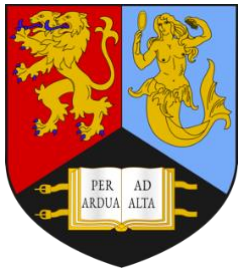

NUDGING FINANCIAL LITERACY, ATTITUDES AND BEHAVIOURS AMONG LOW SELF-CONTROL YOUNG ADULTS: A RANDOMIZED CONTROLLED TRIAL

By

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ABSTRACT

This study examines how financial education programs can improve financial literacy and nudge financial attitudes and behaviors of people with low self-control. This study is motivated by the rapid expansion of the finance sector which accelerates pressure on individuals to plan responsibly and manage their money effectively. Numerous governments and private organizations have taken steps to improve financial capabilities of households by providing access to financial education. However, to date, there are mixed evidences on the efficacy of the programs implemented on financial literacy, attitudes and behaviors, where most of the results were predominantly correlational and do not support causal inferences. Additionally, studies that incorporate individuals' cognitive biases remain limited and little is known about the mechanisms that can help people with low self-control to execute intentions and achieve desired behaviors. Rather than relying on financial education programs alone, prior studies therefore suggest the use of "nudges" to assist people to make better decisions. Therefore, this study asked whether 1) financial education programs can affect the level of financial literacy, attitudes and behaviors; 2) SMS reminders can lead to attitude and behavior change if sent as value added to a financial education program.

In order to answer these questions, this study used a "pre-test-post-test between group" experimental design. A group of 162 university students in Malaysia with lower-than-average self-control scores were randomly split into three groups. One received a classroom financial education program only, one received the program and a series of SMS reminders, and one received no intervention at all. The study therefore explored the effectiveness and impact of these treatments towards improving financial literacy, attitudes and behavior in three areas, namely savings, budgeting and money management.

The results of the experiment demonstrated that the financial education program had an effect on improving financial literacy, particularly in terms of basic knowledge. However, questions that required more practical experiences saw little improvement post-intervention. Furthermore, the study found that the addition of frequent SMS reminders resulted in increased attitudinal and behavioral impacts, particularly on saving for emergency, comparing prices, paying bills on time and sticking to budgeting plan. Given the improved behaviors as a result of frequent SMS reminders, such self-control mechanism could be embedded as part of national plan in promoting financial prudence by the government or any financial planning agencies.

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CHAPTER 1

INTRODUCTION

1.1 Motivation

Studies over the past two decades have provided important information on both financial literacy and financial capability in terms of its formation, strategies, and importance to individual's wellbeing. They are regarded as important subjects given the increased complexity in the modern financial marketplace which requires people not only to be financially well informed, but also capable in managing their daily finances. The government and policy makers have come out with many policy tools (OECD, 2010) to assist people adjusting themselves with challenges in the current's marketplace. One of the popular tools is financial education, which serves to provide people with adequate amount of information to help them make sound financial decisions.

Recently, there has been a considerable amount of literature highlighting the significant impact of financial education on improving financial literacy, attitudes and behaviours. However, its effectiveness as a stand-alone solution is still a growing area of concern, as it is yet to fully capture issues on behavioural constraints that stymie the connection between knowledge and behaviours. Despite being a financially literate person, the presence of financial constraints (such as low income) and an individual's cognitive biases limits their ability to execute desired intention and make optimal decisions. Considering these limitations, there is a need to expand the discussion on the efficacy of financial education by incorporating human factors, and explore the possible self-control mechanism that could effectively improve knowledge, attitudes and behaviours.

The chapter is divided into four sections. The next section 1.2 will explain the background of the study, which highlights the issues and problems that motivate this study, and also the rationale and significance of the study. Next is section 1.3 outlining the purpose and objectives of the study, followed with section 1.5 outlining the structure of the thesis.

1.2 Background of the Study

The significant increase in the role of finance (or often known as financialization) has been one of the major highlights in the economic development since the past three decades. Financialization, according to Lapavitsas (2011), is posited as a "s*ystematic transformation of mature capitalist economies"* which involves changes in the role played by the financial institutions, households, and financial sectors. The impact of financialization has created a shift in social and economic relations, which saw changes in people's attitudes and behaviours in using financial services and products, rise in incomes from financial activities, and series of financial bubbles and crises. Families are getting involved actively in the financial markets as asset holders in various financial instruments, and creditors to corporations. The complexity of financial products and services offered in the current marketplace have become more apparent as a result of rapid expansion in the financial sector. One of the popular issues debated around the concept of financialization is the domination of financial activity over real activity (Stockhammer, 2010). This can be seen from the significant increase in debt levels over GDP across all sectors, particularly the household sector, which demonstrates their active involvement in the credit market. For example, household borrowings in the US had more than 50 percentage points increase to 96% from 46% since 1976. Similarly, recent evidence from the UK reported a massive increase in credit lending to individuals since 2010 (not including student loans and credit cards), which most of this is believed to be accounted by hire purchase financing (Rowlingson and McKay, 2017). In Malaysia, the ratio of household debt to GDP

hits its all-time high at 89.1% in 2015, whereby most of it was undertaken by finance house purchases (Jalil, 2016). Although financialization process allows for greater capital flows which arguably stabilizes the financial system (Stockhammer, 2010), it may also expose consumers to various financial risks, which could result in loss of financial control (Poppe et. al., 2016). In addition to that, financially illiterate consumers neither be aware nor appreciate the opportunities offered by the emerging marketplace, and therefore are most likely to be the victim of financial fraud and scams (Deevy et. al., 2012). Given that the market keeps growing, increased support and education for people to understand and navigate the financial world would be helpful so that they can be more prepared, have a better understanding about financial products and services, be aware of financial risks and have better financial management skills (Beal and Delpachitra, 2003).

1.2.1 The needs for financial literacy education

Over the last two decades, financial literacy has been the central focus of attention and research in assisting consumers dealing with the challenges stemmed from financialization. Along with the increase complexity of financial market and products, consumers are expected to take responsibility for their own financial well-being and security (Hilgert et. al., 2003). Factors such as enhanced technology and market innovation and increased competition have made the financial industry sophisticated in the sense that a broad range of providers offer a multitude of products and services to consumers. Predatory lending, high debt levels and low saving rates accelerate the need for financial literacy (Braunstein and Welch, 2002).

According to the National Foundation for Educational Research, financial literacy is defined as *"the ability to make informed judgments and to take effective decisions regarding the use and management of money"* (Noctor et. al., 1992, p. 4). Consumer financial decision making can have great personal and societal consequences. Throughout a consumer's life, they will have to make big financial decisions such as choosing houses and mortgages, saving for education and ultimately enough for retirement, as well as relatively small decisions, such as using credit cards, repaying debts, and health and risk insurance. Both big and small decisions can have a negative impact if the consumer is poorly informed and makes serious financial mistakes or miscalculations (Lynch, 2011). Therefore, the objective of financial literacy is to combat the recent consequences of the credit crisis, consumer over-indebtedness and bankruptcy by providing consumers with a means to make better financial decisions (Huston, 2010). In line with this, navigating consumers with proper educational support is needed in order to help them take charge of their financial security and adapt with the complex financial marketplace. This is in line with what the European Banking Federation (EBF, 2009) had stated previously that financial literacy is not only crucial in providing consumers with better understanding about certain products or services, but also protecting them from being vulnerable to financial risks. Previous works have demonstrated the importance of financial literacy in guiding people to manage their financial resources (Cude et. al. 2006) and help to better understand certain financial terms and benefits that links with the products (Bhushan and Medury, 2013). Lusardi and Mitchell (2011) added an important remark on the role played by financial literacy on people's future well-being, particularly in life after retirement and that it should not be taken for granted even in countries with developed financial markets.

1.2.2 Arguments against financial literacy education

In recent years, the discussions on the outcome of financial literacy are no longer limited to helping consumers to be financially informed learn something. Financial literacy has been conceptualized on a much broader notion and has become an integral component of financial capability; not only to improve knowledge and skills, but it also involves in changing attitudes and behaviours (Kempson et. al., 2006; Atkinson et. al. 2007). As a result, financial education has been recognized as one of the important tools to improve one's financial capability (Huston 2010; Lusardi and Mitchell, 2011; Borden et. al, 2008). This was further supported by Ben Bernanke, the former U.S Federal Reserve Board Chairman (Lusardi and Mitchell, 2014) who shared his thought on the importance of financial education not only to increase product knowledge and awareness, but also as a protection to financial abuse:

> *"In our dynamic and complex financial marketplace, financial education must be a life-long pursuit that enables consumers of all ages and economic positions to stay attuned to changes in their financial needs and circumstances and to take advantage of products and services that best meet their goals. Well-informed consumers, who can serve as their own advocates, are one of the best lines of defense against the proliferation of financial products and services that are unsuitable, unnecessarily costly, or abusive".*

Countries around the world have taken steps by implementing various financial education programs flagged under its respective national education strategy. To date, about 59 countries worldwide currently involve in either designing, implementing or revising its national strategy, with all financial education mandates being monitored by a leading authority appointed by the government (OECD, 2015). However, evaluations drawn from the financial education

programs appeared to be encouraging, yet mixed across different target audience, delivery methods and expected outcomes. For instance, the POWER! Programme conducted in Malaysia was successful on improving financial knowledge, but produced mixed results on attitudes and behaviours (Sabri, 2016; Messy and Monticone, 2016). Another program conducted in Indonesia was not only effective on improving knowledge, but impacted several behaviour outcomes such as budgeting and savings (Doi et. al., 2012). Similar results were also reported in New Zealand and Australia (Gibson et. al., 2012). Several issues contributed to these findings. First, the presence of heterogeneity in both knowledge and behaviours, which meant that the programs were found to be less effective to a certain group of people. The management of personal finances is generally taught in a normative format, where individuals are lectured in a structured, systematic and prescriptive fashion. It is argued that a "one-size-fits-all" program certainly does not fit all types of groups and may not benefit everyone, due to the fact that different individual has different set of character, preference and economic circumstances (Lusardi *et.al.*,2013, Prochaska-Cue, 1993). Given the presence of heterogeneity (income level, cognitive ability and psychological preference), it is suggested that financial education programs should be delivered to specific groups of population in order to ensure its effectiveness and to have change in behaviours.

Other than that, results from prior research highlights the disconnection between knowledge and behaviours, indicating that knowledge is not necessarily the sole factor that can change behaviours and outcomes. Although having knowledge is essential, people struggled to perform certain behaviours (such as savings) due to limited resources and motivational support (Ajzen *et. al.*, 2011). Prior studies have documented the role played by socio-economic factors such as income, peer influence, parents and family socialization which are highly influential on individuals' decision-making behaviours (Johan *et. al*, 2020; Sabri *et. al.*, 2012; Shim *et.*

al., 2010; Xiao *et. al.,* 2009; Joo and Grable, 2004). Besides socio-economic factors, behavioural factors (or non-cognitive factors such as impulsivity or gut feelings) also play an important role in the process of translating knowledge into actions. It is assumed that financial education should improve knowledge and understanding, thus better knowledge should change people's behaviour. However, in reality, people make bad decisions and do not behave as to what the traditionalists had expected despite being well-informed about financial (Stromback *et. al.,* 2017). For example, people do not save and plan for life after retirement (Lusardi, 1999), buy unnecessary items and overspend (Abendroth and Diehl, 2006; Sotiropoulos and D'astous, 2013; Thaler and Ganser, 2015). These evidences show the gap that exists between the theory on how people were expected to behave and how people actually behave when dealing with real world choices. Additionally, Fisher et. al., (1992) and Misovich et. al. (2003) acknowledged the role of psychology that mediates the connection between knowledge and behaviours. Although people understand the benefits of a specific behaviour and they may even have some ideas of how to get started, too often they have difficulty (or lack of willpower) to execute intention. Thaler and Shefrin (1981) described this situation as "bounded self-control", which is a psychological barrier that stymie the connection between knowledge and outcomes or behaviours (Letkiewicz and Fox, 2014; Carpena et. al., 2017).

Self-control is conceptualised as individual's ability to delay immediate gratification in order to reach larger alternative goals. Similarly, Logue (1995) defined it as "engaging behaviours that result in delayed (but more) rewards". Living in today's modern world, one cannot escape from dealing with self-control either in the form of impulsivity, sensitivity or procrastination (Letkiewicz and Fox, 2014). The advancement of technology (such as internet and social media) does not just transform the economy and society, but also provides much easier access for people to fulfill temptation without having to wait any longer; hence, making the work on

self-control as an important subject matter. This view is supported by economic psychologists that stressed out the importance of considering psychological factors in economic decision making, and suggested self-control should be given a focus in explaining financial behaviour (Warneryd, 1989; Lunt, 1996). Previous studies have shown that low self-control individuals are not only vulnerable to various imprudent behaviours (Reisig and Pratt, 2011), but are also less likely to save money from every paycheck, feel more anxious about financial matters, and less secure in current and future financial situation (Stromback et. al., 2017). In the same vein, recent study by Hastings and Mitchell (2018) found the association between impatience and financial literacy on retirement savings behaviour, with the former being the strongest determining factor.

1.2.3 Problem Statement

Most current literatures pay attention to predictors of financial literacy and behaviours, which comprises of both socio-economics and behavioural factors. However, the scope of literature that examines the remedies for one to deal with cognitive biases (in particular, self-control) remains understudied, Nevertheless, has overtime become a popular area of investigation. Few studies have discussed several "nudging" tools that can be used to help people with low self-control to manage their money effectively. This includes the use of default options, "behaviourally-informed" financial education tool, pre-commitments, setting deadlines, foreseeable expenses and saving rules, and concrete goal setting (Rha et. al., 2006; Thaler and Sunstein, 2009; Ariely and Wertenbroch, 2002; Cho and Rust, 2017; Carpena et. al., 2017; Brambley et. al., 2019).

Although some of these self-control devices were proven effective, they are not without limitations. The use of default options for pension, for instance, is only relevant for working individuals with regular income thus, not applicable for non-working individuals particularly among university students. Besides, due to the heterogeneity in individuals' economic behaviours, default options do not seem to benefit everyone in general (Lu et. al., 2010). For example, it may sound more practical for employees to focus on paying off their loans (particularly those with higher cost of debts such as credit card) rather than increase contribution for retirement saving and investment. Other mechanisms such as setting deadlines and concrete goal setting did improve participants' attitudes towards budgeting and savings behaviour (Carpena et. al., 2017). These choice architectures however, are mandates and not a pure nudge, as it requires people's attention and effort to develop a plan of action. Additionally, prior research on this subject were mostly conducted in collaboration with various stakeholders (such as banks and private institutions) involving large samples and substantial amount of money; hence making it difficult and costly to extend (for reviews, see Bruhn et. al., 2013 and Brambley et. al., 2019).

For decades, information technology brought significant changes to the whole economic landscape and has been amongst the important antecedents to financialization (Davis and Kim, 2015). Yet, ironically, very little attention has been paid on the use of technology that examines people's decision-making behaviour, particularly that involves psychological traits. Until recently, the use of mobile phone short-message system (or SMS) has evolved as a popular intervention to encourage change in outcomes, mainly in health and sciences research. Collectively, they outlined the critical role of SMS reminders as a promising method of technology for improvement in outpatient outcomes (Downer et. al., 2006), adherence to a healthy diet and medication (Akhu-Zaheya et. al., 2017), attendance at healthcare appointments

(Gurol-Urganci et. al., 2013), and management of chronic diseases (Jones et. al., 2014). However, the scope of discussions of this research are limited to patients with various clinical and health issues. In psychological and social sciences literature, a systematic understanding of how SMS reminders could nudge attitudes and behaviours remains unclear, although a few studies have been undertaken involving different set of design and group of samples (Karlan et. al., 2016; Rodriguez and Saavedra, 2015). As previous studies show, the young adults (often known as millennials) are the generation that are widely exposed to changing technologies (such as mobile devices) and has the highest level of mobile internet penetration (Statista, 2016 in Chuah et. al., 2017).

This thesis therefore, will examine the impact of classroom-based financial education program with additional intervention of SMS reminders on financial literacy, attitudes and behaviours among low self-control young adults. The study uses SMS reminders as it fits the criteria of a good choice architecture (or nudge) which is inexpensive, easy to use and economically affordable to be avoided (Thaler and Sunstein, 2009). The young adults are often considered as the high-risk group when it comes to financial planning and stability, where most of them carry considerable amount of debt into jobs when they earn entry level salaries (Leach et. al., 1999). Prior studies revealed that the young adults are vulnerable to financial illiteracy (Definit, 2003; Beal and Delpachitra, 2003) and have more tendency to engage in impulse purchases (Kotler, 2000). Burton et. al. (2018) asserts that impulse purchases occur as a result of strong emotional desire which stems from a reaction behaviour characterized by low cognitive control. The number of impulsive purchasers is growing rapidly particularly among the young group (Kacen and Lee, 2002), where control of emotions is still developing. In Malaysia, the young-aged group account for a majority of the population with a total of 14.6 million citizen aged between 15-39 years (PPC, 2018). Therefore, this study will focus on the young adults in

particular, university students given the fact that they are identified as the agents of change in the society that will drive the economy forward. Their life during university years is crucial, as Sommerville et. al. (2017) points it as a period of exploration – a stage where they begin to make the own decisions for the first time. They will become the main thrust of human resources upon graduation, and any financial decisions or problems during early stage of their life could bring negative impact on their individual life, family and career. Hence, any efforts to develop sound financial attitudes and financial behaviours during university years would provide better chances of attaining financial satisfaction and well-being in the future.

1.2.4 Rationale and Significance of the Study

Prior studies that examined the links between financial education, literacy and behaviours have been predominantly correlational. Much attention has been given on finding the direct associations between these variables where mostly were conducted using cross-sectional surveys (Letkiewicz and Fox, 2014; Biljanovska, 2016; Cobb et. al., 2016; Brounen, 2016). Malaysia is no exceptional in this case (Jariah et. al., 2004; Sabri and McDonald, 2010; Sabri et. al., 2010, 2012; Yong et. al., 2018; Aydin 2019). These findings were based on correlations between measured variables which do not support causal inferences (Bauman et. al., 2002). In cross-sectional study, a correlation that exists between variables does not mean that a change in one variable would cause the other variable to change, since observations are made at single point in time. Presently, literatures that capture cause and effect relationship are rather limited, particularly within the scope of developing countries. To the best of the author's knowledge, there has been no study examining the impact of two interventions in a single experiment on financial literacy, attitudes and behaviours of low self-control people in Malaysia. Considering

this limitation, this study uses a different methodological approach by looking at causality effects using experimental design. As the design of the study involved manipulation of variables, it allows a conclusion about causality to be made – something of which correlational research cannot provide, and the results could fill the gap in the current literature.

As highlighted earlier, other than knowledge and socio-economic influence, behavioural factors play important part in decision-making behaviour. With the increasing life expectancy (Wahid et. al., 2019), young adults need to be equipped with financial planning skills to enjoy a reasonable future livelihood. People who failed to control themselves presently will often feel anxious about their financial situation, demonstrate poor financial behaviours and subsequently, would have low financial satisfaction (Joo and Grable, 2004; Oechssler et.al., 2009). In addition to that, people who feel unsatisfied with their current state of finances would not enjoy greater financial well-being. Shim et. al. (2009) in their study posited that other than psychological and health aspects, financial well-being (particularly among the young adults) is closely linked to behavioural control which includes people's satisfaction with their financial status. According to Consumer Financial Protection Bureau (2015), financial well-being is defined as "*a state of being reflecting a person's ability to meet current and ongoing financial obligations, feel secure in their financial future, and make choices that allow enjoyment of life".* Therefore, assisting people to make optimal decision-making is vital, as it would help them to improve financial control by spending resources at optimal level, make sound financial decisions (such as cutting down debts, accumulate more assets) and improve their standard of living (Kiyosaki, 2012). To achieve financial well-being, is important for people to plan their financial activities ahead as an early protection for unexpected financial commitments at certain points in their lives (Ali et. al., 2015).

On a broader perspective, households that enjoyed strong financial health helps prosper the country's economic growth. As posited by Fitzsimmons (1993), the nation's economic well-being is closely linked to its households' state of living. Households that possess good financial behaviour and save more, contributes to the accumulation of national savings which can be used for investment activities, as well as hedging the country against unexpected economic shocks (Mahdzan and Tabiani, 2013). Additionally, high national savings not only helps to stimulate economic activities and increase long-term growth rate, but also lessens the country's reliance on foreign capital which could expose them to macroeconomic crisis (Gavin et. al., 1997).

1.3 Research Questions

The overall aim of the study is to examine the impacts of financial education on financial literacy, financial attitudes and behaviours of low self-control university students. Specifically, this study seeks to shed some lights on the impact of financial education with additional SMS reminders (as complementary agent) on improving financial literacy, as well as three aspects of financial attitudes and behaviours namely saving, budgeting and money management. The following research questions have been developed for this study:

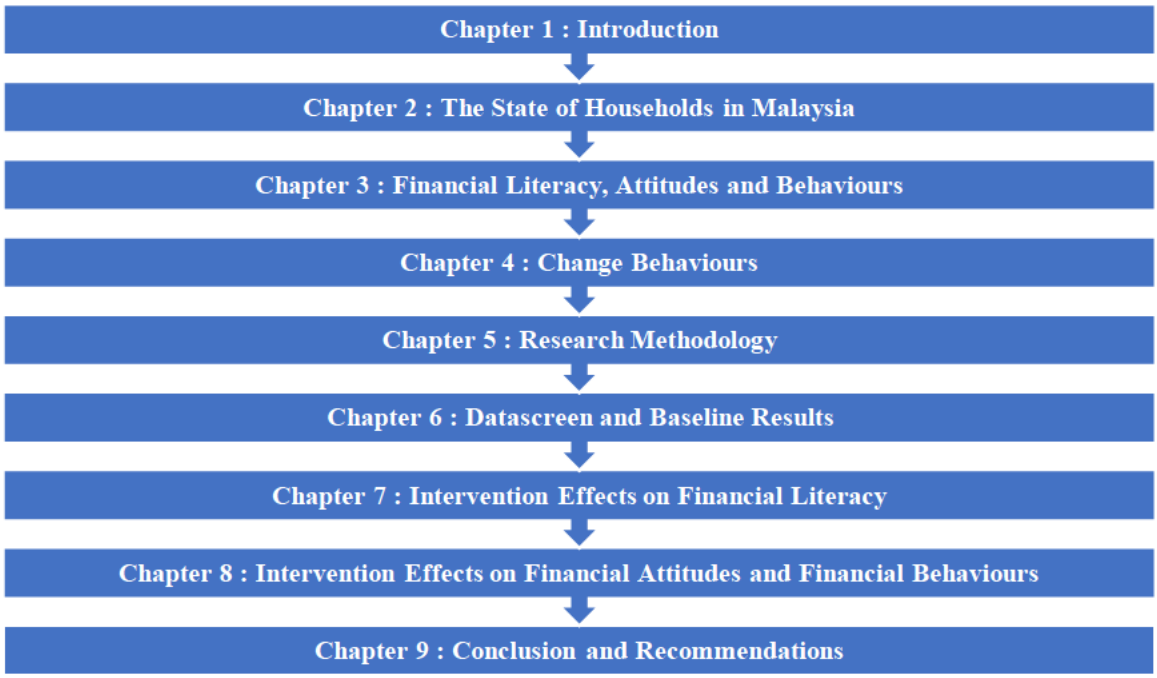
1. What is the impact of traditional financial education program on levels of financial literacy?
2. What are the impacts of traditional financial education program and additional SMS reminders on attitude towards savings, money management and budgeting?
3. What are the impacts of traditional financial education program and additional SMS reminders on saving, money management and budgeting behaviours?

For this study, the term “impact” was preferred than “outcomes”. Although both terms might have similar meaning, they are not the same. An “outcome” is a finite and can be measured objectively. For instance, an outcome of advice intervention on healthy lifestyle might be changes in Body Mass Index (BMI) or bodyweight. Another example of positive outcomes related to financial behaviour is the increased amount of savings or reduced amounts of debts. According to Ajzen and Fishbein (1980), behaviour is not an outcome as it only contributes partly to the outcomes. In other words, outcome is a result of an individual’s behaviour, and therefore, behaviour should lead to outcome. A person who saves money regularly depicts a kind of saving behaviour, whilst an increase in amount of savings every month is an outcome. Meanwhile, impact can be conceptualized as the longer-term effect of an outcome, and more of a subjective manner. The effect of information from an intervention is perhaps, be able to assist people to make an informed choice, or make them become more empowered. Using the same example used above, a person who managed to lose body weight might experience an increase in the level of happiness and self-confidence. A person who can escalate monthly savings portrays a positive savings behaviour, is able to make informed decisions and experience a positive financial satisfaction and well-being. Given that the participants of this study are university students who do not earn any regular income, the way the study reported behaviour changes are based on what participants perceived themselves to be, which is more on subjective manner (impact) rather than objective (outcome).

1.4 Structure of the thesis

This thesis is structured into 9 Chapters:

Figure 1.1: Structure of the thesis



Chapter 1 highlights the role played by financialization which has transformed the financial market to another level. To cope with such rapid changes, require consumers (in particular) to be equipped with necessary skills through financial education. This chapter emphasized the importance of financial literacy to safeguard consumers from the complexity of the financial market, and help them make better financial decisions. Nonetheless, financial literacy alone is not sufficient for this purpose, as there are other factors that can influence and change consumer's financial knowledge, attitudes and behaviours. This chapter highlights the role of self-control (one type of psychological barrier) that could potentially stymie the connection between knowledge and behaviours, and several "nudging" tools to help consumer improve financial capability. To date, such findings remain inconclusive. The chapter then discusses the purpose of this study which is to examine the causal relationship between financial education

program delivered via classroom method along with SMS reminders (as additional nudging tools) with financial literacy, attitudes and behaviours. The research questions, rationale and significance of the study are further highlighted.

Chapter 2 provides the overview and arguments on the background of the research from Malaysia's perspectives.

Chapter 3 provides the discussions on financial literacy, how it is being conceptualized, and several empirical studies on the level of financial literacy worldwide as well as in Malaysia. The chapter then narrows down to discussion on financial attitudes and behaviours, its underpinning theories and pattern of behaviours depicted by households. The role of financial education is also discussed in this chapter, followed the links between knowledge, attitudes and behaviours.

Chapter 4 discusses the factors that influence people to perform certain financial behaviours. It then followed by discussions on self-control and behavioural economics theories that influence individuals' decision-making behaviour. The chapter is then followed with discussion on nudge theory, and why nudge should be considered to help people change behaviours. Discussion on theory of change is also included.

Chapter 5 describes in detail the methodology used in this research. It starts with discussion on the design of the research, which is experimental design including the population, sampling and data collection. The survey questionnaire instrument is also discussed and followed by description of the pilot study, data analysis, validity and reliability.

Chapter 6 presents the procedures of screening the dataset obtained for this study which involves several statistical tests including missing values, data outliers and normality tests. Characteristics of participants are also discussed in this chapter.

Chapter 7 discusses the analysis on the impact of traditional financial education program on financial literacy. The chapter begins with frequency analysis of financial literacy scores and a summary of correct answers from all groups. It then narrows down to discussing the effects of the program on the two dimensions of financial literacy which are financial numeracy and financial knowledge.

Chapter 8 discusses the impact of the treatments on financial attitudes and financial behaviours. A detailed discussion on each measurement items of outcome is provided for better understanding.

Chapter 9 re-caps the research questions and discusses the key findings and contributions of the research. The chapter also includes limitations and recommendations for future research. Policy implications and reflections of the research are also included at the end of the chapter.

CHAPTER 2

THE STATE OF HOUSEHOLDS IN MALAYSIA

2.1 Introduction

This chapter aims to provide the understanding on the current state of households in Malaysia. The chapter begins with insights on Malaysia's economic development and its contribution on improving household income level and overall quality of life. The chapter is then narrowed down into exploring the level of financial inclusion and financial literacy in Malaysia. The level of national and household savings will also be discussed, which include the discussion on saving motives as well as the factors that hinder Malaysian households to save and to have a prudent financial behaviour. Apart from savings, the chapter also reviews the levels of household borrowings including the purpose of financing and sources of borrowings. This is followed by the discussion on government's initiatives to promote financial capability and uplift the levels of financial literacy and behaviours among Malaysian households. The last section provides the concluding remarks.

