKRAs) presented in GTP with the aim emphasized on the quality of education. Following the GTP, Economic Transformation Programme (ETP) was launched in 2010 as part of Malaysia's National Transformation Programme. It has been formulated realising that high-income nation status is fundamental for achieving V-2020. Twelve National Key Economic Areas (NKEAs) and six Strategic Reform Initiatives (SRIs) were roofed under the two pillars of the ETP. Education is one of the twelve NKEAs highlighted in the ETP. In general, education is regarded as one of the major contributors to the social and economic capital development. This shows how important education is in this new era.

1.1.1 Education in Malaysia

Ministry of Education reported (as cited in Lee, 1999), the literacy rate of the country in 1991 was 74%. Back in 1990s, several transformations in school education in Malaysia were made in order to widen the opportunity of education for Malaysian people. Tan (2011) states Malaysia has been using six years of free basic primary education system for a long time. A public examinations determined student's progress to secondary education. However in 1992, government decided to increase the provision of basic education to nine years by which student may progress to lower secondary education (Secondary Year 1 to Year 3) without having to pass public examinations. The progress to upper secondary education (Secondary Year 4 to Year

5) though, was strictly for those who passed Lower Certificate of Education (SRP) examination only. The SRP examination was then replaced by Lower Certificate Examination (PMR) examination to ease for Secondary Year 4 entrance with minimum requirement; a pass in any subject. This results in mass increase for students' enrolment to Secondary Year 4 and therefore took the Malaysian Certificate of Education (SPM) examination at the end of Secondary Year 5 (Tan, 2011).

Besides transforms in educational system, Malaysia's school curriculum underwent many reforms as efforts to improve the quality of education (Lee, 1999). Malaysia has been using New Primary School Curriculum (referred to as KBSR) since 1982. The continuation of reforms in curriculum at secondary level; the Integrated Secondary School Curriculum (referred to as KBSM), was made in 1988 after implementation cycle of KBSR was completed (Lee, 1999). The KBSR was replaced to a new curriculum design starting year 2016 which is called as Primary School Standard Curriculum (referred to as KSSR). Following it, Secondary School Standard Curriculum (KSSM) is expected to be rolled out in 2017 as continuation of curricular reforms at secondary level replacing the KBSM (Malaysia Education Blueprint 2013-2025). In parallel with the KSSR, a new assessment format; School-based Assessment or *Pentaksiran Berasaskan Sekolah* (PBS), is rolled out to evaluate students holistically. Table 1.1 summarizes the chronological order of the national school curriculum reforms since 1982.

Despite the changes made, Malaysia's student cognitive performances were still considered low as compared to international standards. This is reported in the 12-year Malaysia Education Blueprint (2013-2025). The discouraging results shown in

the international student assessments reported in the blueprint namely, Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS). The declining pattern is observed as Malaysia's average student score was higher than the international average for both Mathematics and Science in its first participation in TIMSS. Then in 2007, it dropped to below the international average and decline in ranking for both Mathematics and Science.

Adversely, 18% of Malaysia's students failed to meet minimum proficiency levels in Mathematics and 20% in Science. This indicated increase in 2003 failures rate as 7% and 5% of Mathematics and Science respectively.

Table 1.1

A Summary of Malaysia's School Curriculum Reforms

No.	Curriculum Reforms	Year
1	The full implementation cycle of the New Primary School Curriculum (referred to as KBSR)	1982-1988
2	Implementation of the Integrated Secondary School Curriculum (KBSM) for language subjects	1988
3	Implementation of the Integrated Secondary School Curriculum (KBSM) for other subjects	1989
4	Rolled out of new curriculum; Primary School Standard Curriculum (KSSR) starting from Year 1 -Rolled out of the new assessment format; School-based Assessment (referred to as PBS)	2011

Malaysia's first time participation in PISA also resulted in discouragement as it ranked in the bottom third of 74 participating countries, below international average. 44% and 43% of the 15-year-old Malaysian students who participated in PISA failed to meet the minimum proficiency levels in Reading and Science respectively and worst result shown in Mathematics assessment, by which almost 60% failed to meet minimum proficiency level. This was discouraging despite mathematics is a compulsory subject in school and highly related to the science and technology which are very crucial for this era of globalisation. Hong, Ting & Hasbee (2009) conclude mathematics is fundamental for students to be adept in fields of science, technology and innovations which are crucial for Malaysia in order to increase knowledge workers and become a developed country by 2020.

Malaysia is on its path to change the over-emphasis on public examination results with new curriculum design and vast efforts on improving the quality of education. The teaching-learning strategies conducted in school play a crucial role in improving education quality. As stated by Lee (1999), teaching and learning approaches such as rote-learning and spoon-feeding resulted from examination-oriented education, may failed to meet the fast industrialising society like Malaysia. The need of reform to mathematics teaching is extremely high so as to survive in the overwhelmed growth of science and technology. Education today should not only give knowledge but also provides students with communication skills, problem solving skills, creative and critical thinking skills (Effandi & Zanaton, 2007).

Besides the focus on academic achievement, education in school should also inculcate attitudes and values that are appropriate for students' lives (Effandi & Zanaton, 2007). The focus on achievement is common for every school in the world, even for a very long time. Every school focuses on accomplishment, success, literacy and discipline, but the positive education introduced by Seligman, Ernst, Gillham, Reivich and Linkins (2009) which incorporate character strengths into teaching, wished to teach both the skills; skill of achievement and well-being without undermining the main focus are still new.

This supports the Malaysian Education Philosophy stated in Malaysia Education Blueprint (2013-2025), which to produce students with balance and harmonious in intellectuality, spirituality, emotionality and physicality. The blueprint emphasized that strong ethics and spirituality are wished to be inculcated in the education system in order to prepare child to rise to the challenges they will certainly face in adult life. It also aims to prepare children to resolve conflicts peacefully, to take reasonable decisions and principles at critical moments, and have the courage to do what is right. The educational system is also designed to foster a caring individual who contributes to the betterment of the community and the country. This shows that education in Malaysia needs to incorporate the teaching and learning of character strengths in the classroom as part of the efforts to nurture and develop students with strong ethics and spirituality so that they can be prepared to face the increasingly challenging world.

1.1.2 Teaching and Learning of Mathematics in Malaysia

Effandi and Zanaton (2007) identified two pedagogical limitations as the main weaknesses in traditional secondary education: lecture-based instruction and teacher-centred instruction. The lecture-based instruction limits students' responses, with teacher dominates classroom activity by conveying over eighty percent of the talk. This approach sometimes incorporate a simple question and answer with students by which only correct answers are accepted while incorrect answers were neglected by the teacher. The teacher-centred approach is the teacher take centre stage and students depend on their teachers to decide what, when and how to learn.

Highly trained and well-educated manpower is a precondition in achieving fully developed country status. The highly academic and exam-oriented system is exclusive in nature and would only advantage students who splendid academically, and create problems for student who do not possess obligatory level of academic ability. The problems become a great concern as the students belonging to this group have incremented in number over the years. This system does not align well with democratization of education by which to allow more students, as well as academically weak students, to progress to higher education level. The democratization of secondary education in Malaysia has not been assisted by efforts to help academically weak students (Tan, 2011).

Several mathematics teaching and learning approaches are promoted and investigation on the effectiveness is carried out over the years. These include cooperative learning (Effandi & Zanaton, 2007), problem based learning (Faridah &

Halimah, 2008) and constructivisim (Sharifah, Farah & Ismin, 2012) which aims to provide students with alternate learning environments that was very minimum or not offered at all in conventional teaching (CT) method. These methods focus on students' achievement, which is a common goal for all schools. Yeo (2011) stated, nowadays schools focus more on academic achievement; doing well, obtain A's in exams etc., because it was believed to secure students' placement in a good university or to get a good job. This practice could sometimes undermine the need to instil values and build character. Park and Peterson (2009) further argued that most of today's higher education and social programs emphasis on helping young people attain academic skills and abilities such as critical thinking, that are essential for them to achieve life goals. However they said that individuals may lack the desire to do the right thing without good character. The Character Strengths Learning in this study, aims to create a positive classroom which incorporating the teaching and developing of character strengths, specifically aimed for weak students and for mathematics classroom. It provides student with the skills of well-being without compromising the main focus of school which is achievement or accomplishment of academic.

1.1.3 Teaching and Learning of Character Strengths

Character Strengths Teaching and Learning (CSL) comes from the idea of creating a positive classroom by teaching and developing character strengths of students. Park and Peterson (2009) define character strengths as aspects of personality that are morally valued. Peterson and Seligman (2004) categorized 24 character strengths into six virtues in their Values in Action (VIA) project. They highlighted the distinction

between character strengths and talent in which "talents and abilities can be squandered, but strengths and virtues cannot" (p. 21). Teaching character in school was initiated by Mike Feinberg and Dave Levin in 1994, during their launching of Knowledge is Power Program (KIPP) with mission to "build a network of public schools that prepares students with knowledge, skills, and character necessary to succeed at all levels of K-12 education, college and the competitive world beyond" (Macey, Decker & Eckes, 2009). They also stated, KIPP has attracted media attention in its apparent success in providing education to poor, minority students. Seider, Gilbert, Novick, and Gomez (2013) found that character strengths are predictive of student outcomes. Therefore the CSL in this study is an alternate approach to traditional method that incorporating character strengths into everyday teaching and learning in classrooms, specifically mathematics classroom.