2.2 Malaysia Demographic Profile

The population in Malaysia is currently estimated at 32.69 million (DOSM, 2020a). Out of this figure, 29.7 million are Malaysian citizens whilst 2.97 million are non-citizens. Currently, Malaysia ranks at 6th place as the most populous country in Southeast Asia and 42nd in the world. As depicted in Table 2.1, total population has increased by 4.07 million since the last ten decades, however, at a declining growth rate from 1.8 percent (2010) to 0.4 percent (2020). Nonetheless, the growth of Citizens remains stable at 1.1 percent since 2018. The declining rate was attributed to the decrease in fertility rate, net international migration and the return of

foreigners to their respective countries during the Movement Control Order following the spread of the COVID-19 pandemic worldwide. With the slow average yearly growth rate, it is projected that the total population to increase to 41.5 million by 2040 (DOSM, 2020b). Malaysia is a multi-ethnicity country with four main ethnic groups, broadly classified as Bumiputera (Malay and Indigenous), Chinese, Indian and Others. The Bumiputera comprised a total of 69.3 percent of the total population, followed by Chinese (22.8 percent) and Indian (6.9 percent), whilst Others are the minority at 1 percent.

Table 2.1: Total population and annual growth rate in Malaysia (2010-2020)

Year	Number ('000)			Annual population growth rate (%)		
	Total	Citizens	Non-Citizens	Total	Citizens	Non-Citizens
2010	28,588.6	26,264.1	2,324.5	1.8	1.6	4.0
2011	29,062.0	26,616.9	2,445.1	1.6	1.3	5.1
2012	29,510.0	26,961.7	2,548.3	1.5	1.3	4.1
2013	30,213.7	27,325.6	2,880.0	2.4	1.3	12.5
2014	30,708.5	27,696.2	3,012.3	1.6	1.3	4.2
2015	31,186.1	28,060.0	3,126.1	1.5	1.3	3.0
2016	31,633.5	28,403.5	3,230.0	1.4	1.2	3.3
2017	32,022.6	28,735.1	3,287.5	1.2	1.2	1.8
2018	32,382.3	29,059.6	3,322.7	1.1	1.1	1.1
2019	32,523.0	29,382.7	3,140.4	0.4	1.1	(5.6)
*2020	32,657.3	29,696.9	2,960.4	0.4	1.1	(5.6)

**Estimated*
source: Department of Statistics Malaysia (2020)

The age structure of the population is categorised into three main groups; the younger-age group (0-14 years), the working-age group (15-64 years) and old age (65 years and over). Presently, the working-age group (15-65 years) dominates the population by 69.8 percent as opposed to other age groups (Table 2.2). Out of this number, there are about 14.6 million (or 45.4 percent) Malaysian aged between 15-39 years, indicating that the youth account for a majority of the population (PPC, 2018). In addition to that, the median age population is 29.2 years, which means half of the total population is younger (and older) than this age. The large

number of youth and young working adult population signifies a greater source of future economic growth, and also potential workforce for the country. Therefore, it is critical for the government to provide wider access to labour market, and ensure that the young people do not have difficulties to find and maintain a decent job. Having high participation in the labour market allows people to earn income for living, and also increases the opportunity for saving, which can have the effect on economic growth. As mentioned by Gokhale (2000) and Mahdzan and Tabiani (2013), a high savings nation helps in the accumulation of wealth which allows individuals to improve standard of living and hedge the country against potential economic shocks.

Table 2.2: Structure of Malaysian population by age

No.	Age group	% of Population (2020)
1	0-14 years	23.3
2	15-39 years	69.8
3	65 and above	6.7

Source: Department of Statistics Malaysia (2020)

Given its strong economic position and growth within the region, Malaysia has been able to maintain a relatively low unemployment rate at 3.36 percent as of 2018, lower than average rate of 5.8 percent among the OECD countries (OECD, 2019). However, several social challenges require attention particularly in human capital development. For instance, low financial literacy levels (Mokhtar et. al., 2018), gap in educational attainment, reaching out the under-served population and proper accounts monitoring of people who have access to financial services (Luna-Martinez, 2017). Other than that, the rising cost of living is another key concern, particularly among low-income families (OECD, 2019). In response to improving financial inclusion and capability of its citizens, a holistic financial inclusion framework was introduced as part of the Central Bank's Financial Sector Blueprint (2011-2020), aiming at improving the overall well-being of communities on the aspects of convenient

accessibility, high take-up, responsible usage and high satisfaction of financial services (Bank Negara Malaysia, 2010). Other than that, efforts also have been made to improve purchasing power and reduce poverty through various structural reforms. This includes the introduction of a new fuel subsidy mechanism, better access to education and healthcare services, affordable housing programmes, and direct cash transfer to every household earning RM4,000 monthly (or £730) and below (OECD, 2019).

2.3 Economic Growth

Over the last two decades, Malaysia has recorded remarkable economic performance. Gross Domestic Product (GDP) has been on the rising trend and continues to grow from USD314.4 billion/year (2012) to USD364.5 billion/year (2019) (Table 2.3). The country's standard of living (measured in total GDP per capita) has shown a good improvement; growing from $10,817 (in 2012) to $11,414 as of 2019, which is largely contributed by the services sector (Hussin, 2013). Real GDP grew at an average rate of 5.1 percent over the last eight years. All these were possible due to improved macroeconomics prudence and diversification of export products which had strengthen Malaysia's resilience on external shocks. Other than that, Malaysia's pragmatic strategies in transforming its economy from agricultural-based to an industrial and services-based had opened the linkages to global supply chain network, which allows for an expansion in trading activities with several major countries including China, the United States, Japan and Singapore (OECD, 2019).

Table 2.3: Malaysian GDP (2012 – 2019)

Indicator / Year	2012	2013	2014	2015	2016	2017	2018	2019
GDP (in billion USD)	314.4	323.3	338.1	301.3	301.2	319.1	358.7	364.6
GDP (percapita, in USD)	10817.4	10970.1	11319.1	9955.2	9817.7	10254.2	11373.2	11414.8
GDP (annual growth %)	5.5	4.7	6.0	5.1	4.5	5.8	4.8	4.3

Source: World Development Indicators, World Bank (n.d).

In comparison to other economies, the Malaysian economy has been performing well, with some of its GDP indicators outperformed its ASEAN counterparts. Strong domestic demand has helped Malaysia propel a steady GDP growth rate of 4.3 percent in 2019, higher than the growth of advanced countries like Singapore, US and the UK (Table 2.4). In addition to that, Malaysia's GDP per capita was around two to three times higher than that of Indonesia and Thailand. However, the standard of living in Malaysia is not as expensive as in Singapore, which is more developed and produced four times higher GDP per capita ($65,233.30) than Malaysia. Compared to other highly populated and developed countries, Malaysia's GDP per capita is still far behind than those of the US ($65,118) and the UK ($42,300), but more or less the same with China ($10,261). Nonetheless, Malaysia has the potential to improve and stay competitive as the country is rich with natural resources and talented people, and has a higher potential to produce renewable energy, which is an important issue for the future (Cook, 2016). Currently, Malaysia is ranked 27th (out of 63 countries) in world's most competitive economies, ahead of other regional peers like Thailand (29th), Indonesia (40th) and Philippines (45th) (Kok, 2020).

Table 2.4: GDP across selected countries (2019)

Countries	Population	GDP (billion, USD)	GDP (percapita, USD)	GDP (annual growth %)
Malaysia	31,949,777	364.6	11,414.8	4.3
Indonesia	270,625,568	1.1 tril	4,135.60	5.1
Singapore	5,703,569	372.1	65,233.30	0.7
Thailand	69,625,582	543.5	7,808.20	2.4
China	1,397,715,000	14.3 tril	10,261.70	6.1
United States	328,239,523	21.1 tril	65,118.40	2.2
United Kingdom	66,834,405	2.82 tril	42,300.40	1.5

Source: World Development Indicators, World Bank (n.d).

2.4 Household Income Groups

The household income level in Malaysia is categorized into three groups (Table 2.5). First, the low-income earners (or B40 group), which accounts for 40 percent of the country's total income, and earn less than RM4,850 (or £866) per month. Second, the middle-income earners (or M40 group) which also, accounts for 40 percent of the country's total income, and earn between RM4,850 – RM10,950 (or £866 - £1955) per month. Third, the high-income earners (or T20 group) which accounts for 20 percent of the country's total income, and earns more than RM10,950 (or £1955) per month. Presently, the B40 and M40 groups comprised of 2.91 million households each, whilst around 1.46 million households are in T20 group.

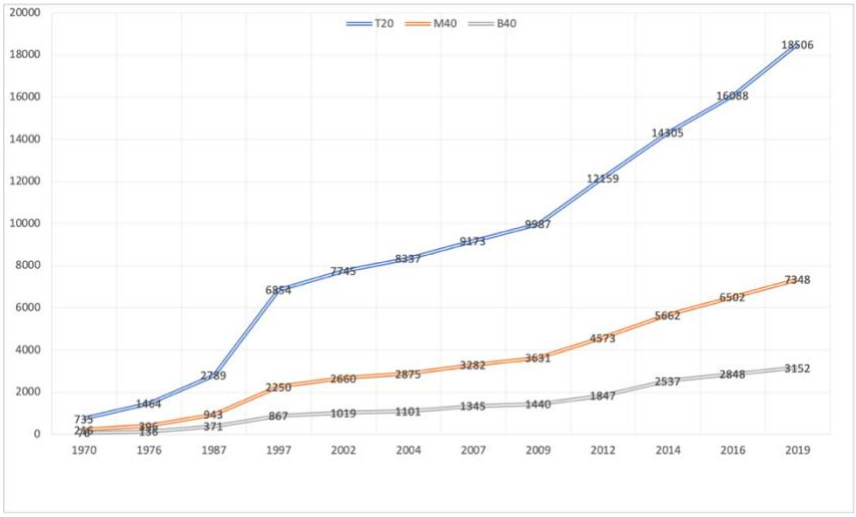
Table 2.5: Malaysian Household Income Category (2019)

	B40	**M40**	**T20**
No. of households	2.91 million	2.91 million	1.46 million
Mean Income	RM3,152	RM7,348	RM18,506
Income threshold	<RM4,850	RM4,850-RM10,959	>RM10,959

The positive growth of the country's Gross Domestic Products (GDP) over the years are reflected in the household income. Based on the State of Households report (Khazanah Research Institute, 2018), between 1970 – 2019, the household mean income in Malaysia has been steadily increasing, followed with reduction in income inequality (Figure 2.1). The mean income of B40 households has been 7.6 times higher since 1970; the greatest cumulative growth in income compared to other income levels. The M40 households also enjoys a similar upward trend in mean income, growing 6.2 times higher from 1970. Although the mean income trend for T20 group in increasing, they enjoyed the least cumulative growth in income but still a respectable improvement of 4.4. times since the last five decades.

The rise in household income levels is mirrored in the Malaysian Well-Being Index (MyWI), an indicator to scale the society's overall quality of life which has shown significant improvement for almost two decades since 2000 (EPU, 2017). The MyWI consists of two important holistic components which are economic and social well-being. Dimensions under the economic well-being components include income and distribution, education and transport. Whilst the social well-being dimension covers the aspects of housing, health, public safety and social participation. Between the period 2000 – 2016, the MyWI has consistently improved from 100 points to 122.8 points (EPU, 2017). The economic components rose sharply by 30.3 points compared to the social well-being components (22.8 points), mainly due to improvements in transportation and income and distributions. The increasing trend suggests that overall, Malaysians' quality of life seem to be improving towards a more positive state.

Figure 2.1: Mean of Household Income by Income Group, 1970 -2019



Source: Khazanah Research Institute (2018)

However, despite the improving trend in the household income, one key concern is the steady increase in income gaps between the three groups, whereby the T20 households is enjoying income growth at a faster rate than the others. According to Khazanah Research Institute (2018), it was estimated in 2000 that the difference in mean income level were RM6000

(between T20 and M40), RM2000 (between M40 and B40) and RM8000 (between T20 and B40). However as of 2016, the difference increased to RM9000, RM4000 and RM13000 respectively. This was mainly due to the increase in the cost of living which piling up the pressure among the B40 and M40 households to make ends meet. As mentioned previously, the rise in cost of living has been a key source of concern, growing at a much faster rate than what households are receiving, which could potentially affect future consumption and activities. Although inflation rate has been kept low in recent years, food prices have increased faster than prices of other goods and services which changes households' expenditure pattern (OECD, 2019; Khazanah Research Insitute, 2018). The burst of food inflation has increased the burden of the low and middle-income earners whom spent much of their income on food items and services, and had to cut down discretionary expenses to maintain their living. However, the spending pattern of the T20 income group are quite the opposite, whereby the spending pattern are much towards discretionary in nature, for example recreation and culture services, and consume many foods away from home (eating at cafes and restaurants).

As mentioned earlier, the government has introduced various initiatives to help ease the burden with the rise in cost of living and to increase the standard of living of its households. Policies that aim to reduce income inequality and poverty such as the New Economic Policy 1970-1990 (NEP), National Development Policy 1991-2000 (NDP) and New Economics Model 2011-2020 (NEM) play a significant role in helping the government to distribute income fairly and effectively to all Malaysians (Safari et. al., 2019). Other than that, the establishment of Financial Sector Masterplan (2001-2010) and Financial Sector Blue Print (2011 -2020) which underpins the country's vision to become a fully developed nation, has been successful in providing the access to quality financial services to households across every segment and uplifting the country's financial inclusion to another level.

2.5 The Level of Financial Inclusion

Malaysia is among the middle-income countries that have the highest level of financial inclusion. The pillar for Malaysia's financial inclusion is its national identity card called *MyKad* issued by the government. It is a compulsory identity card for the Malaysian citizens aged 12 and above. It is the first smartcard in the world that was designed to perform a wide range of functions such as data storage (which include identification, driver's license, passport and health information) and an e-cash function. With *MyKad*, has made it easier for households to open a bank account as new customers are quickly validated upon the presentation of their *MyKad*. Meanwhile, the agent banking initiatives was setup to cater for unserved households who are located at remote or excluded areas that have no bank branches. Since its inception in 2012, the agent banking has become an effective vehicle to advance financial inclusion in Malaysia.

These initiatives have helped Malaysia to improve its financial inclusion to another level. Between the year 2011-2014, Malaysia recorded one of the highest improvements in percentage of adults that have account with financial institutions; an increase of 15 points from 66 percent to 81 percent respectively (Table 2.6). Among the ten ASEAN member countries, Malaysia was ranked second (after Singapore) in percentage of adults with a bank account (Figure 2.2). As of 2015, almost majority of Malaysia's adult population (or 92 percent out of 22 million adult population) have an active deposit account which allows them to perform various transactions, such as save and withdrawal of money, use of ATM machines and also online banking services (World Bank Group, 2017). Additionally, local participation in the financial market investment shows a great improvement with more than 70 percent of Malaysian adult workforce have their money saved in trust funds account (mutual fund).

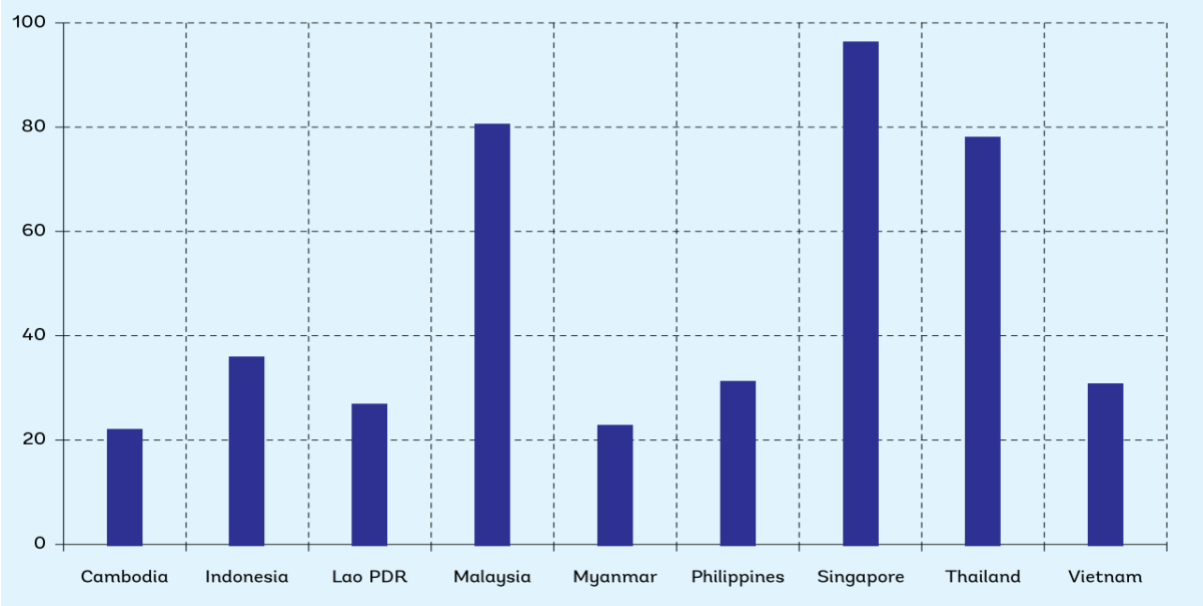
One contributing factors to the high rate of financial inclusion is the large eco-system of banking institutions that the country has, which offers a wide range of conventional and Islamic financial products and services. Conventional banking generates income by charging lenders interest and making other investments. In contrast, Islamic banking employs Islamic teachings and Syariah laws in their banking products, which charge profit rates rather than interest rates. In other words, conventional banks are in the business of lending & borrowing money based on interest whilst Islamic banks are not money lending institutes but they work as a trading or investment houses. To date, the banking system in Malaysia comprises of 27 commercial banks and 16 Islamic banks. In addition to the large commercial banks, 6 development finance institutions (DFIs) were established with a specific mandate in developing key sectors that are considered strategic and important to the socio-economic development.

Table 2.6: Percentage of Adults with an Account in Selected Middle-Income Countries

Country	GNI per capita (US$)	2011	2014	Difference 2014-2011 (p.p.)
Brazil	11,690	56	68	12
Costa Rica	9,550	50	65	15
Croatia	13,420	88	86	(-)2
Hungary	13,260	73	72	(-)1
Malaysia	10,430	66	81	15
Mexico	9,940	27	39	12
Kazakhstan	11,550	42	54	12
Panama	10,700	25	43	18
Poland	13,240	70	78	8
Russia	13,850	48	67	19
Turkey	10,970	58	57	(-)1
World	10,683	51	61	10

Source: World Bank Group (2017)

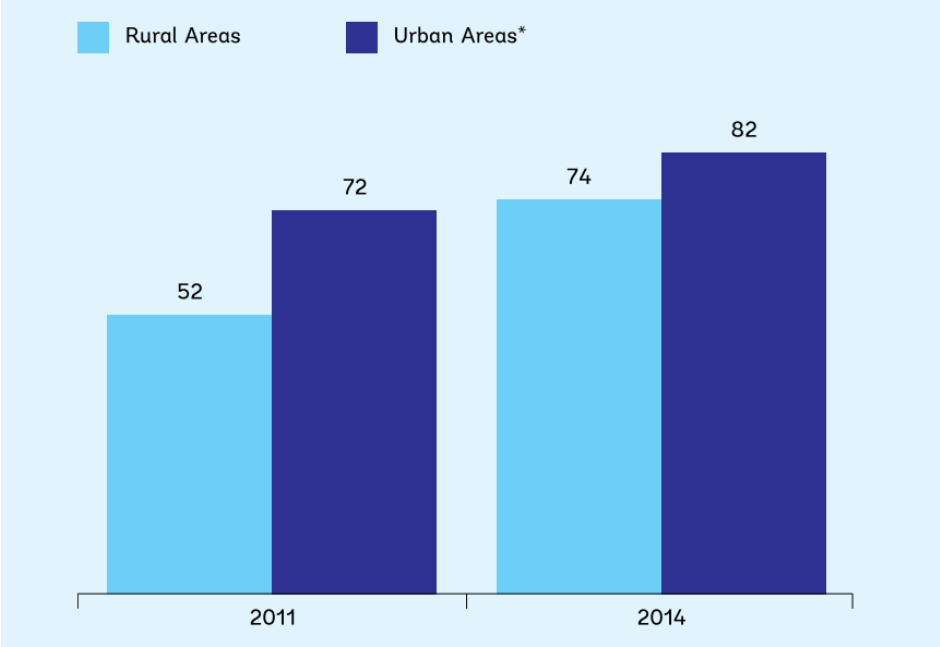
Figure 2.2: Percentage of Adults with an Account in ASEAN



Source: World Bank Group (2017)

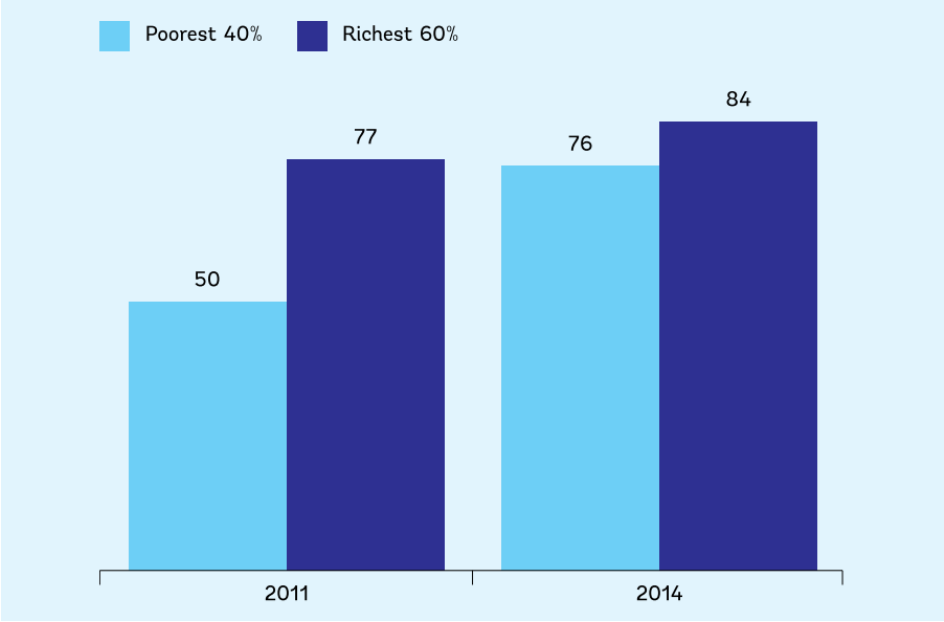
Opening a bank account in Malaysia involves a very simple procedure. Malaysian citizens are only required to present their *MyKad* for a quick validation and sign the paperwork required. In terms of fees, most bank accounts can be opened from as low as RM20 (£3.57) and no annual fees are charged for maintaining the account. The introduction of agent banking initiative in 2012 (under the Financial Sector Blueprint 2011-2020) as part of the initiatives to enhance the financial inclusion agenda, has helped reaching out the under-served and those living in remote areas to open a bank account and have better access to quality financial services. As a result, in 2014, the percentage of adults living in rural areas that have bank account increased to 74 percent from 52 percent in 2011, reducing the gap with those living in urban areas (Figure 2.3). Indirectly, the strategy has also benefited the low-income earners, whereby about 76 percent of adults from the low-income category (poorest 40%) were granted the access to an account with a financial institution, an increase of 26 points from 50 percent in 2011 (Figure 2.4). More importantly, this has further reduced the gap on account ownership between the poorest and the richest.

Figure 2.3: Percentage of Account Holders in Rural and Urban Areas in Malaysia



Source: World Bank Group (2017)

Figure 2.4: Percentage of Account Holders by Income in Malaysia

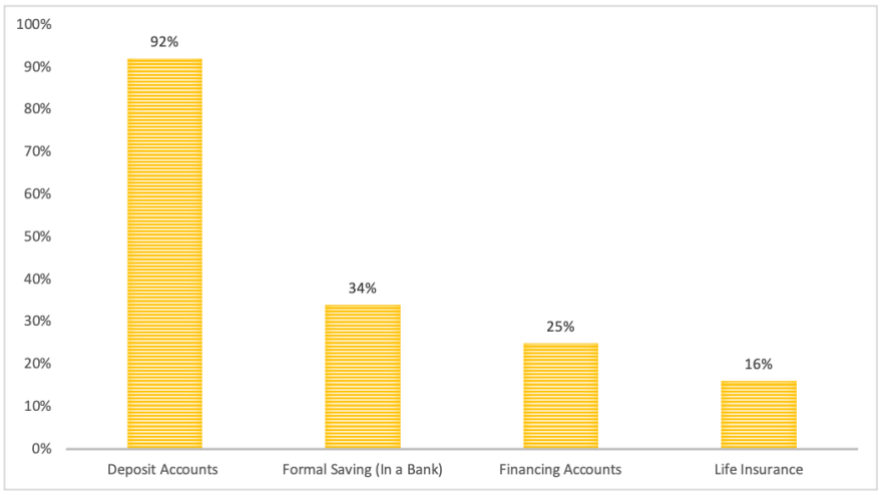


Source: World Bank Group (2017)

2.5.1 Use of Financial Services

Figure 2.5 below highlighted the survey from the Global Findex Database on the use of financial services among Malaysian consumers. As mentioned earlier, one of the key highlights of Malaysia's success story in financial inclusion is the high percentage rate of adult population (92 percent) that have a deposit account with a bank. However, the figure does not reflect in the amount of formal savings. Although majority of the adult population have a bank account, only 34 percent do formal savings in a bank, whilst the rest are made through other formal instruments and institutions. One reason to why people are not interested to save money in the bank is due to the rate offered, which is not attractive as offered by other institutions. Among of the popular choice of institutions in Malaysia are *Permodalan Nasional Berhad* (PNB) and *Lembaga Tabung Haji* (TH), whereby these institutions offer good return with very minimal risk involved as they implicit government guarantee on their products. On another note, only 25 percent of adults have financing accounts (which includes credit card debts), whilst the take up rate of insurance coverage are still standing low at 18 percent. The low number of adults owning a credit card is part of the initiative to promote affordability in debt servicing through the introduction of measures such as the Credit Card Guidelines and the Guidelines on Responsible Financing. This also serves a clear indication that the government is playing its part in providing a better regulation to help households regain control over their debts.

Figure 2.5: Use of Financial Services in 2015 (% of adults)



Source: Global Findex Database; World Bank Group (2017)

However, the penetration rate of life insurance in Malaysia is still low, with less than 40 percent of the total population have life insurance coverage (Kana, 2019). Additionally, about eight million working individuals (in which half of it are those of B40 group) are still without life insurance protection (Bank Negara Malaysia, 2018). This scenario is critical since lack of coverage for life insurance policy can have serious financial consequences to family members if breadwinners of low-income families suffer premature death. Income remains one of the strong factors that influences the purchase of insurance coverage. Unlike the high-income group who can afford to consume aspirational goods like paying for insurance premium, the low and middle-income earners have to cope with various financial commitments to make ends meet, and therefore purchasing insurance may be the least in their priority (Son and Ismail, 2020). The high income group is framed as "aspirational class" group who can afford to pay for insurance premium since the group is viewed as financially strong households and do not require any support or aid from the government. Apart from that, knowledge and awareness on the importance of insurance coverage are still lacking, which contributed to the low level of life insurance ownership. Among of the possible reason to this is the inability to understand

the legal language contained in the policy and evaluate the benefits of life insurance protection (Sang *et. al.*, 2020). These findings show that while financial inclusion has increased significantly since 2011, certain gaps exist, particularly among the low-income segment where affordability (income) and product knowledge remain a challenge. As described by Rob and Woodyard (2011), knowledge is an important component in financial decision-making. Having the knowledge about certain products and services offered and understand the risks associated with it, enables people to make better financial decisions (from spending to borrowing), and have great impact on financial behaviour.

Another challenge that requires attention is to ensure people with access to financial services remain as active users, and make full use of their accounts. Despite having the modern payment system infrastructure, a lot of people still prefer to use cash when making every day payments. The situation is further exacerbated when huge number of employers pay their employees' salaries and wages using cash money instead of bank accounts (World Bank Group, 2017). There are many reasons contributed to this. According to The Star (2019), some people are very skeptical with the security of online payment methods especially when they are required to submit personal details. Others viewed that cash payment is still needed as there are some outlets (particularly outside the city) are yet to fully adopt the system and do not accept cashless payments (Chow, 2019). The transaction using cashless payments is still a debatable issue among scholars. Among of the advantages for consumers is that it offers convenience and speed (Teo *et. al.*, 2015) and most importantly, discourage robbery and other cash-related crimes (Goel *et. al.*, 2019; Armey *et. al*., 2014). However, cashless payment increases the propensity for people to overspend and weakens impulse control (Park *et. al*., 2020; Zandi *et. al*., 2013). When consumers make purchases using cash payment, it induces the negative arousal caused by the pain of paying, given that the transaction of money changing hands is

vivid and can be easily visualized. Therefore such "painful" experience reduces purchase intention and their willingness to pay. On a contrary, cashless payment transaction does not entail any physical handover of money, which makes the transaction less painful. Hence the absence of negative arousal increases their intention to purchase and willingness to pay (Park *et.al*., 2020). These findings suggest that above-mentioned factors (such as technological adoption and security) psychological traits also play an important role in consumer's purchase decision.

2.6 Level of Savings

Despite Malaysia's success record in financial inclusion over the years, the percentage of household savings were discouraging. This section provides the evolution of Malaysia's national savings and household savings before and after the period of 1998 Asian financial crisis.

2.6.1 Level of National Savings

Malaysia had gone through many hurdles since they were badly hit by Asian financial crisis in 1998. The aftermath of the event had given huge impact on its economic, social and political system. Prior to the crisis, Malaysia has had a good record in domestic savings and investment performance over the past decades. Between the period 1950s to 1970s, the average domestic savings rate was 22.5 percent, the highest amongst other Asian countries (Mansur *et. al*., 2011). The figure then rose steadily to an average of 25 percent to GDP between 1970-1981 and further stretched to reach 34.8 percent in 1990.

As depicted in Table 2.7 below, national savings remained strong between 1990-1997, ranging between 31.6 percent and 39.1 percent as proportion to GDP. Sound macroeconomic

conditions, financial deregulation and political stability have made it possible for savings rate to increase (Mansur, 2011). At the same time, the value of domestic investments has also increased between 33.8 to 45.4 percent, which was higher than national savings. Within that period, national deficit gap level stood between -2.2 percent and -10.2 percent, which indicates more funds were used for public and domestic investments than savings. However, despite the large portion of funds being poured for domestic investments, a slowdown in national growth was recorded at the end of 1996, which further reflected in the drop of export growth from 20.9 percent in 1995 to 7.3 percent in 1996 (Corsetti *et.al.*,1998). Unstable macroeconomic situation across Asian region, speculative attacks and a booming in domestic real estate and equity bubbles were among the key reasons that further aggravated the situation.

Table 2.7: The Saving-Investment Gap, 1990-2008

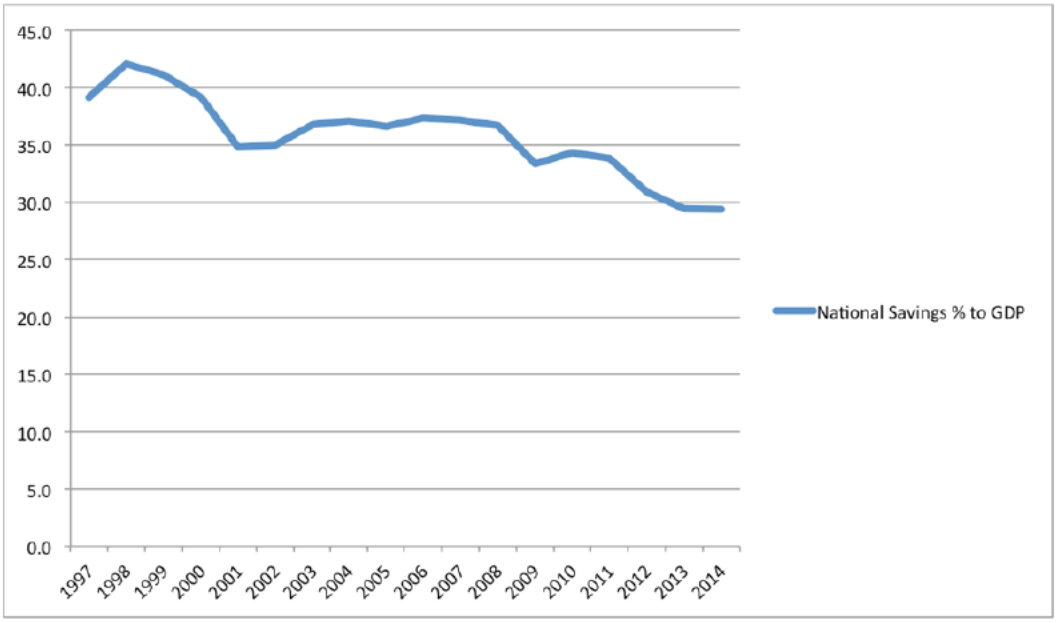
Year	Gross National Saving	Gross Capital Formation	Current Account Balance
		(% of GNP)	
1990	31.6	33.8	-2.2
1991	30.7	39.8	-9.1
1992	33.4	37.3	-3.9
1993	36.3	41.1	-4.8
1994	35.3	43.3	-7.9
1995	35.5	45.7	-10.2
1996	38.8	43.5	- 4.6
1997	39.1	45.4	-6.3
1998	42.1	28.2	13.9
1999	41.1	24.1	17.1
2000	39.1	29.2	9.8
2001	34.8	26.3	8.5
2002	35.0	26.5	8.5
2003	36.8	24.0	12.7
2004	37.1	24.3	12.7
2005	36.6	20.9	15.7
2006	38.3	21.2	17.2
2007	38.2	22.2	16.0
2008	37.7	19.8	18.1

Source: Bank Negara Malaysia, Monthly Statistical Bulletin

Due to abovementioned reasons, the saving-investment gap shifted from negative to positive during and after 1998 crisis. At time when the crisis occurs, national saving was relatively higher than investments, which shifted the saving-investment gap to a more favorable sign. In 1998, gross national savings was recorded at 42.1 percent to GDP, exceeding gross capital formation of just only 28.2 percent, healing the current account balance to 13.9 percent. Despite having persistent surplus during the post-crisis periods, domestic economy remained weak due to the fact that national savings were not used to finance gross investments, as the economy at that time were mainly driven by exports particularly in the resource-based sector (Zakaria, 2010). Instead, national savings were used to cover fiscal deficit through domestic financing in the form of Malaysian Government Securities (MGS). More than 80 percent of domestic savings were used to finance federal debts between the periods of 1999 to 2008 (Khoon and Lim, 2010).

Figure 2.6 below depicted the total national savings between the period of 1996 to 2014. Notwithstanding the positive comeback in current account balance after the 1998 crisis, the trend in Malaysia's total savings deteriorated over the last 18 years from highest points of 42.1 percent in 1998 to 29.4 percent in 2014. Malaysia's national savings composed of savings from the government, financial and non-financial corporations, and households. Between 2006 - 2014 (Table 2.8), the percentage of national savings declined significantly from 37.4 percent to 29.4 percent despite the consistent upsurge in national GDP every year. On a similar note, government savings also fell from 9.8 percent to 1.2 percent between the same periods. Household savings carried a small portion in contributing to national saving, whilst corporation's savings were the biggest contributor. It is clear that Malaysia's high national savings rates are mainly from the corporations, contributing more than 90 percent of total national savings to GDP since 2006. Government and household savings on the other hand contributed less than 10 percent and 5 percent of totals savings to GDP respectively.

Figure 2.6: Total National Savings (% to GDP)



Source: Department of Statistics Malaysia, Bank Negara Malaysia

Table 2.8: Total Gross Savings Across All Institutional Sectors (in RM Billions)

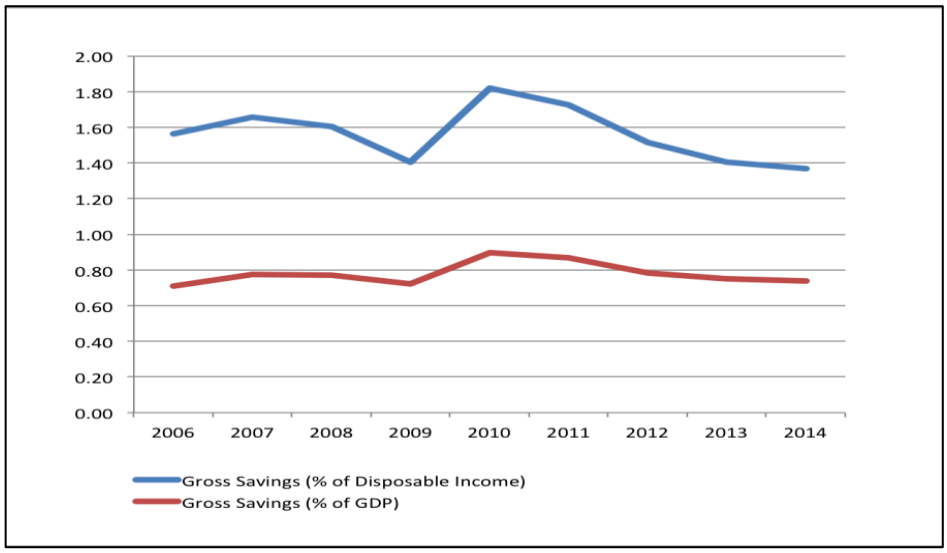
Year	Total Savings	National GDP	Corporations	Government	Households
2006	214,810 ***(37.4%)**	574,656	195,574 ****(91%)**	15,160 ****(7.1%)**	4,076 ****(1.9%)**
2007	238,901 ***(37.2%)**	642,204	213,396 ****(89.3%)**	20,519 ****(8.6%)**	4,986 ****(2.1%)**
2008	272,576 ***(36.7%)**	742,470	240,065 ****(88.1%)**	26,772 ****(9.8%)**	5,739 ****(2.1%)**
2009	237,479 ***(33.3%)**	712,776	214,634 ****(90.3%)**	17,684 ****(7.4%)**	5,161 ****(2.2%)**
2010	283,312 ***(34.3%)**	825,416	268,433 ****(94.8%)**	7,483 ****(2.6%)**	7,396 ****(2.6%)**
2011	308,540 ***(33.8%)**	911,733	295,896 ****(95.9%)**	4,714 ****(1.5%)**	7,930 ****(2.6%)**
2012	299,711 ***(30.9%)**	971,252	288,404 ****(96.2%)**	3,700 ****(1.2%)**	7,608 ****(2.5%)**
2013	299,778 ***(29.4%)**	1,018,821	288,434 ****(96.2%)**	3,714 ****(1.2%)**	7,629 ****(2.5%)**
2014	325,028 ***(29.4%)**	1,106,500	312,369 ****(96.1%)**	4,481 ****(1.4%)**	8,178 ****(2.5%)**

Source: Distribution and Use of Income and Capital Accounts Report, DOSM
** Percentage of total savings to GDP; ** percentage shares in total savings*

2.6.2 Level of Household Savings

Household savings contributes small portion of shares in national gross savings as compared to other institutional sectors, namely the government and corporations. On average, the percentage of household savings rate to disposable income stood at 1.6 percent between the periods of 2006 to 2014 despite a consistent upsurge in incomes over the same periods (Figure 2.7). For record, household gross adjusted disposable income increased from RM260 billion to RM598 billion which saw a small percentage increase in average gross savings rate from 1.6 percent to 1.8 percent from 2006 to 2010 (DOSM, 2014). The figure however plummeted to 1.4 percent (from 1.8 percent high) between the period of 2010 -2014.

Figure 2.7: Percentage of Household Savings, 2006 -2014

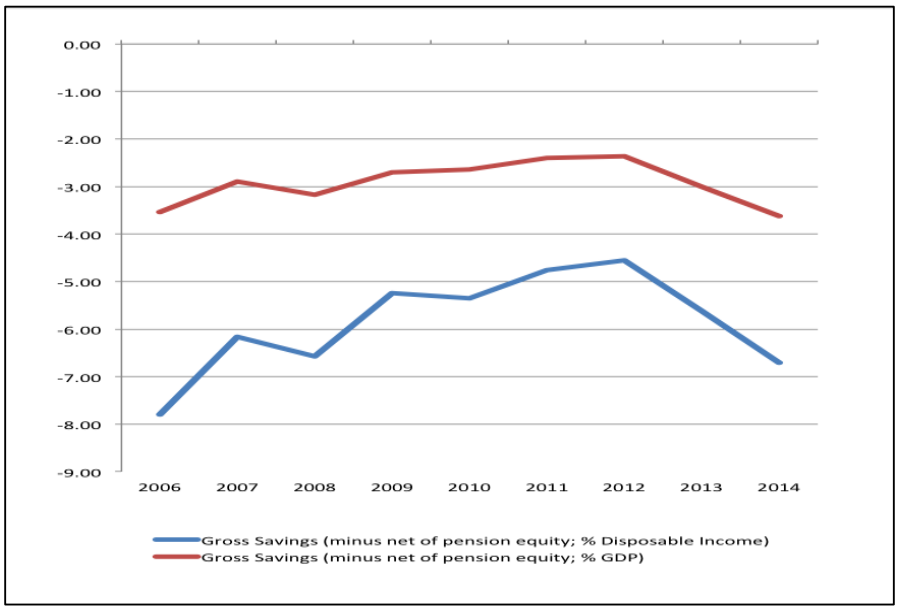


Source: Distribution and Use of Income and Capital Accounts Report, DOSM

Household savings rate to GDP on the other hand averaged about 0.8 percent, not even reaching 1 percent since 2006. Gross savings rate was counted after considering several mandatory pension contributions, namely the Employee Provident Fund (EPF), Civil Servant Pension Scheme (KWAP), The Armed Forces Fund (LTAT), Social Pension, and Social Security Organization (SOCSO). If those contributions are taken out (as shown in Figure 2.8 below),

the situation then becomes really dire. Gross savings rate for all years turns negative, averaging at -5.8 percent of disposable income and in fact, once slumped to record low of -7.8 percent in 2006. Savings rate to GDP also show a similar downward pattern with average of -2.4 percent, albeit a positive turnaround in 2014.

Figure 2.8: Percentage of Household Savings
(Minus net of Pension Equity), 2006 -2014

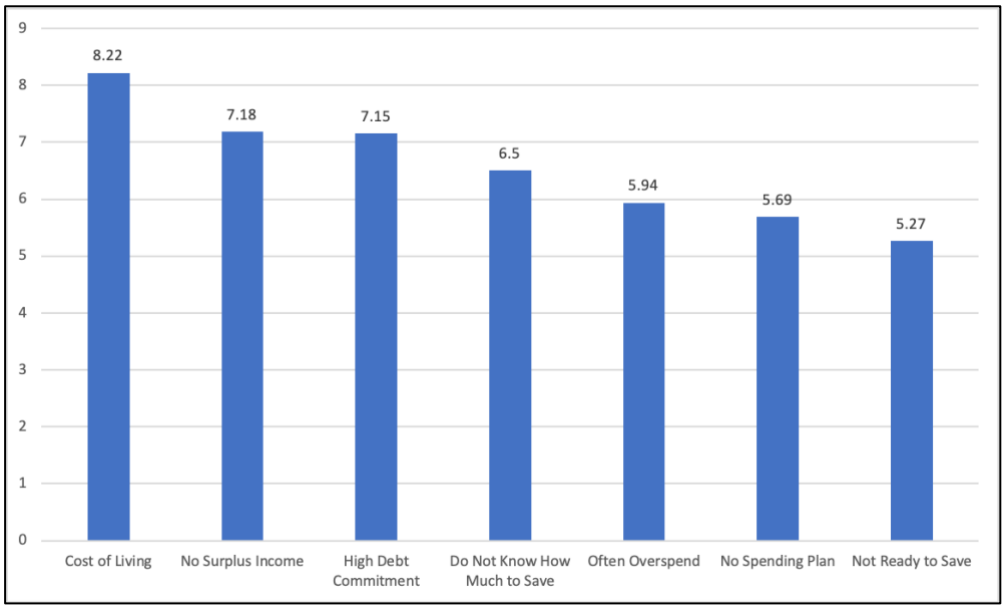


Source: Distribution and Use of Income and Capital Accounts Report, DOSM

Like insurance, rise in cost of living and income level remains as the main factor that influences people's ability to save. Based on a survey conducted by AKPK (2018) involving 3,500 working adults nationwide, almost 18 percent (or one-fifth) of Malaysian working adults are unable to save mainly due to high cost of living and having no surplus income (Figure 2.9). A little more than half of the respondents (53 percent) are only able to save between 1 – 10 percent of their income; 16 percent can only save between 11-20 percent of their income, and a mere 13 percent could save more than 20 percent of their income. The inability to save may be due to the vicious cycle of having to manage with only limited financial resources attributed to the high cost of living which in turn leads to not having surplus income for savings. In this

situation, it would be unlikely than one can plan to save, what more to be ready to save. The low-income group who earns less than RM2,000 (£357) are most financially challenged when it comes to savings. The high-income group on the other hand, save the most. Other than that, lack of knowledge on planning for saving and overspending money is another reason to why people were unable to save.

Figure 2.9: Reasons to Why Malaysian Working Adults Could Not Save (Mean Rank)



Source: AKPK (2018)

Comparing with other countries, Malaysia's household savings rate ranked among the lowest in the world. Table 2.9 below depicts the comparison between Malaysia's percentage shares of household savings to adjusted disposable income with other selected countries. China being the second largest economy in the world, ranked the highest among the seven countries averaging at 37 percent from 2006 to 2013. Malaysia on the other hand, bottomed the chart with an average of 1.6 percent of disposable income between 2006 – 2014 as opposed to Australia (8.3 percent), and Korea (4.8 percent). Interestingly, the US households whom are said to have severe financial fragility and incapable in managing finances (Lusardi, 2011) have higher household savings rate averaged at 5.4 percent over the same period and has yet to reach

below 3 percent since 2006. The European Union (EU) households whom are vulnerable to the effect of European debt crisis since 2009 save an average of 5.1 percent in the same periods.

Table 2.9: Percentage Shares of Household Savings to Disposable Income (by Countries)

Country/Year	2006	2007	2008	2009	2010	2011	2012	2013	2014
China	34.3	35.8	37.3	37.8	39	38.11	38.1	38.5	n/a
Australia	1.7	4	9.9	9.1	10.1	11.1	10.2	9.7	9.2
Korea	5.5	3.5	3.8	4.8	4.7	3.9	3.9	5.6	7.2
US	3.4	3.1	5.1	6.3	5.8	6.2	7.9	5.2	5.8
EU	4.8	4.4	4.8	7.1	6.1	5.2	4.8	4.7	3.8
Malaysia	1.6	1.7	1.6	1.4	1.8	1.7	1.5	1.4	1.4

Source: DOSM 2015; OECD, 2015

2.6.3 Saving Motives of Malaysian Households

Table 2.10 below depicts the total income, consumption and gross savings of Malaysian households from year 2006 to 2014. Individual consumption rose by 56 percent during the periods, in tandem with growth in adjusted disposable income. The growth in consumption was due to significant increase in cost of living such as food inflation, increases in fuel price, toll-ways and public transport and the introduction of Goods and Services Tax (GST) which has further changed Malaysian families' spending and savings pattern ("Rising cost of living a major concern for Malaysians" 2016). But that does not mean households are not able to save at all. Besides rise in spending, gross savings had steadily increased throughout the periods from RM4.1 billion to RM8.1 billion, albeit a small yearly growth in savings. A study by Lim *et. al*. (2011) noted that most Malaysian households saved in order to meet basic psychological needs and as preparation for rainy days. Majority perceived saving for security needs as important as it could buffer themselves with financial shocks in the future given the recent sluggish economy and high cost of living. Other higher-order saving motives such as societal, luxuries and self-actualization motives however received less attention.

Table 2.10: Income, Consumption and Savings Pattern among Malaysian Households, 2006 – 2014

Resources / Year	2006	2007	2008	2009	2010	2011	2012	2013	2014
Gross adjusted disposable income	260,406	300,961	357,710	367,759	406,607	459,078	502,828	543,681	598,382
Actual individual consumption	280,725	319,517	381,227	387,018	428,379	480,865	525,742	574,229	638,508
Gross savings	4,076	4,986	5,739	5,161	7,396	7,930	7,608	7,629	8,178

Source: Department of Statistics Malaysia

Haron et. al. (2013) conducted a similar study on households' saving motives amongst older Malay Muslims given that this group is the largest older population based on race in Malaysia. They found that only less than half (or 41 percent) of the respondents have savings and this group is barely surviving economically. There are many factors that motivate them to jump from basic to higher level of savings motives, such as family size, level of education, income quintiles and income adequacy. Majority of those who were able to save are limited to saving for basic necessities (based on Maslow's hierarchy of needs). Only small percentage of the savers could save for meeting security needs and social needs (self-actualization).

Interestingly, religious belief was found to be the significant predictor and main motivation for self-actualization saving motives. Majority has the same target in saving for social needs that is going for Hajj, which is the fifth pillar of Islam. As they grow older, their main focus has switched to fulfilling religious obligations and going for Hajj is one of the tenets of their faith. What makes them even more motivated to save is the support they received from *Lembaga Tabung Haji* (Pilgrimage Fund Board), a government-linked agency that was established to facilitate Hajj savings and manage pilgrimage activities for the Malaysian Muslim community. Furthermore, it is common in Malaysia to see adult children living with their parent under one roof particularly among the Malays. Due to that, most of their monetary needs and social care are being taken care of by their family members. Rather than relying on

savings, Malay elderly who do not save are living on family arrangement to cushion them from poverty after retirement. To promote co-residence and reduce families' burden, the Malaysian government has given a special tax relief on medical expenses incurred for those who are taking care of their aging parents (Inland Revenue Board of Malaysia).

Meanwhile, survey by Mohd *et. al.* (2016) on saving and consumption pattern involving 300 respondents from the low-income group revealed that more than 80 percent of the surveyed households do save even though the amount is not too high as opposed to the high-income group. Savings were made in many forms, not restricted to money but on assets such as gold, and land. Most of the monies were placed in different types of savings and investment products offered by various financial institutions, such as Pilgrimage Fund Board (long-term savings), *Amanah Saham Bumiputera* (government-linked trust funds) and savings account. Interestingly, cash savings is one type of informal savings amongst low-income households used for emergency purpose. It is commonly known as "savings under the pillow" and has become one of the popular type of savings particularly amongst those reside in remote areas. Community death savings (also known as compassionate benefits or *Khairat Kematian* in Malay) is another popular choice of informal savings amongst the Malays, and largely practiced by the Muslim. It serves to provide financial support for funeral service and to ease financial burden upon death amongst family members. These findings contradict with Manturuk *et. al.* (2012) that argued low-income households did not make formal savings due to lack of knowledge and access to financial institutions. Perhaps the growth in savings engagement between low-income households with financial institutions is a result of vigorous effort taken by the Central Bank of Malaysia in strengthening financial inclusion. However, such effort will not fully guarantee financial inclusion if the account is not able to provide

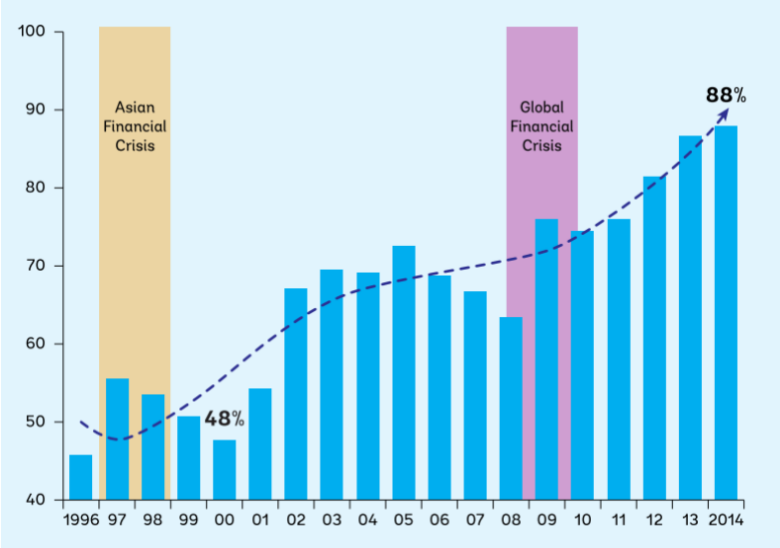
transactional services, not complemented with good facilities and costs involved in using the account (Rowlingson and Mckay, 2015).

2.7 The Level of Household Borrowings

The expansion of credit in the country has translated into higher household indebtedness levels. Over the past two decades, Malaysia's household debt, both in absolute terms and as a share of GDP, has generally been on a rising trend (Figure 2.10); doubled from 48% (2000) to 88% in (2014). Since 1996, the level of household debt has increased more than sevenfold, registering on average a double-digit growth of 11% per annum to reach RM1.1 trillion in the first half of 2014. With the persistent increase in lending to the household sector, household credit now accounts for more than 60% of total bank and non-bank lending, surpassing corporate credit since 2004.

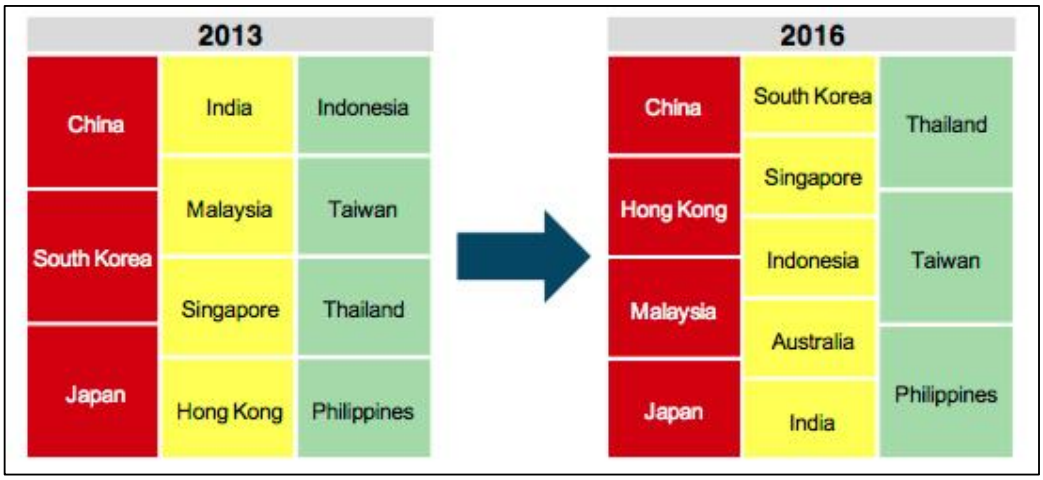
Malaysia is currently among the highly levered households in Asia alongside South Korea and Singapore (Khazanah Research Institute, 2016; Standard Chartered Research). Figure 2.11 depicts the position of several countries in three different categories of leverage risks – high (red), medium (yellow) and low (green). Japan, having their massive total debt to GDP ratio of 400 percent remains in the red zone alongside with China since 2013. China's debt to GDP ratio has increased from 147 percent (2008) to 232 percent due to government's massive stimulus programs in combating global financial crisis. Since Malaysia's leverage is now the highest among its Asian counterparts and has the highest external vulnerability in the region, it has moved from medium-risk to high-risk category in 2016.

Figure 2.10: Household Debts as a Share of GDP, 1997 - 2014



Source: Bank Negara Malaysia; World Bank Group (2017)

Figure 2.11: Malaysia's Leverage Risks

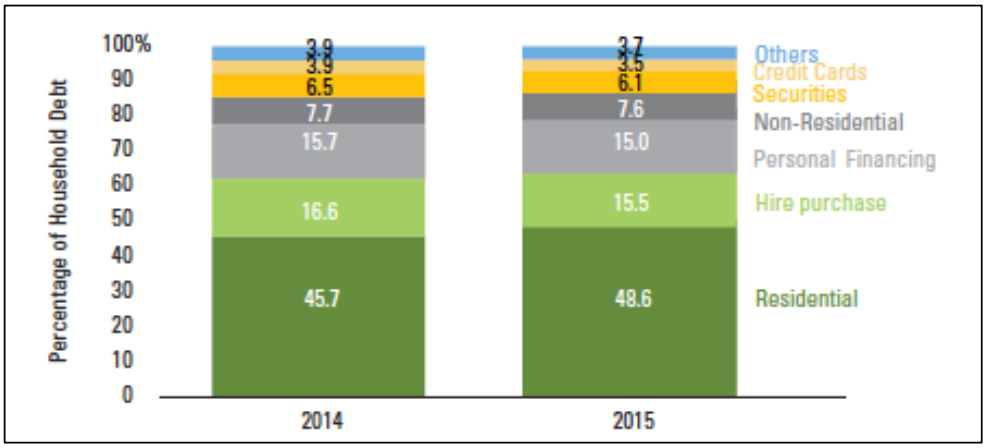


Source: Standard Chartered Research

Although the level of household indebtedness has grown rapidly, it is considered manageable by financial sector authorities. Figure 2.12 below highlights the profile of borrowings by purpose of financing amongst Malaysian households between the year 2014 and 2015. On a positive note, almost half of the borrowings were being financed for residential purpose. Housing loans rose by 11 percent between the two periods, making a total of 48.6 percent of

household borrowings in 2015. The surge in housing loans indicates that households accumulate more financial assets than debts, thanks to sustained demand for housing that positioned households balance sheet at a healthy level ("household debt increases", 2016). For record, total financial assets grew at a faster rate than debt by RM97.9 billion in 2015 as opposed to increase of debt by RM70.4 billion in the same year. As the liquid financial asset-to-debt ratio ranged between 1.4 to 1.6 times (Khazanah Research Institute, 2016), it indicates that households have the ability to service the debts and meet the debt obligations. Besides house purchase, about 15 percent of total household borrowings were made to cover for hire purchase and personal financing and the rate does not seem to change so much between the two periods. Whilst a small percentage of borrowings were paid for various purposes, namely non-residential, securities, credit cards and others.