According to the literature reviewed by Ross, McDonald, Alberg and Gallagher (2007), implementation of school reforms in high schools and middle schools has shown to occur more slowly than in elementary school. The great challenges for implementation in middle grades are mainly because of the impacts of social, psychological and biological changes. Many research studies emphasized on the need for supportive middle school environments.

Mathematics taught in traditional way mainly focuses on the end grade in order for the students to get a good grade by memorising and regurgitating facts (Sharifah et al., 2012). The need to teach well-being in mathematics classroom is often neglected because the existing of other subjects that specifically teach moral and values. It was also found that one of the weaknesses in teaching strategy of

mathematics teacher, being the classroom lessons that have not adopted the values (Phang et al., 2012). CSL in this study promotes the well-being and good behaviours by incorporating character strengths in classrooms teaching and learning of mathematics due to the importance of balance in intellectual, spiritual, emotional and physical. At the same time, the CSL is hoped to facilitate students' engagement in learning and accomplishment. By incorporating the teaching and learning of character strengths in mathematics classroom, students are generally taught two things in a classroom, which are the mathematics topic as well as character strengths. The incorporating of character strengths is hoped to increase students' mathematics performance, to develop their character strengths, to get them engage in the classroom activity, as well as to help them achieve well-being.

1.2 Problem Statement

Numerous efforts had been done by Malaysia government for providing wide education to its people and improving the quality of education in the country. The importance of mathematics in today's world also has been emphasized as to produce 'world class' mathematical competency. Despite the efforts, great concern was established on the Malaysian students' mathematics performance at international level. The declining of Malaysian Form Two students' mathematics performance in the TIMSS assessment has been observed throughout the four years of Malaysia participation (1999-2011) (refer Figure 1.1 for the achievement trends). The participants' average score exceeded the international average in 1999 and 2003, but the average score has dropped from 519 in 1999 to 508 in 2003. In 2007, the average

score went down to 474 below the international average and continue to drop to 440 in year 2011 results. Although, there was a slight increment in year 2015, but our performance is still discouraging as compared to the international standard. This indicates that Malaysian students' performance in mathematics need to be improved in order to keep up with the international level especially students of Form Two due to their poor performance on TIMSS assessment. It is however conflicting with a claim by Seligman et al. (2009) in which they noticed that for more than a century, the schooling has been focusing too hard on academic accomplishment. But in Malaysia educational context, despite the great focus directed to students' academic accomplishment by the Ministry of Education, there are still rooms for improvement as our students' mathematics performance is not highly encouraging.

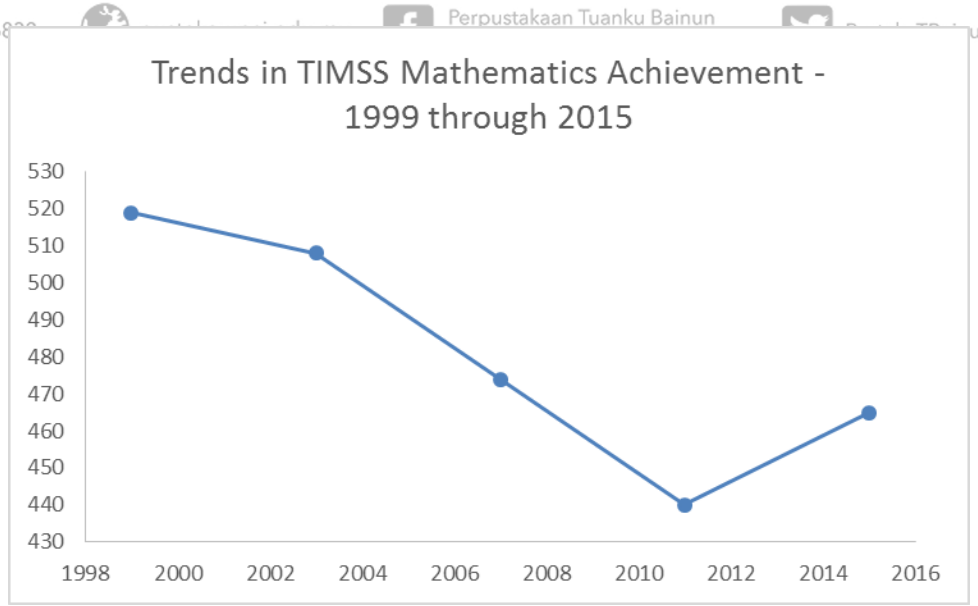

Figure 1.1 Trends in TIMSS Mathematics Achievement 1999 through 2015

Source: *Laporan TIMSS 2015* (http://www.moe.gov.my)