Figure 2.12: Profile of Borrowings by Purpose of Financing, 2014 & 2015



Source: Khazanah Research Institute

2.7.1 Source of Borrowings

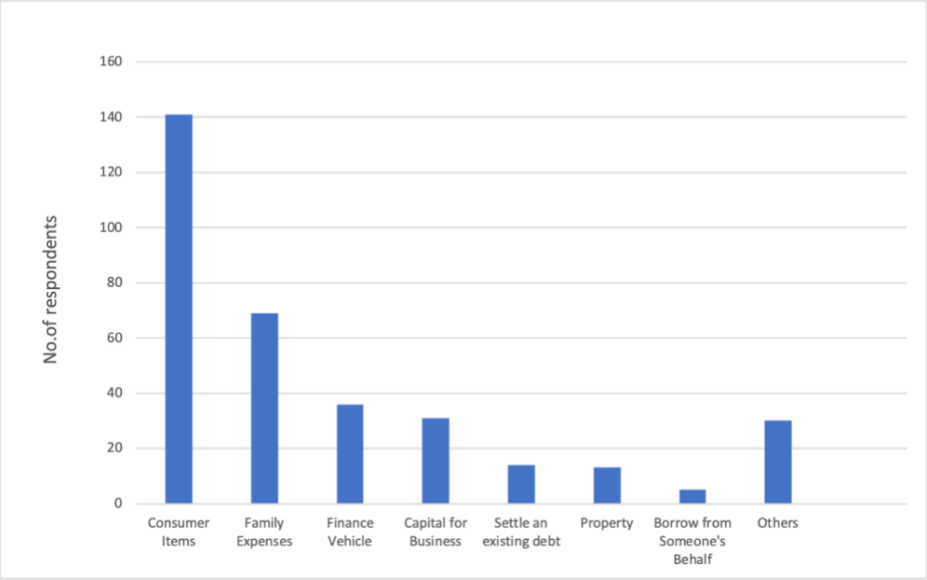
The increase of shadow banking in Malaysia in recent years has motivated non-bank loan taking behaviour amongst Malaysian consumers. What makes it popular was because of its

unique features that transforms long-term risky securities into short term credit-risk free instruments and offers alternative source to financing with less regulatory rules. Furthermore, it is not easy for the young-age group and old-age group to get access to credit facilities with formal financial institutions due to difficulty in fulfilling the income requirements. According to Loke (2016), RM43 billion worth of personal credit facilities has been disbursed by non-bank institutions in 2012, more than twice higher than RM19.4 billion worth of personal loans disbursed by banks. In terms of income group, only 33 percent of lower-income households had the opportunity to get loans from banks as opposed to other income groups. However, majority of them (63.3 percent) hold a mixture of bank and non-bank loans, which implies low-income earners are relying much on loans from non-bank as well as families and friends. The high-income earners on the other hand, hold about 5.6 percent of the credit facilities and prefer to go for credit card and formal bank loans in times of financial difficulties.

The nonbank loans taken out by the households were used for several purposes. As depicted in Figure 2.13 below, most of the money went out for purchasing consumer goods. Attractive installment packages especially on durable goods by retailers could be one of the main factors to the increase in purchase. Another reason was to cover for family expenses, given the rise in cost of living and uncertain economic conditions. Such difficulties left consumers with no options but to continue to be leveraged in order to meet expenses. Purchase of vehicle, capital for business and paying for other expenses are among other popular choices of consumers for taking out non-bank loans. Meanwhile paying for property, settling an existing debt and borrowing for someone's behalf are some of less popular choices among consumers. There are also cases reported where the millennials spent money unnecessarily and live beyond their means compared with the old-age group. According to report from Zainal (2019), about 40 percent of millennials admitted to spending more than they can afford while 70 percent

expressed dissatisfaction with their current income. Among the reasons are due to impulse buying behaviours and the desire to catch up with lifestyle choices. With limited financial knowledge, the impact of financial liberalization has given them the easy access to credit financing (such as personal loans and credit card) to instantly satisfy their needs and wants. In line to this, prior studies suggest that those who are susceptible to impulsive shopping lack in self-control, and more likely suffer from credit problems (Moffitt *et. al*., 2011), and often feel insecure with their current and future financial situation (Stromback et. al., 2017). This serves a clear indication that psychological intervention in financial decision-making does have an impact to future financial well-being. What is worrying is that 60 percent of reported bankruptcy case were among the young borrowers (aged between 25–34 years) with borrowings were mostly made for consumption and not for wealth accumulation. The findings seem to be consistent with Loke (2016) that those declared bankrupt are those of younger generations. Further, a lack of credit history and lower income mean that those aged 18-24 years old have a greater tendency to obtain loans from non-bank sources.

Figure 2.13: Purpose for Taking Non-Bank Loans



Source: Loke (2016)

2.8 Financial Education Initiatives

One of the reasons to the low amount of savings and increasing debt levels depicted by the Malaysian households was due of low financial literacy level. Despite having 92 percent "banked" consumers, majority of them lack the understanding of basic financial principles such as compound interest, time value of money and risk diversification (Financial Stability and Payment System Report, 2015). In regards to this, financial education is recognized as one of the tools to improve financial literacy and knowledge, as well as helping consumer to make informed financial decision (Lusardi, 2019; Atkinson & Messy, 2013; Lusardi, 2003).

To address the issue, the government is currently doing its part to improve financial literacy and behaviour of its citizens. The national's financial education initiatives and programs were put under the governance of the Central Bank or Bank Negara Malaysia (BNM). The Credit Counselling and Debt Management agency (AKPK) was established in 2006 to assist the Central Bank in navigating Malaysian citizen to be financially resilient and achieve best practice behaviour. AKPK is tasked to assist individuals managing finances and debts. Specifically, AKPK performs three main functions 1) providing financial education on the responsible use of money and credit management skills; 2) giving advice to individuals on financial management; 3) helping individuals regain their financial control and debts through debt management program. Since the agency commenced its operation in 2006 until 2018, AKPK has conducted more than 850,000 counselling cases covering various issues on cash flows, saving and investing and debt management (AKPK, 2018). Young adults age between 30-40 years old are the major group who enrolled for AKPK's debt management program, given the fact that this group recorded the highest percentage on credit card debts due to bad spending habits (Minion, 2021). Apart from that, AKPK has delivered various financial education programs via symposium, online learning portal, and financial articles to more than

1.2 million adult consumers (AKPK, 2018). The programs conducted by AKPK received some success stories. Among others, about 3,906 individuals who received the debt management program were able to fully settle their debts through loan restructuring and negotiation with credit providers.

2.9 Conclusion

Despite the slow population growth, Malaysia enjoys a strong economic performance over the last years which allows the country to maintain a steady unemployment rate. On average, household income levels have been steadily increasing over decades across all income categories. Additionally, Malaysia recorded a remarkable financial inclusion level among the ASEAN and middle-income countries, with majority of its population have an active bank account. However, these success stories are not without issues and limitations. Several social challenges such as low financial literacy levels and educational attainment gap are still apparent, which might have an impact towards its future human capital development, given the fact that the young adults group represents 70 percent of the country's total population.

It also appears that many Malaysian households have little to no savings despite having provided better access to financial services. The improvement in household incomes have not translated in the household savings rate which remained low at 1.6 percent (on average), and ranked the lowest when compared with other countries. Food inflation was among the main factors, which grew in tandem with the rise in cost of living. The situation makes it difficult for households particularly the low-income earners to make ends meet and to set aside portion of income for savings. Study shows that the medium and low-income earners spent most of

their monthly income on food items and services, and are more financially insecure as opposed to those with higher incomes. On a similar note, the consistent upsurge in household incomes in Malaysia was driven by income from current transfers, property and investments, while paid employment (such as salary and wages) fell as a source of income for most of 60 percent of households. The situation has further widened the gap between the rich, middle class and poor households in Malaysia. The rise in food prices was not in line with income received by the middle and low-income households who mostly earned money from paid employment, hence, reducing their purchasing power. Heavy debt commitment is another reason to low savings rate which left households with small amount of take-home pay every month. Although at aggregate level, household indebtedness level is considered manageable by the financial sector authorities, the high leverage ratio among low-income earners is another area of concern, which is seven times of their annual income, and that they are more vulnerable to sudden financial shocks. Another contributing factor to the low savings rate is difficulty to plan how much to save and spend money, indicating that Malaysian working adults are lacking in knowledge and planning skills. Households also struggle with impulsiveness, where they often overspend money. The impact of financialization has made credit services becomes easily available which further increases the temptation to spend more than they could afford.

This chapter captured the state of Malaysian households' financial behaviours from the aspects of saving and borrowings. It can be concluded that households' inability to save was not limited to cognitive (knowledge) and socio-economic factors. Psychological factors such as impulsiveness and self-control play important role that can influence households' spending and saving behaviours. Several financial education initiatives have been undertaken to promote prudent financial behaviours under the control of Central Bank (Bank Negara Malaysia) supported by the Credit Counselling and Debt Management Agency (AKPK). More

recently,the National Strategy for Financial Literacy (2019-2023) was introduced to elevate financial literacy and promote responsible attitude and behaviours. Nonetheless, this chapter argues that these programmes are a long-term strategy that will take time to reach all parts of society, particularly the most vulnerable. Also, the action plans are mostly focusing on educating households (i.e., promoting understanding and awareness) which might not necessarily change behaviours. It would be helpful to have a mechanism that could help households improve habits and outcomes with immediate effect.

CHAPTER 3

FINANCIAL LITERACY, ATTITUDES AND BEHAVIOURS

3.1 Introduction

This chapter aims to contribute to the understanding of financial literacy, attitudes and behaviours, its patterns and formations, and its connection. It starts with a discussion on how financial literacy is conceptualized, and its levels among households worldwide. The chapter then narrows down to the level of financial literacy in Malaysia. The chapter then continues with a brief definition, links between knowledge, financial attitudes and financial behaviours, as well as behaviour pattern displayed among households across different countries and demographic settings. Section 3.7 discusses the role of financial education which is considered an important tool to improve literacy and behaviours. The last section provides the summary of the chapter.

3.2 Financial Literacy

In a financialized world, the government plays an important role in providing an effective policy and regulation to ensure the functionality of the market is properly conducted, and at the same time consumer's right are always protected. As discussed in Chapter 2, for Malaysian context, several reforms were established to oversee the development of the market, which are regulated by various government agencies and institutions. Given the fact that socio-economics factors do have an impact on behaviours and future financial well-being, various economic policies have been initiated by the government to balance the national's income distribution, reduce poverty and help ease the burden with the rising cost of living. At the same time, the

complexity of the financial marketplace has given the new challenge for people to be more responsible and independent in managing their finances. Efforts from the government needs to be balanced and requires cooperation from consumers to improve their knowledge so they will be able to manage financial matters in a more efficient manner. In some countries for example, employees are fully responsible in planning for retirement, which was previously under full provision of employers (Lusardi, 2019). For one to secure financial well-being, they need to be able to manage current financial needs and make sound financial decisions (Sohn *et. al.*, 2012). One indicator to identify people's ability to make informed decision is through their financial literacy level. Presently, the issue with financial literacy among households is a growing concern, with just one-third of the average global population are familiar with basic financial concepts (Lusardi and Mitchell, 2011a; Klapper *et. al.*, 2015). This is not only a problem among those in developing economies, but also in advanced economies with well-developed financial markets (Lusardi, 2019).

In general, the term "literacy" reflects an individual's ability to read, define (or make meaning) and learn. The outcome of literacy is when people is able to learn something. According to Jackson (1993), the learning process starts from gathering information and ideas, which then offers the opportunity for people to offer reflections and communicate the meanings. In a broader sense, literacy consists of two main elements; the ability of people to understand and use materials related to written, graphical and numerical information (Huston, 2010). The term "understand" refers to attaining knowledge of words, symbol and arithmetic information, whilst "use" is referred as acquiring skills in the form of reading, writing and calculating. In a nutshell, as defined by UNESCO (1980), literacy is defined as:

"The process of acquiring the essential knowledge and skills which enable people to engage in all those activities in which literacy is required for effective functioning in their group or community"

Previously, financial literacy has been conceptualized by many scholars in different ways, which subsequently brought to a breadth of definitions. Some of the definitions are not standard carrying different concepts and meaning. As a result, terms like financial literacy, financial knowledge, financial education and financial capability are often interchangeably used in most prior literatures across different countries (Zait and Bertea, 2015; Huston, 2010). Financial capability for example, is often used in the United Kingdom and Canada (Orton, 2007; Atkinson *et. al.,* 2007; Remund, 2010). Whilst financial literacy is mainly expressed in the USA and Australia (Worthington, 2006; Orton, 2007). All these make comparisons different, especially when studies are conducted in different countries and different languages. Based on definitions 1-3 provided in Table 3.1 below, financial literacy has been conceptualized as a specific form of actual knowledge (what people know) and perceived knowledge (what people think they know). Other scholars conceptualized financial literacy as the ability of a person to apply the knowledge (definition 4-7). Moore (2003) in their definition suggested that knowledge alone is not enough for one to be financially literate and must be supported with practical experience in order to be financially competent and achieve greater well-being.

Table 3.1: Definition of Financial Literacy

No.	Conceptual Definition
1	Individuals are considered financially literate if they are competent and can demonstrate they ***have used knowledge*** they have learned. Financial literacy cannot be measured directly so proxies must be used. Literacy is obtained through practical *experience* and active ***integration of knowledge.*** As people become more literate, they become increasingly more financially sophisticated and it is conjectured that this may also mean that an individual may be more competent" (Moore, 2003, p. 29).
2	***Knowledge*** of basic financial concepts, such as the working of interest compounding, the difference between nominal and real values, and the basics of risk diversification" (Lusardi, 2008a)
3	Financial literacy is a basic ***knowledge*** that people need in order to survive in a modern society (Kim, 2001)
4	The ***ability to evaluate*** the new and complex financial instruments and make informed judgments in both choice of instruments and extent of use that would be in their own best long-run interests (Mandell, 2007, pp. 163-164).
5	Focus on debt literacy, a component of financial literacy, defining it as "***the ability to make simple decisions*** regarding debt contracts, in particular how one *applies basic knowledge* about interest compounding, measured in the context of everyday financial choices" (Lusardi and Tufano, 2009).
6	The ***ability*** **to** ***make informed judgements*** and to take effective decisions regarding the use and management of money" (Noctor *et. al.,* 1992).
7	Personal financial literacy is the ***ability to read, analyse, manage and communicate*** about the personal financial conditions that affect material well-being. It includes the ability to discern financial choices, discuss money and financial issues without (or despite) discomfort, plan for the future and respond competently to life events that affect every day financial decisions, including events in the general economy (Vitt *et. al.,* 2000; cited by Cude *et. al*., 2006).

Meanwhile, Lusardi & Mitchell (2011b) observed three important fundamental concepts that are considered important for one to navigate the maze of financial decisions that they have to deal with every day. These universal concepts are further designed as proxy to financial literacy, which are 1) numeracy (or ability to do interest rate calculation and understand the concept of compound interest), 2) understanding of inflation and 3) understanding of risk diversification. The first two concepts test a person's understanding on basic economic concepts and their ability to calculate basic interest rates calculation, which is an important element in planning for savings. While risk diversification assesses basic understanding on managing risks and return of a portfolio investment, which is vital in investment decision making (Lusardi and Mitchell, 2006). The three questions were phrased as follows:

- *Suppose you had $100 in a savings account and the interest rate was 2 percent per year. After 5 years, how much do you think you would have in the account if you left the money to grow? [**more than $102**; exactly $102; less than $102; do not know; refuse to answer.]*

- *Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. After 1 year, would you be able to buy? [more than, exactly the same as, or **less than today** with the money in this account; do not know; refuse to answer.]*

- *Do you think that the following statement is true or false? "Buying a single company stock usually provides a safer return than a stock mutual fund." [true; **false**; do not know; refuse to answer.]*

Lusardi's work on measuring financial literacy was very influential worldwide. The questions which are known as "The Big Three" have been widely adapted and used in many national surveys across the world, including the Survey of National Financial Capability Study and Survey of Consumer Finances in the US (Lusardi, 2019). Nationally representative surveys were conducted using The Big Three involving several countries with different economies, including Japan (Sekita, 2011), Netherlands (Van Rooij et. al., 2011), Italy (Fornero and Monticone, 2011), Australia (Agnew et. al., 2013), France (Arrondel et. al., 2013), Chile (Moure, 2016), and Canada (Boisclair *et. al.*, 2017). Moreover, the survey also has been used in the "Flat World Project", a financial literacy survey conducted by Lusardi and Mitchell (2011a) which involved international comparison across 15 countries.

In their 2007 seminal paper which examined the link between financial literacy and retirement planning, Lusardi and Mitchell re-evaluated the questions and categorized it into basic and advance levels. The basic level consists of the fundamental concepts as mentioned above, while advance consists of several questions which are more technical and beyond the basic concepts, such as understanding of capital market, asset pricing and relationship between risk and return.

The addition of advanced questions is needed to ensure people are competent in making saving and investment decisions.

Meanwhile, few authors emphasized more on the skills (or ability) of the person to apply the knowledge when conceptualizing financial literacy (Table 3.1, definition 4-7). In general, a person is considered financially literate if the knowledge could help them make important financial decisions that will have an impact on short-term (present) and future life events. Noctor's (1992) definition *"the ability to make informed judgements and to take effective decisions regarding the use and management of money"* have been used in the work of Beal and Delpachitra (2003) and the ANZ Bank Financial Literacy Survey in Australia (2008). The term *"making informed judgements"* referred to a person's ability to deal with problems related to financial difficulties, and the capacity to plan for future needs, based on financial knowledge that they have (Schagen and Lines, 1996). Vitt *et. al.* (2000) provides a similar definition, but specifically highlights the characteristics of an informed financial decision-maker:

> *"Personal financial literacy is the ability to read, analyse, manage and communicate about the personal financial conditions that affect material well-being. It includes the* ***ability to discern financial choices, discuss money and financial issues without (or despite) discomfort, plan for the future and respond competently to life events that affect every day financial decisions, including events in the general economy****"*

Part of Vitt *et. al's.* (2000) definition *"respond competently to life events"* indirectly highlights the importance for one to apply the knowledge appropriately which have great influence on behaviour changes. In other words, having financial knowledge and ability to apply would result in positive financial behaviours. Few scholars shared similar views on defining financial

literacy, which is not limited to increase in knowledge and skills, but also involve one's attitudes and behaviours. For instance, the OECD INFE's (2011) definition incorporates financial attitudes and behaviours as essential components of financial literacy (besides knowledge and skills) which helps individual to make better financial decision for future well-being:

> *"a combination of* ***awareness, knowledge, skill, attitude and behaviour*** *necessary to make sound financial decisions and ultimately achieve individual financial wellbeing"*

The OECD INFE's (2011) definition has been used in the work of Atkinson and Messy (2011) that examined the level of financial literacy involving 12 countries from Asia, Europe, Africa and Latin America. Interestingly, this definition, which incorporate the elements of knowledge, skills, attitudes and behaviours is similar to how financial capability is conceptualized. Several authors suggested that financial literacy is part of financial capability as it involves the capacity of a person to act on knowledge and make self-beneficial financial decisions; hence the reason why both terms are often used interchangeably (Johnson and Sherraden, 2007; Sohn *et. al.*, 2012; Zottel *et. al.*, 2013). However, financial capability involved much broader concepts and not limited to financial literacy alone. Along with knowledge, skills, attitudes and behaviours, motivation is another important element of financial capability which plays significant role to influence people to start taking actions. As conceptualized by HM Treasury (2007):

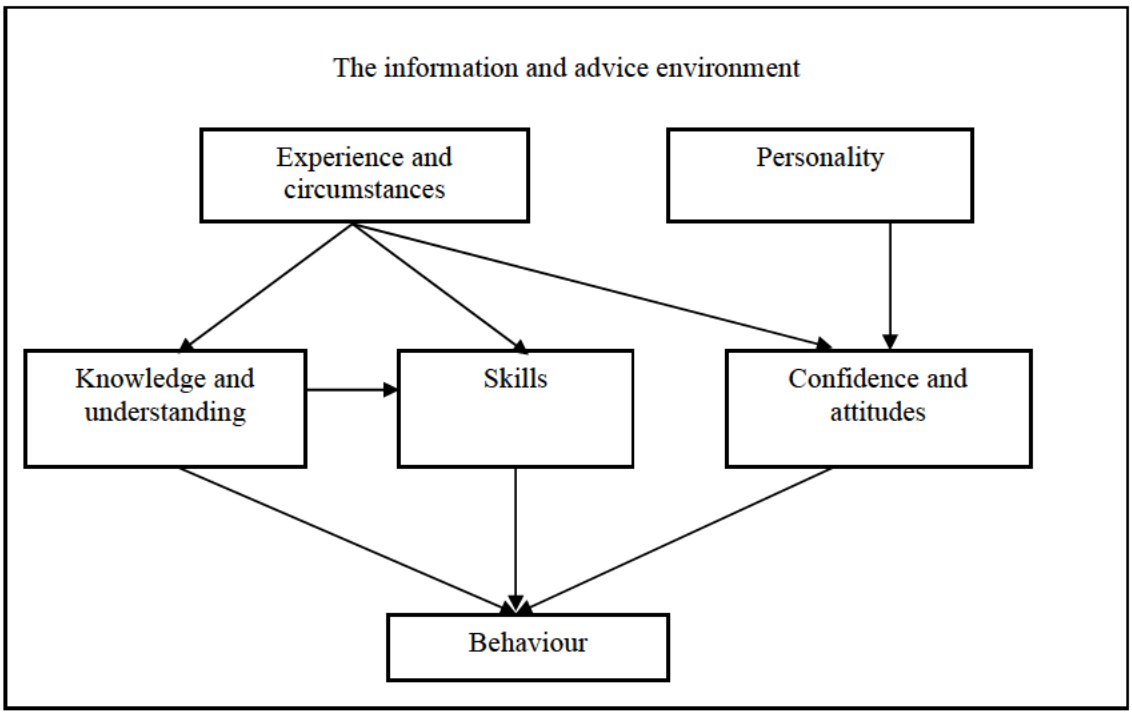
> *"Financial capability is a broad concept,* ***encompassing people's knowledge and skills to understand their own financial circumstances, along with the motivation to take action.*** *Financially capable consumers plan ahead, find and use information,*

know when to seek advice and can understand and act on this advice, leading to greater participation in the financial services market"

Motivation acts as a push factor that drives towards intended behaviour, and it is much easier to be done when the decision is consciously made (MAS, 2013). It comes either in the form of incentives (for example, saving for wedding or holiday purposes), or experience (for example, people started to purchase medical insurance after knowing their friends had to pay substantial amount of money for surgery). Besides the role of motivation, HM Treasury (2007) highlights the importance of actions and behaviours, which are amongst important measures of a financially capable person.

Kempson *et. al.* (2006) on their work measuring financial capability in the UK suggested that *"to determine whether a person is financially capable or not, is to look at their behaviour"*. They proposed a framework (as depicted in Figure 3.1 below) highlighting the formation of behaviour, which perceived as evidence of financial capability. Three important determining factors to behaviours are knowledge, skills, and confidence and attitudes, which all can be obtained from experience and circumstances. Another factor that influences financial capability is personality, which gives great influence on one's confidence level and attitudes to apply the knowledge and translate it into desired behaviours.

Figure 3.1: The UK's Financial Services Authority (FSA) Financial Capability Framework



Source: Kempson et. al. (2005, p. 49)

Kempson, *et al.* (2006, p.24) further conducted eight focus groups to test what people perceived about financial capability and to check whether it matches with the proposed conceptual model as shown in Figure 3.1. Two important findings were gathered during the focus group session. Firstly, participants found it difficult to understand the difference between knowledge and skills. Secondly, it was found that people's perception about financial capability were very much different from the conceptual model that has been developed. Instead, financial capability is discussed in four forms of behaviours which are 'managing money', 'planning-ahead', 'making choices' and 'getting help', and all the factors that formed behaviours (such as knowledge, skills and attitudes) are discussed within the context of these four activities.

'Managing money' reflects the way a financially capable person to live within their means. To achieve this, requires one to 1) develop plans to earn income for living; 2) be able to resist the temptation to spend or borrow money; 3) keep track of expenditures by using proper financial

records; 4) be able to accept responsibility for any actions; and 5) do budgeting as preparation for unexpected events or expenditures.

Meanwhile, ‘planning ahead’ is another domain of a financially capable person, which indicates the ability to deal with unexpected future expenses or events. Planning is important for short-term and long-term purposes. Short-term planning includes preparation for any unexpected events, whilst long-term planning involves making plans for retirement and old days. People who plan ahead would be able to identify the help they need from others, where to seek advice and are able to identify appropriate financial products that could help them to deal with the situation.

‘Making choices’ is another domain of a financially capable person, which is defined as the ability to choose the right products for them. This is related to having the knowledge and awareness of certain products and services offered to them, before making the decisions to purchase. Lastly, ‘getting help’ indicates a person’s ability to stay informed (or keeping up-to -date) with the things that has been going on, and is able to compare information about products and services. Additionally, financially capable person knows where to find a place for advice and help. A full report of baseline survey on the levels of financial capability in the UK was prepared by Atkinson et. al. (2006). A summary of the underlying components of financial capability that were outlined in the report is shown in Figure 3.2 below.

Figure 3.2: Financial Services Authority (FSA) Financial Capability Domain

Managing money	- Involve budgeting and control activity. - Ability to resist temptation to borrow and spend. - Use credit services wisely.
Planning ahead	- Ability to save money for unexpected events or specific purpose. - Planning for long-term.
Making choices	- Able to choose products that are suitable for them. - Knowledge of financial products, attitude to risk and behaviours.
Getting help	- Keep up to date with financial matters. - Ability to deal with dispute and complaints when needed.

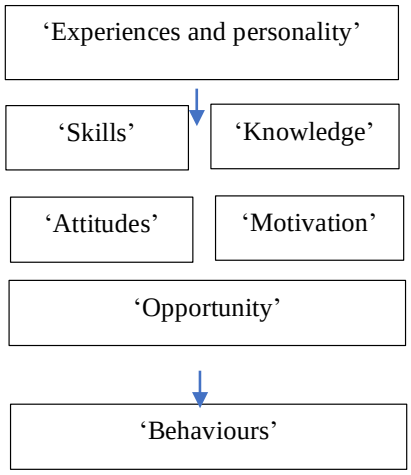
Source: Atkinson et. al. (2006)

Following the FSA framework, the Money Service Advice (MAS, 2013) conducted a financial capability survey in the UK and provided a similar, but more updated financial capability framework. It was proposed after considering several limitations of interventions which are not effective on improving financial capability. The FSA framework (as depicted in Figure 3.3 below) was updated by adding "opportunity" as the fifth critical elements (after knowledge, skills, attitudes and motivation) in the formation of financial behaviours and overall financial capability of an individual. They argued that often people have the motivation to execute certain actions, but were denied to do so due to lack of opportunity.

For example, some people might have the motivation to seek for financial advice, but had to put it on hold due to lack of information available on which agencies they should refer to, or lack of professional financial services provided. People living in remote areas are often at the disadvantage by the lack of facilities and support for education to learn and improve financial knowledge. Hence, with limited opportunity made available for people to execute intentions, have further limited their chances to display positive behaviours, and hindered the initiatives to have more financially capable individuals. Opportunity functions as a support system that prompt people's behaviour which comes either in the form of social or physical opportunity

(MAS, 2013 p.8). Social opportunity includes the availability of appropriate financial advice to the network of people of which the individual is a part of. While physical opportunity includes issues such as the availability of the internet, smart phones or advice services.

Figure 3.3: MAS (2013) Financial Capability Framework



Source: MAS (2013)

Overall, the discussion presented above shows the lack of standard financial literacy measurements, which prompted the use of different terminologies, and interpretations on the instrument's content. One obstacle for a standard measurement was due to lack of clear definition made from prior research. Huston (2010) revealed that nearly three-quarters (or 73%) of prior literatures did not provide financial literacy definition in their study, whilst almost half (or 47%) used the term financial literacy and financial knowledge synonymously. Based on this evidence, Huston (2010) proposed a clear measurement of financial literacy and conceptualized it as a combination of understanding (personal financial knowledge) and use (or ability to apply) of knowledge. Specifically, they defined financial literacy as *"measuring how well an individual can understand and use personal finance-related information"*. The two dimensions of "understanding" and "use of knowledge" proposed was based on how general term of literacy is operationalized, which consists of understanding (i.e., knowledge of

words, symbols and arithmetic operations) and use (ability to read, write and calculate) of materials related to prose, document and quantitative information. One of Huston's (2010) important highlights in conceptualizing financial literacy was that both financial literacy and financial knowledge are categorized as two different constructs, and that they are not the same. Financial knowledge is an integral dimension of financial literacy, which can be acquired through education or experience related to financial management concepts, but is not equivalent to financial literacy. Besides financial knowledge, another dimension of financial literacy is application, which refers to the ability to effectively apply or use the financial knowledge to make financial decisions.

From the above discussion, it is clear that there are no standard definitions when conceptualizing financial literacy. However, one clear fact is that financial literacy focuses more on measuring actual financial knowledge and skills to perform the knowledge. It is posited by prior researchers that individuals with good financial literacy would result in positive attitudes and behaviour. Financial capability, on the other hand, covers a much broader framework in which part of the domains are embedded within the financial literacy and attitude dimensions, and do not directly measure knowledge and fundamental financial concepts. Besides, some of the domains of financial capability like 'opportunity' and 'motivation' are not relevant to be tested within the context of this study involving individuals with self-control problems. One thing that hinders them to perform certain behaviour is due to lack of willpower (or bounded self-control) – which means people understand the benefits and try to perform the behaviour but they are limited in their capacity to execute intentions. Therefore, following Huston (2010), this study focuses on examining the level of financial knowledge (or understanding) that participants have, and their ability to apply or use the knowledge in their daily life as university students. Instead of using a broader definition like financial capability

(which includes all the five critical elements of knowledge, skills, attitudes, motivation and opportunity), This study aimed to measure how well participants could understand and use finance-related information, based on the contents delivered from the interventions (which are financial education program and SMS reminders) and how it could assist to circumvent behavioural constraints and improve financial attitudes and behaviours.

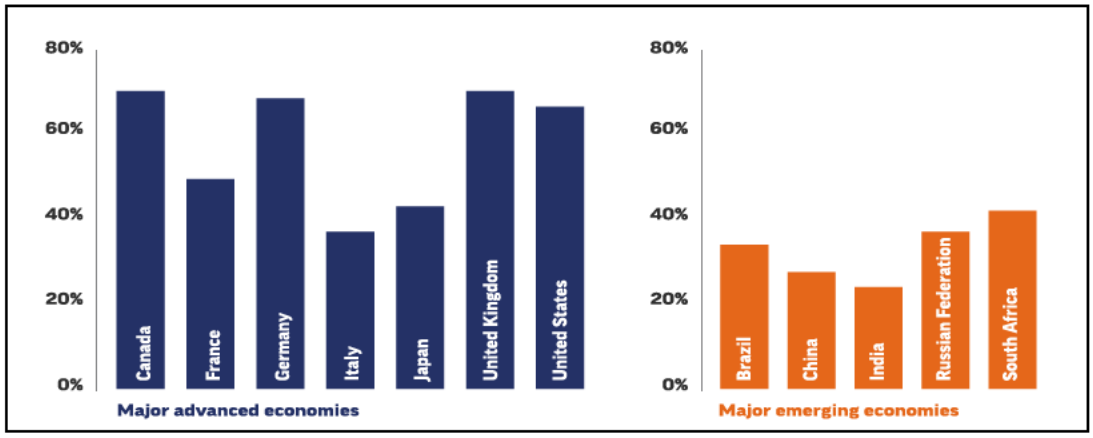
3.3 Levels of Financial Literacy Worldwide

Klapper et. al. (2015) published the recent world financial literacy report, which examines the level of financial literacy among adults across 140 economies worldwide. Using Lusardi and Mitchell's (2005) "Big Three" questions, participants are defined as financially literate if they answered at least three (out of total four) questions correctly based four basic financial concepts; inflation, basic interest rate, compound interest rate, and risk diversification. On average, they concluded only 33 percent of world adult population are considered as financially literate. Countries that scored higher financial literacy rates (65 percent or more, on average) were mostly from the European Union which include Denmark, Finland, Germany, Norway, Netherlands, Sweden and the United Kingdom. Whilst those of non-European countries were Australia, Canada and Israel. On a contrary, the southern Asian region recorded the lowest financial literacy score, with only less than a quarter of its adult population (between 0 - 25%) are considered as financially literate.

Meanwhile, on average, about 55 percent of adults in major advanced economies are more financially literate than 28 percent average of the emerging economies (Figure 3.4). Nonetheless, there was a wide difference in financial literacy rates between countries of each

economy. For example, the percentage of financially literate adults in advanced economies ranged from the lowest of 37 percent (in Italy) to the highest of 68 percent (in Canada). Similar disparities can be seen among countries in emerging economies, ranging from 24 percent (India) to 42 percent (South Africa). Atkinson and Messy (2013) provided similar views on financial literacy gap that exists between these two economies.

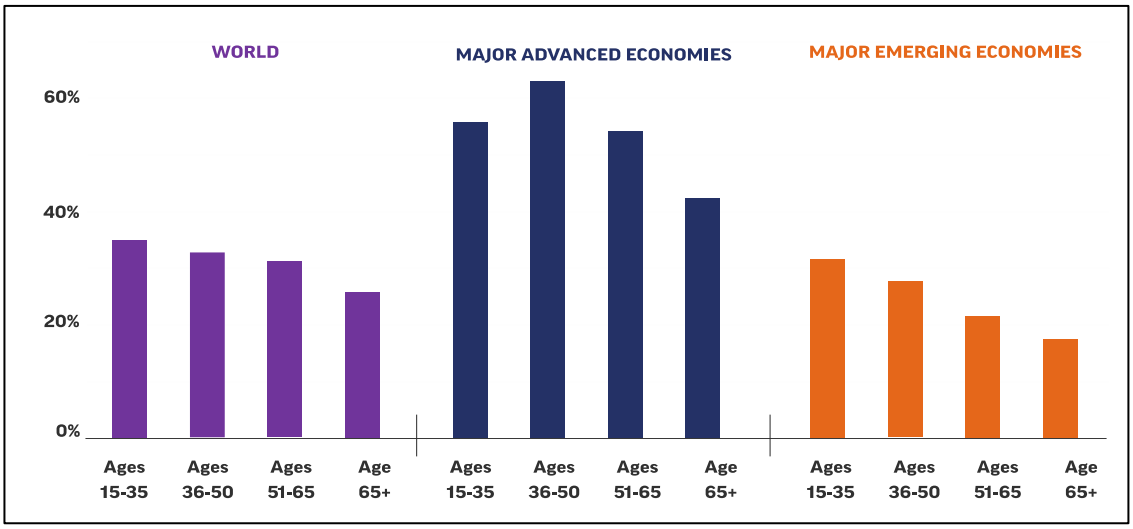
Figure 3.4: Variation of Financial Literacy Rates between Advanced and Emerging Economies *(source: Klapper et. al., 2015)*



Evidence of financial illiteracy is also prevalent in some advanced countries with well-developed financial markets like the USA, Japan, Italy and New Zealand (Lusardi and Mitchell, 2011). Sekita (2011) found a low financial literacy level in Japan, whereby only half of the respondents were able to answer basic interest rate and inflation questions, and more than half (or 60 percent) were not able to answer question on risk diversification. A study in Italy involving a total of 3,992 samples, found almost 60 percent of respondents had difficulty to answer basic numeracy and risk diversification correctly. This means that a country with sophisticated economic environment does not guarantee improvement in knowledge and cognitive abilities. Instead, in some case, people gained new understanding on certain topics from events that they experienced themselves, and vice versa. In Japan for example, a lot of

people failed to answer questions pertaining to inflation as the country had been suffering from deflation since the past two decades (Lusardi and Mitchell, 2011; Nishizaki *et. al.*, 2014). Similarly, due to limited exposure on stock market investments, people in Russia had difficulty to understand the concept of risk diversification and most unlikely to answer question on risk and return correctly. In Klapper and Panos's (2011) work that examined the links between financial literacy and retirement planning in Russia found that just over one-third of the respondents were able to answer numeracy question on compounding interest, and majority (more than 80 percent) were not able to answer risk diversification question.

Figure 3.5: Variation of Financial Literacy Rates Between Age Groups
(Source: Klapper et. al., 2015)



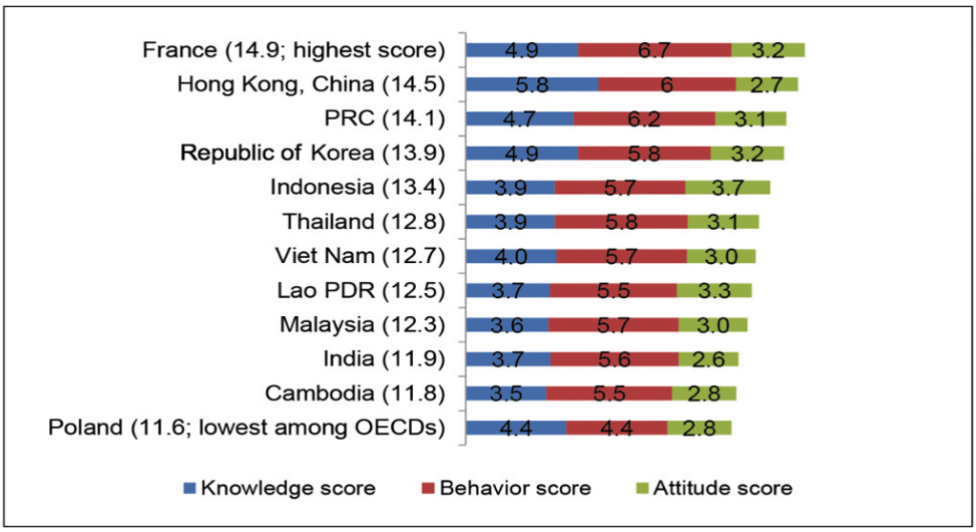
Financial literacy level also differs across population subgroup. As depicted in Figure 3.5 above, the pattern of financially literate people declined with age. With exceptional in advanced economies, the middle-age group were 65 percent (on average) more financially literate than young adults and older groups, mainly due to experience involved in the financial market and use of financial products, which have improved their knowledge (Agarwal et. al., 2009; Lusardi and Mitchell, 2011). The "inverted U-shaped" of financial literacy pattern as

described by Lusardi and Mitchell (2011) showed that the knowledge level of middle-age adults peaked during the middle of their life cycle, higher than the other age groups. Meanwhile, the problem with low levels of financial literacy was more prevalent among the young adults group. Lusardi et. al. (2010) in their paper examining financial literacy among the youth found that more than 70 percent of young adults were not able to answer questions pertaining to inflation, simple interest rate calculation and risk diversification. In comparison with the two economies, the young adult group in emerging economies (age between 15 – 35) recorded the highest financial literacy rates of 32 percent on average as opposed to other age groups. This figure however, is far below than the young adults in advanced economies, which shows a clear disparity in financial literacy level of young adults between the two economies. Meanwhile, financial literacy rates among the older people were much lower than the young and middle-age group, mainly due to decline in cognitive ability which occurs in old age (Finke *et. al.,* 2017). The brain function activities which involve the use of memory, motor skills, perception and attention begins to decline with age, which subsequently affect peoples' ability to make quality financial decision when they reach golden age. In addition to that, there is likely to be a cohort effect that impacts on older consumers. Older people, with experience of a very different financial marketplace may find it difficult to keep up with the fast pace of change in the financial market place, including the introduction of new technologies (Atkinson and Messy, 2012). Prior studies found that older adults experiencing a sharp decline in cognitive ability (mainly that involves numeracy skills) have difficulty to answer questions pertaining to financial decision-making behaviour (Boyle *et. al.,* 2012) and have problem to manage their money effectively (Hsu and Willis, 2013).

As mentioned earlier, most countries with lowest financially literate adults are located in the Southern Asian region, with just about a quarter (or more) of adults were observed as

financially literate (Klapper *et. al.*, 2015). Countries with the lowest rates are Cambodia (18 percent), followed by Vietnam (24 percent), Philippines (25 percent), Thailand (27 percent), Indonesia (32 percent), and Malaysia (36 percent). Myanmar and Singapore are among the countries that recorded more than 50 percent of financially literate adults in this region.

Figure 3.6: Financial Literacy Score Among Selected Asian Economies
(*Source: Morgan and Trinh, 2019*)



A recent report by Morgan and Trinh (2019) observed a similar pattern of financial literacy level amongst selected developing Asian economies. Following OECD's measurement (Atkinson and Messy, 2012), financial literacy is conceptualized as a combination of knowledge, behaviour and attitudes required for one to make financial decisions and achieve sound financial well-being. The total financial literacy score ranges between 1 – 21, a combination of a total of 21 questions from each dimension; financial knowledge (7 questions), financial behaviour (9 questions), and financial attitudes (5 questions). As depicted in Figure 2.5, financial literacy score of countries in south Asia ranked among the lowest as compared to other developing Asian economies like Hong Kong, China (14.5), PRC (14.1) and Korea

(13.9). Despite being ranked among the top ASEAN country with GDP per capita of US$9,899, Malaysia recorded a lower financial literacy score of 12.3 compared to its neighboring countries with much lower GDP per capita; Indonesia (13.4; $3,872 GDP), Thailand (12.8; $6,736 GDP), Vietnam (12.7; $2,390 GDP), and LAO PDR (12.5; $2,531 GDP).

In relation to gender differences, it has previously been observed that women are less financially literate than men (Lusardi and Mitchell, 2008; Atkinson and Messy, 2012; Agarwala et. al., 2015; Bucher-Koenan et. al., 2017). It is suggested that women have different risk preference, whereby they are more risk-averse in nature, and lack of confidence when making financial decisions, which explains why men are more financially knowledgeable than women (Goldsmith and Goldsmith, 1997: Chen and Volpe, 2002). This gender gap has raised further the concern on women's ability to have better financial security, especially for live after retirement. Looking specifically into age, Bucher-Koenen *et. al.* (2017) observed that financial literacy gap is more prevalent among older women than the younger generation. This is due to traditional societal role where the older generation generally pays more attention at home caring for children and the family, rather than actively involved in the workforce. Meanwhile the younger generations are much more inclined towards being educated and building up career in the labor market. Lusardi and Mitchell (2008) found differences among older women who not only display very low financial literacy level, but also have not made any savings plan for retirement.

On another note, there were mixed evidence provided from earlier studies on the association between level of education and financial literacy. It has been observed that individuals who obtained higher educational level were more likely to have better financial knowledge and literacy scores (Lusardi and Mitchell, 2011b; Atkinson and Messy, 2012, Potrich *et. al.*, 2015).

Financial literacy is also linked with individuals with high cognitive ability like mathematical and arithmetic skills (Lusardi *et. al.,* 2010). Unsurprisingly, the effects of education on financial literacy were much greater among college students who studied specialized course on business, finance, economics and accounting as opposed to students from other disciplines (Volpe *et. al.,* 1996; Amadeu, 2009; Sarigul, 2014). Nonetheless, despite having access to high levels of education, a very low and inadequate financial literacy levels was also found among college students in several lines of studies (Volpe *et. al*., 1996, Chen and Volpe, 1998, Lusardi and Mitchell, 2011a). To a great extent, the size of difference in financial literacy score was particularly small regardless of their field of study (Markovic and Devaney, 1997; Chen and Volpe, 1998). Atkinson and Messy (2012) observed that in some countries, even people with low levels of education were able to achieve high financial literacy scores. This indicates that financial literacy is not necessarily determined by level of education alone. Education may not be the best proxy to financial literacy, as both factors significantly predict retirement planning (Lusardi and Mitchell, 2011a). Instead, other socio-economic factors such as income, use of financial services, childhood consumer experience (such as discussing financial matters with family, opening savings account at early age) parental and peer influence play significant role on influencing people's ability to be financially literate (Valentine and Khayum, 2005; Clarke *et. al.,* 2005; Sabri *et. al.,* 2010; Potrich *et. al.,* 2015)

3.4 Financial Literacy in Malaysia

A considerable number of studies and reports have been published on the level of financial literacy in Malaysia. In 2019, the Financial Education Network, an agency under the Central Bank of Malaysia published a report on the current state of financial literacy in Malaysia. Overall, it was reported that Malaysians have low confidence regarding their own financial knowledge, with 1 in 3 rated themselves to be of low financial knowledge. Most Malaysian (or 73 percent) have the basic idea what inflation is about; the rise in cost of living. But only less than half (or 38 percent) can relate its effect to their purchasing power. Furthermore, only 43 percent of Malaysians understand that the growth of money is compounded over time, while 22 percent believe that money grows on a linear basis. In short, the financial knowledge of Malaysian household is limited to basic level and they have difficulty to understand topics that is more advance and technical. Besides socio-economics factors, perhaps this serves the answer to why their participation in the financial services (such as savings, investment and purchase of insurance) is still low.

On different segment of populations, Tan *et. al.*, (2011) studied financial literacy level among 200 working individuals in a commercial area in Malaysia called the Klang Valley. A set of 15 financial literacy questions with two difficulty levels were used, adapted from the work of Lusardi (2008) and Lusardi and Mitchell (2005; 2007). From the survey, it was found that majority of the respondents (more than 80 percent) were able to answer basic questions that tested their understanding on inflation, interest compounding and risk diversification. However, respondents find it slightly difficult when answering more advanced questions on stock and capital market investments, with less than half were able answer it correctly. Using a similar survey measurement, in 2013, Khan *et. al.* (2019) conducted a financial literacy survey that involved a total of 454 young (or Gen-Y) investors in Malaysia. The result shows

that the Gen-Y investors display a medium level of advanced financial literacy, which varies across investors' gender, age, ethnicity, education and investment experience. The findings demonstrate that male, Chinese, university degree holder and experienced Gen-Y investors show a higher level of financial literacy. Their result concurred with findings from earlier research where they found that the Malaysian Chinese are far better than other Malaysians in financial literacy (Abu Bakar *et. al.,* 2006; Lim Thien Sang *et. al.*, 2010). It is noteworthy that Chinese Gen Y investors show a relatively higher level of literacy, which can be ascribed to cultural differences among ethnic groups. Moreover, the Chinese dominate business in Malaysia, which helps them gain more financial knowledge.

Meanwhile, Janor *et. al.* (2016) conducted a comparative study on the level of financial literacy and investment decisions between Malaysia and the United Kingdom. The OECD (2012) questionnaire survey was adapted to measure financial literacy on three main aspects, covering financial knowledge, attitudes and behaviours. For financial knowledge, eight questions have been designed to test for this aspect covering different aspects of knowledge; knowledge on division, time value of money, return earned on the loan, calculation of interest plus principle, compound interest, risk and return, inflation and diversification. With regards to financial behaviour, the questionnaire asks the respondents on questions in which responses to these questions will reflect information on their behaviour; for instance, how they manage their money which include whether they can afford to buy something, paying bills on time and monitoring over their financial spending, saving and borrowing habits and setting financial goals, household budget and choosing financial products. The result shows that on average, the financial knowledge score for Malaysia and the UK were almost equal at 51% and 53% respectively. Malaysia scored higher correct answers on questions pertaining to division (93%) as opposed to the UK (76%), which indicates that most of the respondents could use mental

arithmetic to undertake a simple division. The UK on the other hand, had better score on defining inflation (94%) compared to Malaysia (74%), suggesting an awareness of the simple economic terms. Meanwhile, question on the compounding of interest or return was found to be harder for both Malaysia (30%) and UK (37%). Other than knowledge, Malaysia scored an average behaviour and attitudes of 67% and 53% respectively, slightly higher than the UK (51% and 49%). Going specific on behaviour construct, the UK respondents were most likely to have made active financial products choices by shopping around and using independent information or advice compared to the Malaysians. However, in terms of budgeting, Malaysian respondents were financially responsible and did their budgeting as compared to the UK. Overall, the authors concluded that financial literacy level in both countries are low.

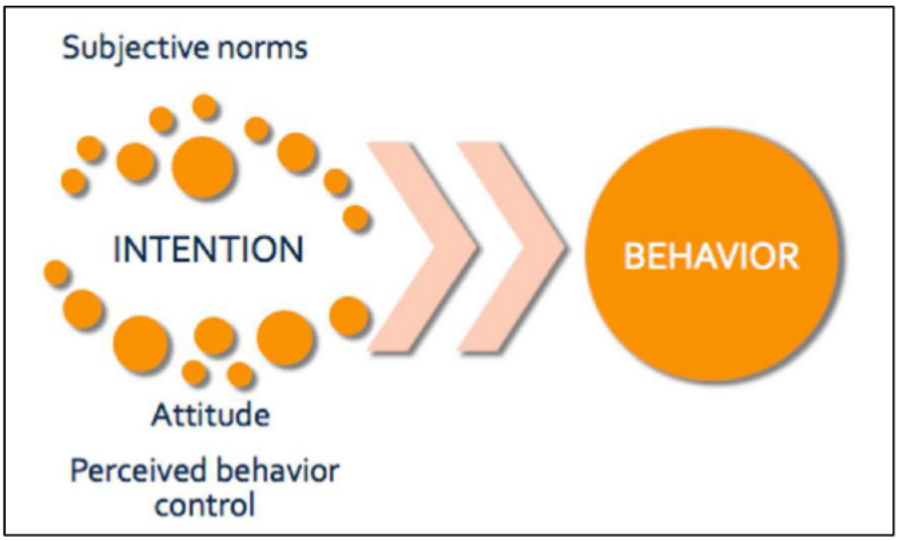
A large-scale study done by Mokhtar *et. al.* (2018) examined the level of financial literacy in Malaysia involving a total of 2000 respondents across four segments of population – public and private sector employees, households living in rural areas and youth studying at higher learning institutions. The study was conducted using a quantitative survey method using financial literacy measurement that tested respondents' understanding on cash flow management, savings and investments, retirement planning, risk-management, Shariah-compliant financial products, estate planning and existing financial institutions. The study received a representation of the country's three major ethnicity, with the Malays being the highest respondents involved (64%), followed by the Chinese (27.9%), and the Indians (5.9%). The overall findings signified that the respondents were not fully equipped with sufficient financial knowledge to make informed decisions regarding their financial affairs. Specifically, there was a knowledge gap in certain areas particularly in credit management, whereby about 84% of respondents spent more than what they received every month, and more than half believed that debts can be inherited. It is also alarming to learn that more than a quarter of respondents had the idea that all investments in Malaysia are legal. Several other concerns were

revealed as the respondents were not fully aware of the differences between conventional and Islamic financial products. It was suggested that financial education program should be made mandatory at all levels, and the training format should meet the different needs of the various segments of society.

3.5 Financial Attitudes and Financial Behaviours

In general, attitude is referred as a measure of opinions or a mean of expression of underlying beliefs and values (Pankrow, 2003). People's expression of beliefs (or sometimes referred as evaluations) could either be on themselves, other people, or objects, which leads into behavioural intention (Petty and Caccioppo, 1986; MAS 2013). According to Ajzen's (1991) Theory of Planned Behaviour, people perform several behaviours because they are intended to do so, and the intention can be determined by three important factors, which are behavioural beliefs, normative beliefs, and control beliefs. Behavioural beliefs produce a favourable or unfavourable attitude toward the behaviour; normative beliefs result in perceived social pressure or subjective norm; and control beliefs give rise to perceived behavioural control, the perceived ease or difficulty of performing the behaviour. In combination, attitude toward the behaviour, subjective norm, and perception of behavioural control leads to the formation of a behavioural intention.

Figure 3.7: Theory of Planned Behaviour
(*Source: Ajzen, 1991)*



It is difficult to define if one perceived the "right" or "wrong" attitudes as it is purely a subjective matter. Some attitudes will generally be seen as more desirable than others. As argued by McLeod (2009), it has a connection to 'self-image and social acceptance' and people tend to adjust their responses even if they do not reflect their actual beliefs, just because they want to build a good image or be accepted by others. Meanwhile, Kaminska and Foulham (2013) explained that 'social desirability bias often occurs with respondents; they tend to give a response that it is more acceptable to society, even though it is different to their actual opinion.

In the context of personal financial management among young adults (in particular, university students), the way how people perceived their underlying values on managing money is shaped by several factors, which include socialization agents (attitudes and financial practices shown by parents and peers), knowledge and demographic factors (Borden *et. al.,* 2008; Shim *et. al.,* 2010). Additionally, financial attitudes could also be developed through past experiences and social norms; following what other people commonly do (MAS, 2013). These formations of

underlying beliefs are critical to the way one behaves, regardless of the actual control (Thompson 1981; Danes and Rettings 1993). For example, people who feel little or no need to save, and do not recognise the importance of doing so, are at greater risk of financial problems than those who do. In a study by Shim *et. al.* (2010), they found a support on the hierarchical relationship between knowledge, attitude and behaviour. Using both subjective and objective measure of financial knowledge, they found that financial knowledge played an important role in predicting financial attitudes which in turn, predicted healthy financial behaviours. The results concurred with those of Grable (1999) who found that the increased financial knowledge obtained from financial education program had further improved participants' risk-taking attitude and their intention to change saving and investment choices. However, there are cases where financial knowledge does not impact financial attitudes, but directly linked to financial behaviours (Shim et. al., 2009; Sabri and McDonald, 2013).

Consumer economists have studied financial behaviours for the last three decades. Fitzsimmons *et. al.* (1993) provided a good review of financial behaviours research from the 1970s to the early 1990s. In recent years, more studies have focused on financial behaviours in various settings (for examples, Muske and Winter, 2001; Hilgert *et al.*, 2003; Hogarth *et. al.*, 2003; O'Neill and Xiao, 2003; Xiao, 2006). Financial behaviour can be defined as any human behaviour that is relevant to money management (Xiao, 2008). Common financial behaviours include cash, credit, and saving behaviours. Many financial education programs focus on increasing savings and reducing debts, which are the outcomes of positive financial behaviours. However, it is worth to note that behaviours are not outcomes because they only contribute partly to the outcomes (Ajzen & Fishbein, 1980). Outcomes result from both a person's own behaviour and other factors in many situations. However, behaviours should lead to outcomes (Ajzen & Fishbein, 1980). For example, saving money regularly is a behaviour but increased savings is an outcome. Saving money regularly leads to increased savings given other factors.

3.6 Pattern of Financial Attitudes and Behaviours

The rapid expansion of the financial sectors has shifted the responsibility of managing money to individuals. Yet, due to low financial literacy level (which has been discussed previously), research found that majority of people are not well prepared to manage their financials effectively, and some are struggling to make ends meet. A financial capability survey in the US (Lusardi, 2011) reported that almost half of the Americans have trouble to keep up with monthly expenses and bills, with almost 14 percent of survey respondents stating it is very difficult to do so and 35 percent finding it somewhat difficult. The 2011 economic crises had worsened the case even further, with one-third of respondents stated they experienced a large and unexpected drop in income during the past year. With regards to emergency savings, only half of the respondents (or 49 percent) have set aside emergency or rainy days funds that would cover expenses for 3 months in case of sickness, job loss, economic downturn, or other emergencies. Prior to that, in 2009, a survey was conducted to assess the Americans' confidence in their ability to cope with a small financial shock, and they found that 46 percent of the Americans stated they cannot or are not confident they could come up with $2,000 in a month's time (Lusardi *et. al.*, 2011). In addition to not preparing for unforeseen emergencies, majority of the Americans have not done any retirement planning, despite the positive changes in the pension landscape in the past years. When asked whether they have ever tried to figure out how much they need to save for retirement, only 42 percent of respondents who are not retired said they did.

A similar report produced by Rowlingson (2017) among the UK households found that people have difficulty to find money for one-off expenses in 2017 than they had been few years back. This was partly due to the fall of real wages and income which led people struggle to pay for expenses and reduced their purchasing power, even for basic necessities. The problem had

discouraged savings activity among its households (after minus spending and other expenses from monthly income), which saw a huge reduction in savings ratio from 11.5 percent in 2010 to a low 3.3 percent in 2016. In terms of debt management, almost half of the public (or 49 percent) perceived they are between somewhat to heavily burden keeping up with utility bills and other credit commitments. The low-income group were mostly affected by the rise in inflation rate and basic benefit cuts, which makes money management difficult. Unsurprisingly, savings for retirement did not show any encouraging figures, despite a lot of workers joining the occupational pension scheme. Although the scheme recorded a total of 4.6 million members, only 2.7 million actively contributed to the scheme.

Across age group, the problem is much prevalent among the young adults who are struggling in dealing with complex financial behaviours in a macroeconomic environment that is different from that of previous generations. Born into financially liberalized markets with variable interest rates and easily accessible lines of credit this generation struggle with high rates of housing debt (Emmons and Noeth, 2014), student loan debt (Elliott & Lewis, 2014), and an unstable labour market (Levenson, 2010). About one-third of young adults have no emergency savings (de Bassa Scheresberg, 2013), and lower-income millennials who have any savings at all only accumulate an average of about $200 (Friedline and Song, 2013). Without savings to cover these unexpected events, some borrow from friends or family, some turn to credit cards (Yilmazer and DeVaney, 2005), or simply skip paying a bill (Collins and Gjertson, 2013). Others use alternative financial products, reporting that these products are more convenient and less costly than products offered at mainstream financial institutions (Servon, 2013). The young adults must also pay for college during their transition into adulthood. Lower-income young adults carry higher debt burdens and are more likely to take out private student loans than their wealthier peers (College Board, 2007). Although many students struggle to pay back student loans, lower-income borrowers also struggle to complete their degrees or avoid loan default

(College Board, 2007), suggesting that their transition into adulthood coincides with considerable debt that may inhibit their financial well- being. With limited preparedness for emergencies, increased use of alternative financial products, and burdensome debt accumulation, millennials face obstacles that may threaten their overall financial happiness (Gutter & Copur, 2011), future financial goals, and transition to financial independence.

3.7 The role of financial education to improve behaviours

A recent study by Carpena et. al. (2017) investigated the effect of financial literacy training on financial knowledge, preferences and behaviours of low- income households in India. The study was conducted after considering Banarjee et. al.'s (2010) suggestion to include complimentary interventions to encounter the limited effects of bringing households into the formal financial sector via micro financing. The main motivation of the study was to understand the barriers that prevent individuals participating in financial education programs from translating their knowledge into action. Another objective was to evaluate the effective mechanism in delivering financial education intervention that could improve people's financial behaviour. About 1,300 urban poor households (mostly micro-financing clients) in Ahmedabad, a city in the state of Gujarat India took part in the field experiment. The experimental design consists of four main interventions or components. The first intervention involved two third of the sample randomly assigned to a comprehensive **video-based financial education program**. The program consists of five modules conducted over the period of five weeks in a classroom engagement. Each module was conducted within 2-3 hours session with different financial topics every week (budgeting, savings, loans, insurance and financial summary video). To avoid from Hawthorne Effect bias, samples in the control group were given a similar program but related to health education. The control group was given a non-

financial related program (instead of no program) to ensure that both groups experience the same level of "disruption" every week. The health training video consists of different topic every week; cleanliness and hygiene, midwife, maternal and child health, condoms, AIDS and syphilis, and night blindness. Monetary incentives worth Rs. 50 (equivalent to USD1) were given to participants each time they attended the session.

The second intervention is **"pay for performance"** where participants in both groups were randomly selected to receive a reward for each of the questions they answered correctly during the short exit term conducted at the end of the final training session. The third intervention is **financial-goal setting,** with the purpose to test its effectiveness in overcoming procrastination in financial behaviour and poor self-control problem. Half of the participants who received financial and health education program were randomly selected to receive household visit and given the opportunity to set a target date for several financial planning goals. Every target is marked on a calendar provided to them. The last intervention involving one half of the participants who received financial education program were offered to receive a free additional **financial counselling**. Financial counsellors visited selected participants in their home to give guidance on several financial issues, such as budget preparation, bank account opening, credit services and guide to purchasing insurance policy. The "pay for performance" intervention however did not show any significant effect. Interestingly, other interventions show a significant influence on participants' behaviour on budgeting and savings. Participants who received additional goal setting after financial education program were most likely to save informally (6 percent higher) and formally at a bank (8 percent higher) than the control group. Financial counselling on the other hand, brought to a significant increase in monthly budgeting and formal savings at the bank. More significant increase on all financial behaviours (budgeting and savings formally and informally) can be seen when all three treatments are combined.

3.8 The link between financial knowledge, attitude and behaviours

Financial knowledge alone is not enough to achieve a successful adult life. Instead, it must be supported with positive attitudes and confidence to help individual especially young adults making smart choices. Shim *et. al.* (2010) in their study on the role of parents, work and education on financial socialization among first year college students, argued that financial knowledge plays an important role in predicting financial attitudes which, in turn, leads to healthy financial behaviours. This finding supports the hierarchical relationship of knowledge-attitude- behaviour and suggests that financial knowledge does have a direct link with financial behaviour. Sang *et. al.* (2013) found that the level of financial literacy does not directly affect ones' decision related to financial issues but having the financial knowledge will trigger their attitudes towards a positive financial behaviour. Sabri and McDonald (2013) suggested that financial literacy had a positive, significant effect on savings behaviour. However, their study did not highlight whether financial literacy could trigger attitude towards individual's savings behaviour or not.

3.9 Conclusion

Various attempts to examine financial literacy and capability have been made over the decades. Both financial literacy and financial capability have different interpretations, and the phrases are frequently used interchangeably. Financial literacy has been defined in different ways across different countries. A review of previous studies revealed that when discussing financial literacy, various concepts and definitions have been used, starting from 'financial knowledge,' with a narrow measurement according to "The Big Three," to a more comprehensive assessment of financial capability that includes a focus on skills, attitude, motivation,

experience and behaviour. To date, there is no single concept of both financial literacy and financial capability that is universally accepted. In addition to that, there were no standardized measurement procedures that can be used to apply in a general context. This chapter unravelled the foundation of these concepts, and provides the idea that to know what knowledge and literacy actually are, or what influences people to perform certain attitudes and behaviours, is not an easy task. However, to measure how people could have better knowledge and understanding of financial concepts, and how it could help them circumvent behavioural constraints, requires one single operational definition that is relevant with the aims of the study.

CHAPTER 4

CHANGE BEHAVIOURS

4.1 Introduction

The aim of this chapter is to provide the understanding specifically on financial behaviours and to suggest the tools that can be used to help people to perform positive financial behaviour. It starts with discussing the factors that influence one to perform certain financial behaviours. The chapter then narrows down to discuss the role of self-control, which is the central of this research, and in what way psychological bias could hinder an individual to translate desired behaviours into action. Several theories related self-control formation are also discussed in this chapter. The chapter then follows with discussion on nudge theory, which is a potential tool that could help individual to overcome self-control issue, perform desired actions and have a change behaviour. Section 4.5 will provide discussion on the use of SMS reminders as nudging tools to help improve behaviour of people with low self-control, which is then followed with discussion on theory of change.

4.2 Factors Affecting Financial Behaviours

Various studies have assessed the underlying factors that shape people's financial behaviours. Among of the key factors are socio-economic (or non-cognitive) factors, financial literacy (or cognitive factor) and psychological factor such as self-control.

4.2.1 Socio-Economic Factors (Income)

Deficiency of income is regarded as a vital impediment towards financial behaviours. Therefore, Atkinson et al. (2006) revealed a clear linkage between household income and respondent score for the planning ahead domain, whereby the average scores increase fairly steadily along with income. Further association between financial behaviours and income has also been observed by Friedline and Rauktis (2014) and Lusardi, Schneider, and Tufano (2011). The average factor scores tend to increase with income for the choosing products domain of financial capability, suggesting that individuals with greater livelihoods have better proficiency in choosing products (Atkinson et al., 2006).

Moreover, Financial Capability Survey Around the World (2013) has divulged that the income groups in Tajikistan significantly differ with their financial behaviours, whereby low-income groups have difficulties to save compared to higher-income ones. This is similar to Kempson and Poppe's (2018) study, which has found that those with low active savings had the lowest average income among the Irish people. Furthermore, Taylor, Jenkins, and Sacker (2011) mentioned that poor financial behaviour is associated with low-income individuals who are either unemployed or divorced. Meanwhile, FSA (2005) discovered that lower-income groups possess financial behaviour that does not extend beyond day-to-day money management; this is constrained by the lack of spare cash. This group also utilises a limited range of information, advice sources and products such as borrowing.

In contrast, Atkinson et al. (2007) concluded that people with a higher income have the greatest financial capability, which is supported by FSA's (2005) study stating that such group experiences less money management problems due to spare cash availability. Furthermore, this population generally finds it unnecessary to plan for expected or unexpected events alike; nevertheless, they would utilise a wide range of financial products and sources of information

and advice. Hence, financially capable people will be able to manage their income effectively, which indicates a higher income and has the ability to empower consumer (Taylor, Jenkins & Sacker, 2011).

4.2.2 Socio-Economic Factors (Ethnicity)

There is a gap among race towards financial behaviours (Al – Bahrani, Weathers, & Patel, 2019). This is because, Al – Bahrani et al. (2019) concluded that insufficient parental guidance or even poor access to financial literacy education affected one's financial capability. This can be seen when they divulged financial literacy scores for minorities which are lower than the Whites. They also added that the Whites were more likely to participate in financial literacy education. In line with that, Wingfield (2016) also disclosed that Black students are more likely to score below average than White students. Moreover, Financial Industry Regulatory Authority (FINRA) conducted a survey in 2018 which mentioned that Black community were more financially illiterate among the American adults (Banks, 2020). However Charron Chenier et. al. (2017) stated that on average, the Blacks spend less than the Whites. Therefore, they believed that it is not because of spending habit or lack of financial literacy, but it due to the racial wealth gap. Income inequality has made Black families income half less than the White families. Parallel to that, Do, Mai, Nguyen, Pham, Le, and Vu (2020) stated that minority ethnic community has mediocre academic background. Hence, they primarily seek employment in low-skilled and simple jobs that are unstable, underpaid and unsustainable.

While, Nam, Huang, and Lee (2016) studied ethnic differences among Older Asian Immigrants mentioned that ethnicities are insignificant towards financial capability. They suggested that appropriate measurement based on culture should be developed in order to measure financial capability. As for the Malaysian context, Jeyaram and Mustapha (2015) found that among the

main three ethnics, the Chinese possess higher financial literacy compare to other ethnics. In the recent years, researchers such as Alidaniah et al. (2017), Loke (2017), Mokhtar, Sabri, Catherine, and Thinagaran (2018) and Yusof, Rokis, and Jusoh (2015) also claimed that the Chinese have better financial capability and they have positive responsible behaviour in personal finances among all ethnics. In addition, Loke (2017) found that the Chinese have 8.5 percent lower probability of poor financial behaviour and 6.8 percent higher good financial behaviour compared to other ethnics.

4.2.3 Socio-Economic Factors (Social Influence)

Several literatures acknowledged the role of parents as the key to their children's financial socialization (see Cude et. al., 2006; Sam et. al, 2012), in which, parents are highly influential in developing their children's financial behaviour, thus they should become the role model to their children in managing their financial affairs. Webly and Nyhus (2006) added that economic socialization (namely discussing financial matters with parents) would have an impact on children's future orientation. In other words, children who have good relationship with their family are more likely to be future oriented and have a good financial behaviour. Shim et. al. (2010) discovered that the role played by parents is significantly greater than the role played by working experience and high school financial education of young adults. A set of supportive social support from parents and family members are crucial in helping young adults and adolescence achieve their successful adult life. When parents displayed a positive financial behaviour, they will become financial role models to their children and will trigger positive attitudes and behaviour amongst the young adults. Besides parenting factors, peer influence could also predict individuals' financial behaviour. In Malaysia, it was argued that the most obvious reason that spoiled the young adults in managing their financials was due to peer

pressure (Household debts are self-inflicted" 2013). Similar argument confirmed by Duflo and Saez (2001) where they found that people with similar preferences tend to be in the same group, thus creating a correlation between group and individual behaviour.

4.2.4 Financial Literacy

Other than that, there is a well-developed literature trying to link measures of financial literacy with other economic and financial behaviours. Some literatures argued that individuals are financially illiterate (Lusardi and Mitchell, 2005; Lusardi, Mitchell and Curto, 2010, Sang et. al., 2013) that consequently affect their financial, investment and retirement planning decision (Bernheim and Garrett 2003; Lusardi, 2008; Lusardi and Tufano, 2009; Van Rooij, Lusardi, and Alessie 2011). Other studies reported the positive effect of financial literacy to financial outcomes such as investment practices and savings (Hilgert *et. al*., 2003) and both liquid and illiquid assets (Letkiewicz and Fox, 2014). Having a poor financial knowledge will also increase individuals' financial burden of debts that positively associate with non-payment of consumer credit (Gathergood, 2012). In Malaysia, personal financial planning is still considered at its infancy stage since most Malaysians do not take control of their own financial affairs (Citi, 2008 and Gan, 2008; as cited in Boon *et. al,* 2011). Lack of information and financial knowledge are said to be the main contributors to this problem, which reflects individuals' readiness to pursuing personal financial planning. Due to the poor financial knowledge and awareness, the aggregate savings of Malaysian households is relatively low whilst majority of them have not given any thought on retirement planning, unfortunately. In a report, HSBC revealed that almost 70 per cent of those polled worried about coping with finances upon retirement while 40 per cent expected a poorer standard of living when they retire.

Lack of understanding in financial knowledge to counter for instant gratification is another contributing factor to why people struggle to make ends meet especially among the younger generation. In the above report by Asian Institute of Finance (AIF), only 58% of the respondents have average financial knowledge, depicting a lack of confidence in financial literacy. There are unlimited resources and access to instant gratification being made available in today's world, and it could simply be achieved through a single click. What makes people easily succumb to it was because the lack in education and attitude towards resources (Vijaindren, 2015). Recent study in Klang Valley highlighted the needs to promote experiential learning on financial matters, as the level of financial literacy among young adults (in this case university students) is still considerably low and perhaps through its implementation could promote positive financial attitudes and behaviour (Yew et. al., 2017).

4.3 Intertemporal Choice and Self-Control

Although financial literacy is regarded as one of effective tool in assisting households managing their money in the marketplace, behavioural proponents argued that there are complicating factors in the current marketplace, which call into question the viability of financial knowledge as the best tool in educating households (Letkiewicz and Fox, 2014). Traditionally, people are assumed to have constant preference and follow the expected utility maximization principle in decision-making. The concept of Homo economicus was built on the assumption of how people should behave, given that they are well informed and able to maximize utility in a complex world. In short, the standard economic model has built a foundation in explaining economic behaviour, in particular at macro level. However prior literatures highlighted the inconsistency of these assumptions in actual human behaviour.

Behavioural economic studies have proven the existence of psychological biases (Lerner et. al., 2015; Fredericks et. al., 2015) in consumer decision making, which further concludes the inconsistency between the standard theory assumption and actual human behaviour. One example is intertemporal choice, which is a type of decision that involves consequences at a different point in time.. Such cases can be seen in various individual financial decision-making behaviour such as insurance purchase, long-term investments and retirement planning. Prior studies revealed that people often failed to demonstrate skills in planning for retirement, which seems odd with what theories have suggested. A survey in the US reported that less than 40 percent of the workers have done the maths on how much they will need for retirement, whilst 30 percent are yet to save and plan for it. Only the remaining 20 percent are confident that they can live comfortably in the golden age (Mitchell and Utkus, 2006).

The retirement planning scenario in Malaysia portrays a similar case where according to HSBC financial report, 81 percent of Malaysian are afraid that they will be penniless upon reaching their retirement days (Malay Mail Online, 2015). What is even more worrying is 27 percent of those surveyed had no plans or intention to save for life after retirement, whilst 49 percent said paying off debts is one of the main hurdles to have better savings. In a nutshell, majority of Malaysian (which consist of larger size of generation X and Y in the population) said they have other priorities to take over rather than thinking of saving for retirement.

People might have the knowledge and intention to start saving, but often find it difficult to execute plans into action. This behaviour is called bounded self-control (Thaler and Shefrin, 1981) where there is barrier that limits the ability of individual to carry out their intentions despite knowing such behaviour would benefit them in the future. Survey by Choi et. al. (2002) on 10,000 employees at a firm found that workers were only able to save 6 percent of their

earnings, much lower than targeted 14 percent of what they should save. The low savings rate was not because of lack of awareness, but the capacity to take actions on the intentions that they have.

4.3.1 Hyperbolic discounting

The evidence of self-control problem can be seen when individuals are prone to be hyperbolic discounters; a tendency to choose sooner-small reward over later-higher reward. As opposed to hyperbolic discounters, "rational" exponential discounters on the other hand, anticipate greater future rewards from delaying consumption to another time period. Mitchell and Utkus (2006) argued that people overvalue the present and perceive lower value on future benefits. For example, if people were to offer $100 today or $150 tomorrow, the latter choice would be preferred. However, if the delay gap widens to several years, some people would forgo the importance of additional $50 even though the actual value is constant, thus would prefer the former choice. Another famous example of hyperbolic discounting effect is the marshmallow experiment conducted by researchers from Stanford University in 1972. About 600 children aged 4 to 6 years were presented with one single marshmallow and were told that they will be given another piece if they could wait for 15 minutes. Some of them could not resist temptation and ate the marshmallow when the experimenters left the room. Some struggled to wait for the second marshmallow and tried to reduce temptation by closing their eyes. The result ended with one third was able to defer their gratification and won the second piece. Interestingly, the follow-up studies reported that the children who were able to resist temptation turns out to be much competent adolescent and have higher SAT scores (Shoda et. al. 1990).

To some cases, hyperbolic discounting is also related to procrastination. In the real context of retirement savings behaviour, investors in the UK are reportedly unwilling to sacrifice current short-term consumption and often delay their intention to start saving for retirement to "another year" (Devlin, 2010). According to Yesilkayali (2014), people tend to procrastinate their intention because of immediate gratification (for this case, the short-term consumption) hence discredited the importance of future benefits. When procrastination takes place, there is higher possibility that they will not or will never start saving for their future. Similarly, it also means that those who seldom delay their intentions are less concerned with future and less likely to save as they failed to see their "future self" (Coady, 2013).

4.3.2 Decision Making Under Uncertainty: The Basic Assumptions

Standard economic theories were developed with the purpose to better understand the world particularly within the economic field. The traditional expected utility hypothesis, which was initiated by Daniel Bernouli in 1738 and further refined by Neumann and Morgenstren in 1945, has been used as underlying principles in most economic models. It is assumed that people make rational decisions under uncertainty as it based on compelling axioms on how people should behave. The theory however is not without limitations. Due to its restrictive nature of assumptions, it could not provide answers to issues that involve changes in human behaviours or psychological interference, which could influence people's choice in making decisions. In reality, anomalies such as market inefficiencies, market crash, and individual choices, often occur in real pictures (Wilkinson and Klaes, 2012) hence making the model incomplete and results in inaccurate predictions.

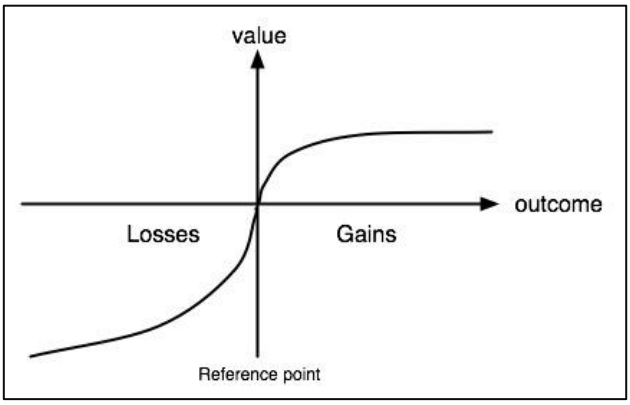
One example of famously debated anomaly in the field of finance is the violation of the Efficient Market Hypothesis (EMH) introduced by Professor Eugene Fama in 1970 (See Fama, 1970). The theory posited that stocks always trade at their fair value, which allows for market to be efficient, thus giving no chance for investors to generate abnormal returns. In other words, stock prices should reflect information at all level (public and private), which in return leave no room for investors to outperform the overall market. It may sound plausible but often reality shows the other way round and seems to be contradicted with Fama's efficient market principles. Some investors were able to make extraordinary profits by predicting future stock price based on historical price movements (Hudson et. al., 1996; Buguk and Brorsen, 2003). Consequently, it makes the stock market become less efficient (which also known as weak-form efficiency) where some investors have the access to private information, which is not made available to all levels. Other studies on market efficiencies have been broadly documented (Patel et. al., 2012; Gilson et. al., 2014 to name a few) where the results vary across countries. Similar evidence on market inefficiency can be seen, for example the Calendar effect; cyclical anomalies in stock market returns based on the calendar. Prior researches have confirmed its existence in stock market of several countries, such as China (Kling and Gao, 2005; Wu, 2013; Shi et. al., 2016), Italy (Barone, 1990), USA (Urquhart and McGroarty, 2014), India (Poshakwale, 1996) Islamic Stock Market (Weber and Nickol, 2016) and several countries in the Asian Stock Market (Yuan and Gupta, 2014). In addition, behavioural economic studies have proven the existence of psychological biases (Lerner et. al., 2015; Fredericks et. al., 2015) in consumer decision making, which concludes the inconsistency between the standard theory assumption and actual human behaviours.

No doubt the standard rational choice model has contributed a strong foundation in explaining economic behaviours, which has been useful in explaining the overall market at macro level. However, several issues that seldom occur within the micro level, particularly related to human

psychology and behaviours need to be addressed in order to fully understand decision making at individual level. As opposed to expected utility theory, which was built on the assumptions of how people should behave, behavioural proponents look at the ways people actually behave when dealing with uncertainty (Brunel, 2006). Nonetheless, their theoretical contributions extended the existing traditional economic models and provided better hindsight on understanding individual level of decision-making behaviours. Such contribution is essential and must be taken into account given that individual biases are discernible in the aggregate market level (Leiser et. al, 2008).

The Prospect Theory, introduced by Kahneman and Tversky in 1979 (and further developed in 1992), provides an alternative in explaining behavioural interception of human decision-making process that involves uncertainty. Contrasted with the standard rational choice model, prospect theory highlights the presence of psychological biases that often leads towards individual decision-making mistakes. The model explains individual's tendency towards loss aversion behaviour given a situation that involves potential gains. They argued that individual prefer to accept lower but certain reward rather than a higher but uncertain reward, making the concave value function much steeper for losses than gains (figure 4.1). In short, investors' risk perception changes based on different situations; they become more risk-averse after experiencing gains, and risk seeking after experiencing losses.

Figure 4.1: The s-shaped Value Function of Prospect Theory



Plous (1993) added that individuals' decision-making preference would depend on how the situation or problem is presented. This type of psychological principle is known as reference dependence. The model's value function is concave if the reference point perceived the outcome as potential gains, as people are more inclined towards avoiding risk (risk averse). On the contrary, people are potentially susceptible to risk if the outcome of the result is perceived as a loss. In relation to decision-making behaviour in stock market investments, Odean (1998) linked prospect theory to the occurrence of the disposition effect. It is an anomaly discovered by Shefrin and Statman (1985) that explained investor's unusual behaviour of selling winning stocks too early and holding losing stocks for too long. Prior studies by Weber and Camerer (1998), Chen et. al. (2007) and recently Heimer (2016) documented the evidence of disposition effect at different level of investors which has negatively affected their trading performance and wealth.

4.3.3 Life Cycle Hypothesis vs Behavioural Life Cycle Hypothesis

The traditional 'rational' Life Cycle Theory that was used to explain saving behaviour is somehow considered inadequate by economic psychologists (Rha et. al, 2006) as it failed to incorporate some important behavioural concepts, which could give detrimental effects to various area of one's life. Shefrin and Thaler (1988) proposed the Behavioural Life Cycle Hypothesis in which they claimed that several behavioural features (namely self-control, framing and mental accounting) were found missing in the economic analyses of household savings. Thus, the arguments for financial literacy could only be strengthened if it is able to help people overcome these issues. Although there's evidence that suggests self-control and financial education are related to various financial outcomes, it is still unclear whether these variables are totally related, whether one moderates the other two, or whether they are all important but works independently on predicting changes in financial behaviour.

4.4 How 'Nudges' Influence People's Decision-Making Behaviour

The term 'nudge' is a form of intervention that changes and improves decision making-behaviour. Nudges can influence the way people make decisions based on how choices are presented to them. These choices are created and organized by individuals (sometimes referred to as professionals) who are called as choice architects. Richard Thaler and Cass R. Sunstein coined the nudge concept in their famous book *Nudge – Improving Decisions About Health, Wealth and Happiness (2008).* They defined the term as "an aspect of choice architecture that alter people's behaviour in a predictable way without forbidding any options or significantly

changing their economic incentives". One important aspect highlighted by Thaler and Sunstein is that intervention must be "easy and cheap to avoid". In other words, several choices must be made available in which people have the freedom to choose (easy) and at the same time such intervention will not bring any financial side effect to them (cheap).

They coined the idea of *libertarian paternalism* which they believed in general, that people should be 'free to choose' and do what they like, and have the freedom to opt-out to something they dislike or disagree with. It is a rather soft and non-intrusive idea, as people's choices are not blocked or significantly burdened. Unlike traditional paternalism (which is more coercive and gained much support from traditional economists), libertanian paternalist for instance, will not make things hard for people if they wish to do something that could have bad effect in future, such as smoking or taking lots of sugar in daily meals. Instead, they nudge, where the approach aims at directing people into a right path leading towards much better lives without compulsion (Leonard, 2008). One widely famous example of nudge is the 'Amsterdam urinals' where they etched the image of a housefly into men's room urinal at Amsterdam airport with the aim to help man 'improve their target'. The idea came after they were having problem with 'bad aim' that creates unpleasant effect at men's restroom. The idea of etching the image turns out to be successful with spillage rate sharply declined to 80 percent.

4.4.1 Why Nudges?

Traditionally, humans are often regarded as self-interested agent and rational decision makers. The concept of Homo economicus (or better known as economic man) assumed that human never makes systematic errors, and has the ability to make rational decision by optimizing their

utility for various benefits. However, reality seems to be the opposite where people are prone to make mistakes and sometimes can be highly emotional when making decisions (Joo and Durri, 2015). Due to these factors, there are people who are willing to hire third parties to help them make good decisions (Thaler and Sunstein, 2008). The shift of decision-making style from being rational to not fully optimizing utilities suggesting that homo-economicus have evolved to homo-sapiens, which in line with what Thaler (2000) have predicted. The existence of behavioural biases in decision-making often put people into trouble, which in some cases give detrimental effect to their wealth and happiness. The way some people make decisions are sometimes influenced by the ways that even the standard economic theory would not be estimated. But through nudges, it could 'alter' people's decision-making behaviour towards much better outcome in lives.

Nudge is an intervention that directs people into certain directions. People sometimes make decisions after they have been nudged without realizing it, as nudges are everywhere and pretty easy to find. Satellite navigation, automatic enrolment, default rule, technology aids, labelling, and information customization are all nudges. It can be distinguished into two categories; educative and non-educative nudge (Sunstein, 2016). Educative nudge (such as warnings and information disclosure) helps to increase people's capacity to act independently and make own choices that could increase their well-being. Non- educative nudge (such as choices of menu in restaurants or default rule) on the other hand, was designed to maintain one's freedom to choose without interrupting their powers of agency (i.e thinking capacities and knowledge).
The automatic enrolment in UK's Workplace Pensions is one good example, which aims to combat inertia and increase employees' participation in pension scheme. It is hassle free, as people do not have to go through tedious signing up processes. Automatic enrolment replaces the opt-in option where employees will be automatically enrolled to the scheme once their

appointment has been confirmed. Nonetheless they have the option to opt-out should they refuse to join. The nudge appears to be a good move as the opt-out rate were very low, with only 8% to 14% participants decided to do so, and the number of private workers enrolled to the scheme increased tremendously as opposed to other sectors since the initiation of the mandate back in 2012 (French and Oreopoulos, 2016). Similar study on the impact of auto enrolment on 401(k) savings in the US further confirmed the result, whereby employee's participation in the saving scheme appears to be much higher under auto enrolment (Madrian and Shea, 2011) as well as increases household savings which is less costly than current tax subsidies provided by the government (Chetty et. al., 2013).

On a contrary, nudge seems to be less effective when one has strong intentions. Bronchetti et. al. (2011) conducted an experiment to test the effects of defaults on employees' refund tax money. In the control group, taxpayers are given the opt-in option to allocate some fraction of their tax refund into US savings bonds. While in the treatment group, the tax refund is automatically directed to savings bond with opt-out option should they disagree with it. They found the default setting in the treatment group was not effective, as the tax filers (in particular the non-income group) have specific plan to spend the refunds. Agnew et. al. (2008) reported similar result where default option seems to be insignificant in influencing women's decision to choose investment option, which turned out to be inconsistent with what prior studies have suggested. The reason was partly due to weak experimental default as the subjects were required to make immediate choices, whereas defaults in reality allow people to procrastinate when making investment decisions.

4.5 Theory of Change

Lekiewicz and Fox (2014) conducted a study on conscientiousness, financial literacy and asset accumulation of young adults. They found that financial literacy does not have direct association with net worth, but found strong education effect, which seems to help those in low conscientiousness to build net worth when paired with conscientiousness. Sabri and McDonald (2013) on the other hand, found a significant effect of financial literacy on savings behaviour. Nonetheless it is not known whether financial literacy could trigger attitude towards individuals perceived savings behaviour. In another separate study, Adomako et. al. (2016) discovered that financial literacy facilitates the association between access to finance and firm growth. In short, firms' growth will increase with access to finance but at a faster rate with a presence of new knowledge and information in managing company financials. The above previous findings brought to the development of the hypotheses as following:

H1: Financial education program leads to improvement in financial knowledge among people with low self-control.
H2: Financial education program leads to improvement in financial attitudes among people with low self-control.
H3: Financial education program leads to improvement in financial behaviour among people with low self-control.

Meanwhile, a simple financial information delivered through mobile text messages (SMS) was found to be an effective nudge in improving savings amongst the youth and that message content matters (Rodriguez and Saavedra, 2016). The number of account balances improved more than 30 percent among those who received SMS reminders. Interestingly, the effects of

SMS reminders to participants' savings effect are long-lasting, in which those who received savings reminders generally maintained higher balances in their savings account even after eight months they stopped receiving the messages. Similar results on informational nudges reported by Clark et. al. (2014) in the US. They found that young workers who received simple flyers that contain information on 401(k) retirement plan were more likely to initiate participation as opposed to the older workers group. Aiming at replicating the SMS intervention in a different population setting, the study then proposed the following hypotheses:

H4: Financial education program and financial education SMS leads to improvement in financial knowledge among people with low self-control.

H5: Financial education program and financial education SMS leads to improvement in financial attitudes among people with low self-control.

H6: Financial education program and financial education SMS leads to improvement in financial behaviour among people with low self-control.

4.6 Conclusion

There are many factors that can influence people's tendency to perform certain behaviours. This chapter revealed that determinants of financial behaviours stems from socio-economic factors, namely income, ethnicity, social influence. Financial literacy also plays an important role in shaping economic and financial behaviours. However, prior research found that the complicating factors in the financial marketplace was not only due to socio-economic factors. Behavioural economists have proven the existence of psychological biases (Lerner et. al., 2015; Fredericks et. al., 2015) in consumer decision making. The traditional 'rational' Life Cycle Theory that was used to explain saving behavior is somehow considered inadequate by

economic psychologists (Rha et. al, 2006) as it failed to incorporate some important behavioral concepts, which could give detrimental effects to various area of one's life. This chapter argued that besides socio-economic factors, psychological elements (in particular, self-control) influence people's decision-making behaviour. Prior studies found mixed evidence on the efficacy of financial education and financial literacy to improve behaviours. There is a need for an effective mechanism to help people with self-control problem to have a positive behaviour change and be able to make and effective financial decisions. This study contributes by filling this research gap. It responds to the need by examining the effectiveness of SMS reminders as a complementary agent to financial education program on attitude and behaviours of people with self-control problems.

CHAPTER 5

RESEARCH METHODOLOGY

5.1 Introduction

For research to have reliable findings, it needs to have a design that matches with the research objectives and is supported with comprehensive set of analyses. This chapter discusses the methodology undertaken to provide the answers to research questions. It starts with discussion on the researcher's philosophical stance that underpins the overall approach taken with the research. Subsequently, detailed plans around conducting the study are further discussed in the research design section, followed with discussion on sampling and data collection procedures. The chapter continues with explanations about data analysis procedures as well as ethical considerations, which covers issues on data collection, informed consent, privacy and confidentiality. The measurement of variables used for this study is explained in the development of questionnaires section. The last section provides summary of the chapter.

5.2 Research Paradigm

The main purpose of embarking on research is to develop new knowledge of a particular field (Saunders et. al., 2015). The process of acquiring knowledge is guided by several assumptions and beliefs otherwise known as research paradigm. Collis and Hussey (2009) defined this as a philosophical framework that serves to guide researchers based on their philosophies and assumptions about the realities and human knowledge. A proper choice of paradigm is crucial in determining the methodology that will be used for the research, as it reflects our beliefs about how a particular problem existed and how it can be investigated and solved (Fraser and

Robinson, 2004; 59). The development of research paradigm starts from individual's belief about the nature of reality (ontological assumption) and the way that knowledge is acquired in order to get to know the reality (epistemological assumption). From these assumptions, it helps individuals to decide the things that needs to be studied, define the research questions, theories and methodology to be used and understand the ways of how data can be analyzed and interpreted (Crotty, 1998; Saunders et. al., 2015).

There are many assumptions that influence a researchers' way of thinking about the world they lived in. In educational research, these assumptions (also called paradigm) are grouped as positivist, interpretivist, critical realist, postmodernist and pragmatist (Saunders et. al., 2015). Within the context of this research, the overall methodology was carried out using positivist approach, given its aim on examining the impact of interventions to human behaviours. Positivist paradigm which was firstly introduced by a French philosopher August Comte (1798-1857), views the world as something that exists independently based on unchanging, universal laws (Hughes, 2010) and that the research focus is based on what is 'posited' or 'given' (Saunders et. al., 2015). Reality in other words, is something that is not socially constructed but instead, follows how physical world operates (Macionis, 2012). To discover the knowledge and answers to questions pertaining to these universal laws requires a systematic method of investigation with measurable entities. This includes observation either through correlational or experimentation methods to explain predictions and causal relationships of phenomena being studied. As to what Comte asserts, true knowledge on human behaviours existed from sense and experience which can be obtained through observations. This assertion justifies the researcher's choice of philosophical stance in conducting this research.

5.3 Threats to Validity

Changes in behaviours may not only happen due to manipulation of interventions, but may also be explained by other factors which give wrong interpretation to research outcomes. Having such problem of different explanations to outcomes signals lack of internal validity. Therefore, it is important to control for these alternative explanations in order to make sure the changes occurred is solely due what has been given to participants during the experimental period, and not because of other factors.

5.3.1 Threats to Internal Validity

One common threat to internal validity is confounding variables. It happens in a situation where changes in outcomes was not due to the manipulated variable, but other variables related to it. Confounding variables acts like 'extra' independent variables, which can give hidden effect to the experiment outcomes. For example, changes in financial behaviour may not solely due to intervention effects but maybe due to other confounding factors such as income level, academic background, and peer influence. Another threat to low internal validity is group threat or selection bias. It happens when participants in one group (intervention) are different and do not have similar or equal characteristics with another group (control). Such differences may include participants with different physical abilities, demographic, and attitudes likes willingness to participate.

Randomized control trial (RCT) was conducted to control for these threats and to check if the intervention works. In RCT, subjects will be randomly assigned either to intervention or control

group. This reflects to the term ‘random assignment’ with the purpose to reduce assignment bias (or selection threat), by ensuring that subjects in one group have similar characteristics or equal with another group (Slavin, 2008). Subjects that received the interventions will be compared with control group in order to see the changes in outcomes. One important aspect that needs to be considered is homogeneity among participants, which minimizes susceptibility to these threats, and reduces the possibility of having floor effect in the data. Lewis-Beck et al. (2004) posited that floor effect occurs “when a measure possesses a distinct lower limit for potential responses, and that most of scores are near to this limit”.

Having to combine low variance with a lot of random errors contributes to poor internal consistency reliability as most of the subjects have a very low score on the measurement scale (De-Mars, 2011). Therefore, to check for homogeneity and to counter against confounding factors, participants with variety of demographic characteristics were considered and randomly assigned into groups. Such characteristics are participants’ level of income (not limited to low family income background), source of income (vary and not limited to participant with just one source of income), ethnicity (not limited to one ethnic) and parent’s field of occupation.

Another potential threat to internal validity related to intervention research is timing or maturation bias. Changes in behaviours might just happen as a consequence of development especially when the intervention participants are from young age group. When intervention period is too long, the element of maturation might blend in to the process and may improve certain targeted behaviours. For instance, if the study tests a student’s ability to understand basic financial management technique and takes more than a year to check for improvement, their understanding might have just improved, perhaps due to practice or experience involved in any business or money management activities. Therefore, to take maturation into account

and to control for interaction between subjects, the time taken to check for changes in outcomes (at post-test) was set to just two months after all interventions were delivered.

On a different note, research that involves comparing groups is often vulnerable to intervention or exposure biases. On common type is data contamination bias where participants in control group might unintentionally obtain or have the access to intervention. Having such threats could potentially minimize the outcome difference between the compared groups. To control for it, a briefing was given to all participants prior to starting of baseline survey pertaining to materials used for the experiment. All documents and other intervention materials are classified as confidential and cannot be shared with others during the experimental period. Instructions were also written in consent form, which requires participants to read and sign it prior to starting of the experiment. Additionally, recruitment of participants in this study involved a small percentage of samples (2.7%) from the total of 14,489 student population. The sample consists of students from different year of study, field of study and demographic background. Hence, reducing the chances of contamination to occur.

There is a possibility that experimenter bias will occur since interventions are fully delivered by the researcher. It happens when the experimenter unconsciously behaves in unacceptable or different ways to participants of all groups (Field and Hole, 2003, p.60). Having such unintentional bias can significantly affect the outcomes. Additionally, participants might have the tendency to change behaviour knowing that their behaviour are being measured. There is also a possibility that participants might want to have the experiment 'work' and try to 'please' the experimenter by giving answers that do not really reflect their true value or opinion. Such response bias (or social desirability bias) is often a common issue when obtaining self-assessed behaviour data. Having such discrepancy may not only give impact to validity of items being

measured, but also give different interpretations of research outcomes (Mazor et al., 2002; Sonderen et al., 2013).

To minimize the issue on response bias for this study, double-blind strategy was applied (Field and Hole, 2003, pg. 61) which involves both the experimenter and the participant being unaware of the experimental hypothesis and which condition the participant is in. Participants were not assigned into groups by their name, but by coding them into numbers according to their respective groups. From this design, the experimenter was not able to identify which group participants were assigned to. Since coding system is used, the same method is applied to participants where they were blinded to group assignment. The use of anonymous survey administration is another strategy to counter for social desirability bias in outcome measures (Nederhof, 1985), whereby though anonymity, participants' survey responses were not linked to them. Furthermore, the survey questions were arranged into a mixture of positive and negatively worded statements. The purpose was to correct for acquiescence response bias, which is the tendency of participants to be inattentive or not making efforts to read and understand the structure of the questions, therefore giving the type of response which is beyond the true value (Colosi, 2005; Drolet and Morrison, 2001). Chances of participants being inattentive is higher when every item of the questionnaire resembles each other, with a lengthy set of questions. Hence, it was suggested that reversing some items helps to reduce the risks of having inattentive response (see also Sonderen et al., 2013).

5.3.2 Threats to External Validity

A common issue related to external validity is whether the findings from the study is applicable and can be generalised to different group of subjects and settings. There are two threats to

external validity, namely population validity and ecological validity (Bracht and Glass, 1968; Field and Hole, 2003). Therefore, control for subject population and conditions of the experiment are required in order to confirm generalization and to reduce the possibility of having low external validity. One issue related to population validity is researcher's tendency to generalize the population of subjects that is available to them than to the targeted population. Bracht and Glass (1968) argued that the results of an experiment might apply only for those special sorts of person from whom the experimental subjects were selected and not for some larger population of people. One way to maximize generality for this study is to ensure the samples that represent the population do not have any specific or unique characteristics, and that they are standard university student with similar age range between 18 – 24 years old who represent the targeted population. Additionally, the use of representative sampling method (via stratified random sampling) helps to reduce threats to generality as participants involved in this study reflect the characteristics of the targeted population (Field and Hole, 2003).

5.4 Ethical Consideration

One important aspect that needs to be considered before undertaking research is securing ethical approval from the University. The main purpose of getting through the formal procedures is to ensure that the study would not harm those being researched and that participants are protected from potential risks that might incur (Thomas, 2013). The draft for ethics review was submitted to the Humanities and Social Sciences Ethical Review Committee, University of Birmingham on November 2017. There were several issues raised on procedures involved in conducting the study pertaining to experiment withdrawal timeframe, anonymity, confidentiality of data, and online data management platform. The issues were rectified and

sent back to ethics committee's attention. The study received its full ethical approval on 1st week of April 2018.

5.5 Research Design

In relation to research questions, it is crucial to have the research being designed appropriately. Research design as Thomas (2013) describes, works 'as a chassis that supports the research'. As the focus of this study is to look at causal effects of financial education interventions with behaviours and its impact over a period of time, therefore experimental design was adopted. Although it can be done using cross-sectional surveys, it is viewed as 'the weakest designs for causal evidence' (Bauman et al., 2002) given that cross-sectional studies dealt mostly with association between variables (sometimes referred as correlational study) and do not support causal references. An experimental design offers a great alternative in establishing causal relationships since it involves direct manipulation of variables (Field and Hole, 2003, p.10). What makes causal effects possible to detect is that one variable (independent variable) is being manipulated to observe its effect on another variable (outcome / dependent variable).

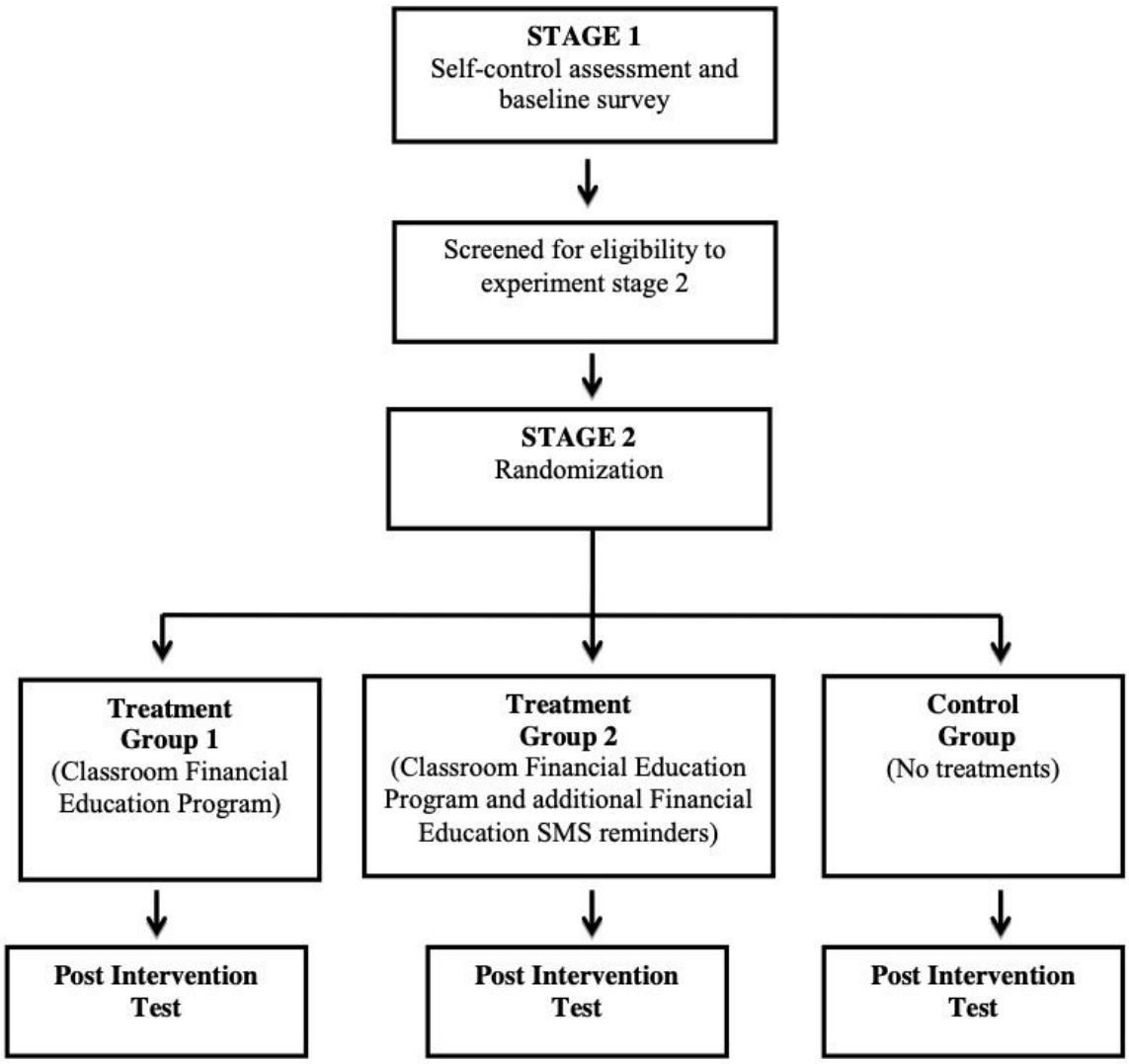
A pre-test / post-test control group experimental procedure was designed for this purpose, which involved three different groups; two experimental groups and a control group (see Figure 5.1). Using randomized control trial (RCT), participants were randomly assigned to any of the three conditions. Participants' behaviours were measured (at pre-test stage) prior to the intervention taking place. After the end of the intervention period, behaviours were re-measured (post-test) to check for any differences exist between the three groups, which signifies the effectiveness of the interventions. RCT is used in this research in order to counter issue on selection bias, which normally arises when participants are not a random sample of the whole population. Through RCT, it can compare the effectiveness of different interventions

by randomly assigning participants to different groups, whilst at the same time minimizing both known and unknown factors that may influence the possible outcome under investigation.

The experimental procedures for this study were designed in two stages. Stage 1 is a period for pre-test data collection, where baseline survey on financial literacy and financial behaviour was conducted. As the target participants for this study are low self-control young adults, the behavioural decision-making assessment was executed concurrently with the baseline survey. Stage 2 on the other hand, involved the selection of participants with low self-control score, randomization to groups and delivery of interventions.

There were two experimental groups that received interventions, namely intervention group 1 and intervention group 2. Intervention group 1 received only one intervention, which is financial education program using classroom method. Intervention group 2 on the other hand, received both classroom financial education program and financial education SMS reminders as additional interventions. Participants that did not receive any interventions on the other hand, were placed in control group. With this design, it is interesting to see to whom do the interventions work for. Could financial education interventions circumvent their behavioural constraint? Does having one dose of financial education program enough for participants to get the impact and change their knowledge and behaviours? Or do they need extra dose of education and be frequently reminded in order to have changes in behaviours? Or perhaps financial education program is not effective at all? To get the answers to these, post-intervention test was conducted two months after the completion of both interventions in order to check for differences between the three groups.

Figure 4.1: Pre-Test/Post Test Control Group Experimental Design
(Source: Authors research)



5.6 Informed Consent

Access to all primary data was obtained only after the study received consent from participants involved in the study. Before data was collected, all participants were given information sheet and consent form containing complete details about the study as well as the procedures involved. The details provided include background of the researcher, research aims, design of the research, risk, benefits and implications to participants should they decided to take part, confidentiality and anonymity, data protection as well as information on ethical clearance. The purpose of consent form is to get their agreement to participate in the study, after they have been given adequate time to read and understand the contents of the information sheet. Following the research design, these two forms were given to participants at two different stages and to different group of participants, listed as followings:

a) Stage 1 – baseline survey and behavioural decision-making assessment;
b) Stage 2 – group that receives one intervention (financial education program);
c) Stage 2 – group that receives two interventions (financial education program and SMS reminders);
d) Stage 2 – control group (did not receive any interventions).

For each stage and group, participants were asked to sign the consent form, and hand it over to the researcher on the day of the assessment. The information sheet however was given to participants to be kept by them for their reference (see Appendix 2-8).

5.7 Data Protection

As the data is possessed on behalf of the university, it was maintained and complied accordingly with The University of Birmingham Code of Practice for Research 2018. All electronic data was protected securely under the university's BEAR DataShare cloud storage platform, in which only the researcher and the two supervisors have access to it. All hardcopy data (questionnaires, consent form and other related documents) were safely kept in a locked container and only the investigator has access to the password. Data are to be preserved for at least 10 years and can only be used for research purposes. For data obtained using mobile phone device, the device was used using a separate mobile phone and newly registered phone number, which was only used for this the study. The use of separate mobile phone and numbers is to protect investigator's personal mobile phone data from being mixed up with data for the research, which could potentially interrupt the content and validity of the data.

5.8 Confidentiality

To respect the confidentiality of data given by participants, all information were secured and privately kept by the researcher. To maintain privacy, participants' real name was not used during the experimental period, but was only used for researcher's reference at the time the fieldwork was conducted. All names were coded into group category and number, based on their respective groups, for instance "FinEdu232" (intervention group 1), "FinEduSMS144 (intervention group 2), and "Control40" (control group). No real names or pictures with participants' front face were published, and all dataset were only used and published for academic purposes.

5.9 Sampling and Recruitment

The experimental units and the main targeted sampling frame are all students (of all years) of the Universiti Malaysia Sabah (UMS) located in Kota Kinabalu, the capital city of the state of Sabah, Malaysia. The rationale for choosing UMS as the main institution for this study was due to the fact that UMS is the main tertiary education institution in Sabah, with total student population of 14,489 grouped under 10 faculties ("UMS Enrolment Statistics", 2017). On an additional note, the researcher's employment link as full time academic with UMS provides the advantage in getting access to samples, which largely contributes to the effort in achieving the targeted sample size.

The definition of youth in Malaysia, based on Malaysian National Youth Development Policy is "individual age between 15 years and before reaching 40 years". However, for any kind of program implementation strategy and orientation of activities, the main focuses are among individual aged from 18 to 25 years. In line to this, the study is focusing on students aged between 18 and 24 years old, which is a standard age for university enrolment for undergraduate studies in Malaysia. The choice of university students was motivated by the fact that they will become the main thrust of human resources upon graduation and any financial decisions or problems during early stage of their life could bring negative impact on their individual life, family and career. Other than that, socio-economic challenges are part of the big challenges that the Malaysian youth groups are currently having to deal with, particularly the rise in cost of living, and personal financing (Malaysian Youth Index, 2015).

Given the behaviour of the population is unknown, the Slovin formula was used to determine the minimum number of samples required for stage 1 of the experiment. Before number of samples can be determined, the formula requires several figures on error of tolerance (which

also known as confidence interval), and number of population size. The formula is presented as below:

$$n = N / 1 + Ne^2$$

In which;

n = sample size

N = population size

e = error tolerance (margin of error)

The total population size is 14,489. Using a suggested 95% confidence interval (or 0.05 margin or error) the total sample size is calculated as following:

$$n = 14{,}489 / 1 + (14{,}489)\ (0.05)^{\ 2}$$

$$= 389 \text{ students}$$

Two sampling methods are used in this study, namely purposive and stratified random sampling method. It is purposive since the university students are the main targeted population and samples for this research. After calculating the minimum required number of samples (which is 389 students), stratified random sampling was used, with the 10 faculties at UMS as the strata (Table 4.1). Stratified is similar with quota sampling. The difference between quota and stratified random sampling is that once the sizes for each quota has been determined, we use convenience to fill the quota or use random sampling to fill the strata.

The number of samples for each faculty were done proportionally using the formula below:

$$ni = (NI / N)\ X\ n$$

In which;
ni = sample size of each faculty NI = total of sub-population
N = total of population
n = sample size

Table 4.1: Proportion of Targeted Samples for Behavioural Decision-Making Assessment (Experiment Stage 1)

Faculty	Total number of students	Percentage of total samples (x/14489)	Samples required from total 389
Faculty of Computing and Informatics	1,043	7.2%	28
Faculty of Engineering	1,141	7.9%	30
Faculty of Humanities, Arts and Heritage	2,635	18.2%	70
Faculty of Business, Economics and Accountancy	2,678	18.5%	71
Faculty of Psychology and Education	1,664	11.5%	45
Faculty of Food Science and Nutrition	732	5.1%	20
Faculty of Science and Natural Resources	2,125	14.7%	58
Faculty of Medicine and Health Science	444	3.1%	12
Labuan Faculty of International Finance	1660	11.5%	45
Faculty of Sustainable Agriculture	367	2.5%	10
Total	**14,489**	**100%**	**389**

5.9.1 Recruitment of Samples

Data collections were carried out right after the study received the approval from UMS and the university's ethics committee. Recruitment of participants was conducted two months in advance before data collection is carried out. An early and longer recruitment campaign period was needed for three reasons; 1) to raise awareness amongst the students about the research; 2) to acquire their willingness to participate in the research; and 3) to meet the targeted number of participants of the experiment. A poster of invitation to participate in the research was created and manually distributed to students within the campus area, covering several faculties, student accommodations, bus stops and lecture halls (Appendix 9). Besides that, recruitment

was also done via social media platforms, such as Whatsapp Messenger, Facebook, and Instagram. Students who responded from the poster campaign contacted the researcher through Whatsapp Messenger and e-mail to get more details about the research. A reply message was sent out by the researcher, which consists of participant information sheet, consent form, and a link to online registration form should they decide to participate. After they completed the online registration, another Whatsapp message / email was sent to the students stating that their registration has been received and that their participation has been confirmed. An online link to assessment booking slot was attached together, which requires them to choose and book assessment slots available that suits their time (Appendix 10).

However, one limitation of using public advertisement is the high chances of getting low response rate, which have the potential to interrupt the timeline and length of the study (Wise et al., 2016). This would give side effect on researcher's workload, costs and even worse, having the study to be prematurely terminated. Therefore, besides using poster method, and in attempt to increase participation rate, the study used mixed mode approach that includes recruitment using direct face-to-face contact. By employing this method, it has the potential to solve issues related to low response rate (Brambilla and Mckinley, 1987). Several lecturers from every faculty were randomly contacted to help disseminate information to their respective students, and also to seek permission to conduct the survey at their classroom. The participating classrooms were not limited to single field of study and same batch of students. Instead, they comprise of various faculties from both sciences and non-sciences fields, different student cohorts (ranging from first year to third year) and a mixture of demographic background. The purpose is to consider for homogeneity among participants, which very less likely to reduce the possibility of having floor effect bias.

5.10 Experimental Procedures

Prior to starting of assessment and baseline survey at stage 1, all participants were briefed about the nature and purpose of the study. Then, consent form was distributed which requires them to sign and indicate their agreement to participate. Participants were told that this is a force-free assessment and that they have the option not to sign the form and can leave the session should they decide not to participate. Additionally, they were told that recruitment to stage 2 is done based on random selection, and not from their self-control report. The reason to this is because there are possibilities that participants might find it disturbing if recruitment is made based on low self-control score which could lead to experimenter bias and that participants will have the tendency to give socially desirable answers during post-intervention test. Random selection was seen viable in this case, given the limited amount of funds and time to complete this study it is not possible to include everyone in the next stage of the study as it would involve much higher costs, and longer time period to complete.

Participants in stage 2 were selected based on median number of total individual mean scores, which was calculated and used as cut-off points in order to identify participants with low and high self-control scores. Participants that scored below the median point were invited to participate in stage 2 and randomly assigned either to intervention or control group. Participants with above median score on the other hand, were not called up, as they did not meet the criteria for stage 2.

5.10.1 Randomization to Groups

Randomization to groups were conducted using Research Randomizer, a free, open-source online software that helps to generate numbers and perform randomization. 3 sets of random numbers were generated (representing 3 sets of groups), with equal number of participants assigned to each set/group. The numbers generated were based on participants' code numbers (Appendix 11).

5.10.2 Invitation to Interventions

All participants in intervention group 1 and 2 were invited to receive the first intervention, which is a free 1-day financial education program. They were contacted using Whatsapp Messenger as it is the most widely and popular mobile phone apps being used among students to communicate on campus. The message was written in two languages, English and Bahasa Malaysia (Malay Language) consisting details about the program with poster, and a link to online registration form for participants to confirm their attendance (Appendix 12). Since participation is made on voluntary basis, several program benefits were offered in order to get their interest to join the program (Appendix 13). Shortly after the program ended, participants in intervention group 2 were asked to stay for briefing and sign the consent form should they agree to take part in receiving the second intervention (additional financial education SMS reminders). Additionally, they were given the option to withdraw from the exercise if they are not interested to take part, as it is purely voluntary. Delivery of SMS reminders started two weeks after financial education program ended and was completed in one month. Participants received the reminders twice every week (every Tuesday and Friday) with 10 different set of message contents. Further details on development of interventions are discussed in the next section.

5.11 Types of Interventions

For every experimental study that involves the use of interventions, Hoffmann (2014) suggested a clear and sufficient explanation for each item involved, which should include several key features such as duration, materials and processes, mode of delivery as well as monitoring. The purpose is to ensure that editors and readers would be able to understand, and use the information provided for replication for future studies. The descriptions of every intervention below are based on Hoffmann's (2014) TIDIeR checklist and guide, which helps to provide a clear description of interventions used in this study.

5.11.1 Financial Education Program

The first intervention is 1-day financial education program, which was conducted in classroom method and delivered to participants in intervention groups. The content of financial education program was designed based on several popular choices of basic financial topics for university students, such as money management and budgeting, and saving money (Grable et al., 2012). Other than that, topics related to Risk and Return as well as Time Value of Money were also included in the module. These two important topics are normally included as part of syllabus content of financial management course taught in most universities. Additionally, these topics are also part of items measurement of financial literacy questions adopted from Lusardi et al. (2010) and Atkinson and Messy (2012). Therefore, it is important to ensure that the development of the financial education module is closely linked with questions that will be asked at the pre-test (baseline survey) and post-test. Most contents of the topics were adapted from Calderone et al. (2013, 2014), The Money Advice Service and Malaysian Credit Counselling and Debt Management Agency (AKPK) financial education module for university students. Detailed description on the content of the program is as listed in Table 4.2.

The program was held at one of the lecture halls on campus from 8.30 am to 5 pm and was divided into four segments with different topics. Time allocated for each segment was 1 hour and 30 minutes. The session starts with an introductory session about issues related to personal financial management activities and purpose of the program being conducted. There were three main lessons covered during the whole day of the program. Lesson 1 highlights topics related to savings and investment, lesson 2 on inflation and time value of money, and lesson 3 discusses strategies and tips on developing financial goals and budgeting. Each lesson involves two ways communication between participants and speaker, and video presentations. This is to ensure the delivery of intervention is interesting and effective. All participants received the same contents and were allowed to take notes for their own reference. The session was fully delivered by the researcher, given the facts the researcher has suitable academic qualification in the field of finance, and also the researcher's role as member of academia in teaching, conducting research and consultation in financial management and investments.

Table 4.2: Contents of Financial Education Program

Topics	Topic Descriptions	Source	Methodology
Saving and Investment	• Importance of regular saving • Differences between savings and investments • Importance of saving account and different avenue of saving • Different avenues of investment	Calderone et. al. (2013), AKPK Malaysia, UK Money Service Advice	Video, Lecture & Discussions Video: Savings tips (AKPK)
Financial Planning and Budgeting	• Keeping track income and expenses • Creation of personal budget and its categories • Allocation of income among budget categories	Calderone et. al. (2013), AKPK Malaysia, UK Money Service Advice	Video, Lecture & Discussions
Risk and Return	• The concept of risk and return • Portfolio diversification	Petty et. al. (2015)	Video, Lecture & Discussions
Time Value of Money	• Concept of Inflation • Interest rates • Compounding and future value • Discounting and present value	Petty et. al. (2015)	Video, Lecture & Discussions

5.11.2 SMS Reminders

The second intervention is financial education SMS reminders, which complements the delivery of financial education program (Table 4.3). The purpose is to check its role as additional intervention in nudging good financial conduct and improve financial behaviours of participants. This additional intervention intends to remind participants to determine savings priorities and achieve desired financial goals. Participants received 10 SMS reminders that contain messages on developing good financial conducts. Instead of sending it once every week, the SMS reminders was sent twice a week for a period of 1 month (or 4 weeks), shortly after the delivery of classroom financial education program. According to Karlan (2016), sending on-going messaging is more likely to result in behaviour change instead of just giving one time encouragement. Additionally, sending frequent reminders has proven to be effective in improving savings habit (Rodriguez and Saavedra, 2015) and beneficial for charities (Karlan, 2015). All messages were sent over via the standard mobile messaging system as per scheduled dates. For participants who have problems with mobile phones, or are in locations that do not receive sufficiently strong network signals, the reminder messages were sent over to them on the second and third days. The contents of SMS reminders consist of several financial education topics which functions as reminder to develop good financial behaviour practices. Adopted from Rodriguez and Saavedra (2015), the topics cover general areas in financial management including savings, budgeting, and money management. It was originally used by Rodriguez and Saavedra (2015) to deliver financial education via SMS messages but they found the intervention does not increase savings among the youth in Colombia. For this research, similar content was treated as additional intervention to financial education and functions as ‘reminders’ on practicing good financial behaviour among low self-control participants, which is not offered by most prior studies.

Table 4.3: Contents of SMS Reminders

No.	Financial Education SMS Reminders	Rationale
1	*'Every Ringgit counts. Even if you save a small amount each day, it adds up at the end of the month. You can save more than what you think!'*	Encouraging savings even starting from small amount.
2	*'List your expenses as needs or wants. Food is a need, but candy is a want. Cut some of the wants to reach your goal'*	Differentiating the needs and wants.
3	*'Resist pressure to spend. Your friends may buy things now, but you are saving for more later. When tempted, picture your savings goal in your mind'*	Resisting temptation to spend.
4	*'Start a savings trend. Your friends need to save too, even they don't admit it. Think of free activities you can do together so you all can save money'*	Encouraging savings when surrounded with social
5	*'Find out where your money goes. Track how much you spend on everything for 1 week by writing it down each day. See what you can cut your spending'*	Tracking expenses
6	*'Spend less than you receive. Calculate how much money you receive in 1 week. If you spend more than you take in, cut your spending and save instead'*	One important component of budgeting is identifying amount of income receive so that they will be able to monitor spending and savings pattern
7	*'Stay one step ahead. Plan how much you will spend this week and stick to your limit. You can do it!'*	Budgeting
8	*'You are first. When you receive money, deposit some in your account for your goal first before you start spending. It's much easier to save that way'*	Prioritize savings as the first step before start spending money
9	*'Think ahead. What things can help or hurt as you try to meet your savings goal? Make the right choices to achieve your goal safely and responsibly'*	Goal setting
10	*'Make savings a habit. Don't stop saving after you reach one goal. Achieving one goal will help lead you to new goals. Our dreams are endless. Good luck!'*	Savings

5.12 Development of Questionnaire

The targeted outcomes of the study are participants' financial literacy and financial behaviours. The instrument for assessing financial literacy consists of 26 items, arranged into three dimensions namely financial numeracy, financial knowledge and financial attitudes. The questionnaire was developed into 5 sections. The first two sections consist of participants' basic demographic and financial services information. Section 3, 4 and 5 measure self-control, financial behaviours and financial literacy. It was used at baseline stage (pre-test) to collect participants' initial behaviour data before being measured again two months after intervention period using the same set of questionnaires. In order to ensure participants' understanding in answering the questions, the questionnaires were written in two languages, English and Bahasa Malaysia (Malay language). The purpose of using bilingual questionnaires was also to consider the ability of participants that come from different academic and geographical background with different levels of proficiency in English language.

5.12.1 Survey Instrument for Measuring Self-Control

The first set of the questionnaire measures participants' self-control behaviours. A total of 17 items that measure participants' self-control behaviour was developed using ordinal scales. The measurements were adopted from various sources, which cover several important facets of self-control. 12 items of Tangney's (2004) Brief Self Control Scale were adopted to measure self-control, in which the initial purpose of the measurement was to understand how self-control predicts consumer behaviours. Its central focus was on people's ability to override inner response and avoid undesired behavioural tendencies. Individuals that have good control over resisting temptation, impulsive actions, unhealthy habits, work ethics and self-discipline reflect their ability to control themselves, hence would have high self-control.

The scale consists of general measure of self-control, and has been widely used in measuring self-control and its impact across various financial domains such as household financial management (Miotto and Parente, 2015), compulsive buying and debts (Achtziger et. al., 2015), financial behaviour and financial well-being (Stromback et. al., 2017). Other than general behaviours, two items that highlight individual's behaviour in relation to financial choices were adopted from Gathergood (2012) labelled as impulsiveness and heavy discounter. The two behaviours were included as both fall within the concepts of time discounting and financial sophistication, which could potentially affect individual's financial behaviours. Three other similar items with high present-time preference were adopted from Antonides et. al.'s (2011) Short-Term Future Orientation Scale. It is the adaptation of Strathman et. al's (1993) 12-items of Consideration of Future Consequences (CFC) construct that measures individual differences in considering distant versus immediate consequences of potential behaviours. The time-orientation scale was adapted to relate future time orientation with mental budgeting, which is a self-control device for lower income households (Antonides et. al., 2011).

Likert scale was used as all the items measure attitude and belief on self-control (Thomas, 2017), which requires participants to indicate their level of agreement to each of the statements. Since the first objective of the study is to identify participants with higher low- self-control score, a specific response is required and a four-scale with no 'neither agree nor disagree' type of answers is the best option. Additionally, a four-point scale helps in minimizing social desirability bias when the neutral option is eliminated (Garland, 1991) and remove the tendency for some people to over-choose the middle option (Thomas, 2017). All the 17 low self-control items were assessed using 4-points Likert scale anchored by "1" (Strongly Disagree), "2" (Disagree), "3" (Agree) and "4" (Strongly Agree). Table 4.4 presents the questions as follows:

Table 4.4: Item Measurement of Self-Control

No	Question	Source	Measurement Category
1	*I am good at resisting temptations.*	Tangney (2004)	General
2	*I have a hard time breaking bad habits.*	Tangney (2004)	General
3	*I am lazy.*	Tangney (2004)	General
4	*I do certain things that are bad for me, if they are fun.*	Tangney (2004)	General
5	*I refuse things that are bad for me.*	Tangney (2004)	General
6	*I wish I had more self-discipline.*	Tangney (2004)	General
7	*People said that I have iron discipline.*	Tangney (2004)	General
8	*Pleasure and fun sometime keep me from getting work done.*	Tangney (2004)	General
9	*I have trouble concentrating.*	Tangney (2004)	General
10	*I am able to work effectively toward long-term goals.*	Tangney (2004)	General
11	*Sometimes I can't stop myself from doing something, even if I know it is wrong.*	Tangney (2004)	General
12	*I often act without thinking through all the alternatives.*	Tangney (2004)	General
13	*I am impulsive and tend to buy things even when I can't really afford them.*	Gathergood (2012)	Impulsiveness
14	*I am prepared to spend now and let the future take care of itself.*	Gathergood (2012)	Heavy Discounting
15	*I live more for the day of today than for the day of tomorrow.*	Antonides (2011)	Time Preference
16	*My convenience plays an important role in the decision-making.*	Antonides (2011)	Time Preference
17	*I only focus on short-term.*	Antonides (2011)	Time Preference

5.12.2 Survey Instrument for Assessing Level of Financial Literacy

There were 17 items used to assess participants' financial literacy level, which was arranged into two dimensions namely financial numeracy, financial knowledge. The design captured two important aspects of financial literacy, which are knowledge and application (Huston, 2010) that serve to provide better hindsight on the effectiveness of financial education in enhancing individuals' financial well-being. All questions were adopted from the work of various academic scholars in financial literacy and consumer studies (Lusardi et. al., 2010; Atkinson and Messy, 2012; Lusardi and Scheresberg, 2013; Gerrans and Heaney, 2016; Louviere et. al., 2016) and have been widely tested on various households' economic outcomes among different countries and populations.

Question 1-6 of the survey tested participants' basic numeracy and cognitive ability in applying financial knowledge to make financial decisions. Numeracy questions is an integral part of financial literacy as according to Huston (2010), individual must not only understand the knowledge, but also be able to apply it appropriately. Participants were asked to provide the correct answer for question relating to three fundamental financial concepts – inflation, loans and calculation of interest rates, which mostly involve basic mathematical calculations. Table 4.5 presents the questions as follows:

Table 4.5: Items Measurement of Financial Numeracy

No.	Question	Source	Measurement category
	Imagine that five brothers are given a gift of RM1, 000. If the brothers have to share the money equally how much does each one get? [ ] More than RM200 [√] Exactly RM200 [ ] Less than RM200 [ ] Do not know	Atkinson and Messy (2012)	Division
2	Imagine that you get a gift of RM1, 000, and you put it in the drawer at home for 12 months. After one year how much could you buy for this money? [ ] More [ ] The same amount [√] Less than they could buy today [ ] Do not know		Inflation Rate
3	You lend RM50 to a friend one evening and he gives you RM50 back the next day. How much interest has he paid on this loan? [ ] RM20 [ ] RM30 [√] None [ ] Do not know	Atkinson and Messy (2012)	Interest Rate
4	Suppose you put RM100 into a saving account with a guaranteed interest rate of 2% per year. You don't make any further payments into this account and you don't withdraw any money. How much would be in the account at the end of the first year, once the interest payment is made? [ ] RM100 [ ] RM120 [√] RM102 [ ] Do not know	Lusardi *et. al.* (2010); Atkinson and Messy (2012)	Calculation of Interest Rate plus Principle
	And how much would be in the account at the end of five years? Would it be: [√] More than RM110 [ ] Exactly RM110 [ ] Less than RM110 [ ] Do not know	Atkinson and Messy (2012); Gerrans and Heaney (2016)	Compound Interest Rate
6	Suppose you owe RM3,000 on your credit card. You pay a minimum payment of RM30 each month. If the annual percentage rate is 12% (or 1% per month), how many years would it take you to eliminate your credit card debt if you made no additional new charges? [ ] Less than a year [ ] Between 5 and 10 years [ ] Between 10 and 15 years [√] The debt is never repaid	Louviere *et. al.* (2016)	Loan

Question 7-17 on the other hand, aim at measuring participants' understanding basic financial concepts, where the focus is more towards knowledge on financial words, symbols and operations. Since the purpose is to test participants' familiarity with financial concepts, no mathematical calculations were involved for this part, although some questions could be guided by mathematical intuition. The measurement of financial knowledge consists of 11-items, more than numeracy questions (6-items) considering the importance of focusing more on information directly related to successfully navigating individuals' personal finances (Huston, 2010). The questions are listed in Table 4.6 below:

Table 4.6: Items Measurement of Financial Knowledge

No.	Question	Source	Measurement category
7	An investment with a high return is likely to be high risk. [√] True [ ] False [ ] Do not know	Atkinson and Messy (2012)	Risk and Return & Investment
8	Normally, which of these assets exhibits the highest fluctuations over time? [ ] Savings accounts [√] Stocks [ ] Bonds		
9	If an investor spreads their money among different assets, the risk of losing a lot of money… [ ] Increase [√] Decrease [ ] Stay the same	Louviere *et. al.* (2016)	Risk and Return & Investment
10	It is usually possible to reduce the risk of investing in the stock market by buying a wide range of stocks and shares. [√] True [ ] False [ ] Do not know	Atkinson and Messy (2012)	Diversification & Risk and Return

11	"Buying a single company's stock usually provides a safer return than a stock mutual fund." - Is this a true or false statement? [ ] True [√] False [ ] Do not know		
12	Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account? [ ] More than today [ ] Exactly the same [√] Less than today [ ] Do not know		
13	High inflation means that the cost of living is increasing rapidly. [√] True [ ] False [ ] Do not know	Atkinson and Messy (2012)	Inflation
14	Assume a friend inherits RM10,000 today and his brother inherits RM10,000 three years from now. Who inherits more? [√] My friend [ ] His brother [ ] Exactly the same [ ] Do not know	Gerrans and Heaney (2016)	Time Value of Money & Inflation
15	A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan is less. [√] True [ ] False [ ] Do not know [ ] Refuse to answer	Louviere *et. al.* (2016)	Loan
16	Suppose you want to make a RM1,000 purchase with your credit card. The retailer tells you that you will be charged an extra 2% fee for using your credit card. Your sister buys the same item in the shop next door for RM1,000. She is charged a flat rate RM15 fee for using her credit card. Who paid a higher credit card fee? [√] You [ ] Your sister [ ] Do not know	Louviere *et. al.* (2016)	Loan
17	Suppose you have RM10,000 of your own money available to invest in a savings or investment. Which one of the following saving or investment offers would appeal to you most? [ ] A guaranteed return of RM12,000 in 5 years (capital plus interest)	Louviere *et. al.* (2016)	Investment

	[ ] A 5-year investment with an expected return in the range of RM0 – RM100,000 [ ] A 5-year investment with an expected return in the range RM8,000 to RM14,000		

5.12.3 Survey Instrument for Assessing Self-Reported Financial Attitudes

Subsequently, 10 questions were used to measure participants perceived financial attitudes towards money management, budgeting and planning ahead, within the context of three financial behaviours discussed in this study. The questions were adopted from existing scales of Godwin & Carroll (1986) and Godwin (1994) that measure the impact of financial attitudes on financial management and behaviour. The items were also used as part of measurements of financial attitudes in examining the levels of financial capability in the UK (Kempson and Collard, 2006; Atkinson et. al., 2007). The questions required participants to indicate the extent to which they agree with the statements of each question, using a 5- point Likert scale (1= strongly disagree, 2= disagree, 3= neither agree nor disagree, 4= agree, 5= strongly agree). Two item consist of negatively worded question, which are 'saving is not really important' and 'I prefer to buy things on credit rather than wait and save up'. Table 4.7 below presents the 10-items of financial attitudes:

Table 4.7: Items Measurement of Financial Attitudes

No.	Question	Source	Measurement category
1	I am very organized when it comes to managing my money every day.	Atkinson et. al. (2006)	Managing money
2	I am more of a saver than a spender.	Atkinson et. al. (2006, 2007)	Managing money
3	I prefer to buy things on credit rather than wait and save up.	Atkinson et. al. (2006, 2007)	Managing money (spending)
4	Saving is not really important.	Godwind and Carroll (1986); Atkinson et. al. (2006)	Saving
5	I would rather cut back than put everyday spending on a credit card I could not repay.	Atkinson et. al. (2006)	Managing money
6	A written budget is absolutely essential for a successful financial management.	Godwind and Carroll (1986); Atkinson (2006)	Budgeting
7	I believe budgeting is helpful.	Carpena et. al. (2007)	Budgeting
8	Planning for spending money is essential for successfully managing one's life.	Godwind (1994)	Planning ahead (spending)
9	I always make sure I have money saved for rainy days.	Kempson and Collard (2006); Atkinson et. al. (2007)	Planning ahead (saving)
10	It is important to have some money saved in case my life changes dramatically.	Kempson and Collard (2006)	Planning ahead (saving)

5.12.4 Survey Instrument for Assessing Self-Reported Financial Behaviours

Financial behaviours can be related to various kind of financial practices, which includes cash, credit and savings management (Hilgert et. al., 2003; Xiao 2006, 2009). In general, financial behaviour is defined as activities relating to money management (Xiao, 2008) and partly contributing to outcomes. For the purpose of this study, participants' financial behaviours were measured by three behavioural categories, namely savings management, money management and budgeting. Although there are varieties of financial management practices, these categories were often used in measuring financial behaviours within the context of college students (Xiao, 2009; Gutter et. al., 2010; Gutter el. al., 2011). According to Joo (2008), financial behaviours can be measured either in objective (measured in amount of income saved, or assets) or subjective (measured in terms of satisfaction) manner. This study used a self-reported financial behaviour with subjective measure considering that the nature of participants' role as student where they do not earn regular salary as an employed worker, and yet to own any assets. Hence, not a suitable option for objective measures. Additionally, the use of self-reported approach is very much convenient as opposed to observations as it requires less effort in terms of time and money, and can be used to acquire information on specific context and targets (Xiao, 2008).

All items used to measure financial behaviours were drawn from various academic resources with its validity and reliability has been previously tested (Atkinson, 2006; Xiao et. al., 2009; Dew and Xiao, 2011; Kempson et. al., 2013). Four items were drawn from the Financial Management Behaviour Scale (FMBS) developed by Dew and Xiao (2011) to measure money management. These four items represent individuals' money management behaviours from the perspectives of product purchase, paying bills, keeping records and spending within budget. Although a few of the subscales require refinement, the FMBS is suggested to be reliable and valid measure of financial management behaviours (Dew and Xiao, 2011).

Meanwhile, the three items used to measure savings management were described by several sets of single acts and contains four essential elements that define financial behaviours: action, target, context and time (Ajzen and Fishbein, 1980 cited in Xiao, 2008). For instance, the single act of savings management was described as ‘save money for rainy days, ‘set aside money each month for savings’ and ‘begin saving well in advance for big events. These single acts of savings represent savings behaviour from three different actions, context and target – saving for emergency use (or rainy days), saving money regularly, and saving for future use.

Budgeting behaviours were measured in two dimensions using Kempson et al. (2013)’s dimension and was adapted to suit our participants’ understanding and context. The two questions “‘I make a monthly budget” and “I am able to stick to the budget” were used to reflect participants’ behaviour and action to construct and monitor their personal budgeting plan. To deal with social desirability bias in outcome measures, three items were randomly chosen and reversed to negatively worded statements with an opposite meaning to the original. The three items involved were those that measured money management activities. Since financial behaviours consist of both positive and negatively worded items, the sequence of questions was randomly arranged to avoid participants from noticing the changes from the statements. The results were then being compared to check if participants were really making an effort to read, understand and answer the questions. Detailed measurements of financial behaviours are listed in Table 4.8 below:

Table 4.8: Items Measurement of Financial Behaviours

No.	Question	Source	Measurement category
1	I save money for rainy days.	Xiao *et. al.* (2009)	Saving (emergency)
2	I set aside money each month for saving.	Xiao *et. al.* (2009)	Saving (regular)
3	I begin saving well in advance for big events, such as Hari Raya Aidilfitri, Christmas etc.	Kempson *et. al.* (2013)	Saving (future use)
4	I compare to every shop when purchasing a product or services.	Dew and Xiao (2011)	Money management (product purchase)
5	I pay all my bills on time.	Dew and Xiao (2009)	Money management (paying bills)
6	I stay within my spending plan.	Dew and Xiao (2009)	Money management (spend within budget)
7	I keep a written or electronic record of my monthly expenses.	Atkinson et. al. (2006); Dew and Xiao (2009)	Money management (keeping records)
8	I make a monthly budget.	Kempson *et. al.* (2013)	Budgeting (attempt)
9	I am able to stick to the budget.	Kempson *et. al.* (2013)	Budgeting (monitor)
10	I just 'grab and pay' every time when purchasing a product without making any survey on pricing.		Money management (reverse)
11	I have problem to stick with my monthly spending plan.		Money management (reverse)
12	I have trouble paying my bills every time when its due.		Money management (reverse)

5.13 Instrument Pretesting

All measurement items were firstly evaluated for its reliability and validity prior to data collection was conducted. The purpose is to ensure that the instruments are measuring what it supposed to measure (Lai, 2013). Although the items have been validated elsewhere from past research, the process does not have any absolute values (Howard, 2018) as it was previously conducted in different context. For this purpose, pretesting of instruments was conducted beforehand, which was aimed at identifying issues that might contribute to misinterpretation of items, context effects, and also to check for appropriate length of questions and time for participants to take the survey (Collins, 2013). Following Reynolds et al. (1993), the process focused on two main areas; assessing items on individual questions and the questionnaire design itself. The individual items were assessed based on its difficulty level, clarity of language and wordings, and consistency of statements. The focus on assessing the design of the questionnaire on the other hand, was on length and sequence of the questions.

The instruments were pretested using mail self-reports method, which involved four assessors from different universities in Malaysia. The assessors were appointed based on their academic designations (which mostly are Associate Professor and senior lecturers) and also research interests within finance and social sciences field. Besides their qualifications, the use of local expertise was needed in order to check for consistency of meanings from the language translation of the questions. The questionnaire and feedback form were sent to the assessors individually and collected back via e-mail.

Most of the panel agreed that the question's difficulty level is fairly suitable for the research purposes. The choices of answers are compatible with respondents' experience in the matter. Additionally, none of the items generate response bias, they felt comfortable answering the questionnaires and most of the wordings of the survey are clear. Nonetheless, there is a concern

on the length of financial literacy and financial behaviours questions, which some of the items require respondents to think too hard before responding. The scale points for literacy and behaviours were different and not consistent and were suggested to be standardized at same level. Some items were removed particularly that involved double barrel (or double-direct) questions, which could further create confusion to the respondents. Oother deleted items were on different risk and return perception, in which the answer could be vary across different participants, thus not relevant to be tested for the study. The scale for financial literacy and financial behaviours were both standardized and adjusted at 5 points Likert-scale to ensure consistency in the data analyses.

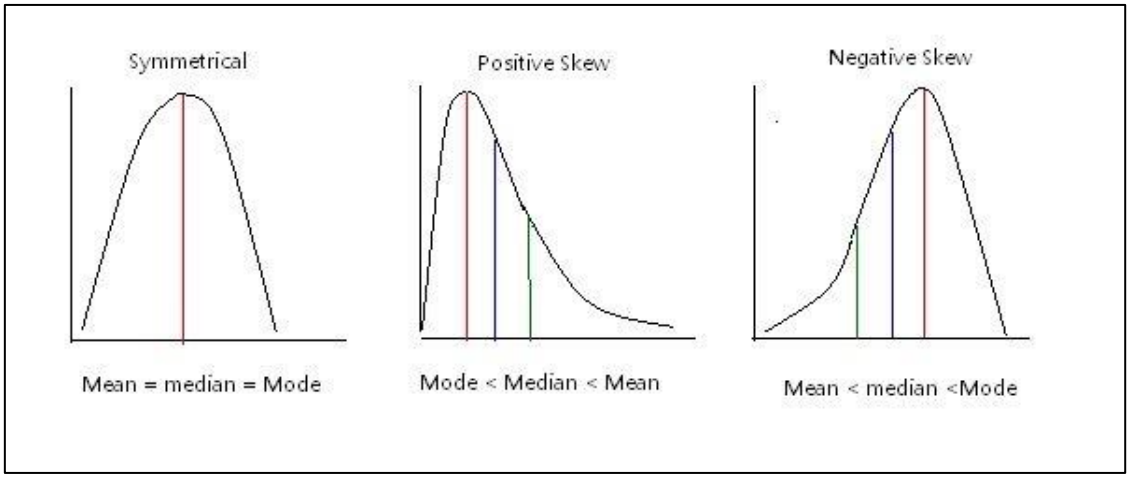
5.14 Data Analysis

Analyses of data were performed using the Statistical Package for Social Sciences (SPSS) version 23 computer software. Initially, there were two options of statistical procedures that can be used to analyze the dataset; either parametric or non-parametric statistics. However, the use of any of these procedures can only be applied after several assumptions have been met. Parametric tests rely on the assumptions that the data are normally distributed (or sometimes known as symmetrical distribution) with large number of sample sizes. Additionally, it only works on arithmetic mean, and to make the mean value meaningful, it requires the use of interval or ratio level of data measurement. Examples of commonly used parametric tests include Independent-Samples T Test, Paired-Samples T Test and One-way ANOVA.

On a contrary, non-parametric test do not make assumptions about normality of the dataset, hence the reason to why sometimes it is referred to as ``distribution free" tests (Field and Hole, 2002, p.234). For this case, the shapes of data distribution are not normally distributed (or

sometimes known as asymmetrical distribution) and they are either positively skewed or negatively skewed (Figure XX). One reason to this is when the dependent variable (or outcome measures) is measured using nominal or ordinal scale. This is due to the fact that data analyses are not carried out using the raw scores, but instead they are ranked. The basic idea of ranking is that you find the lowest score and give it a rank of 1, then find the next highest score and give it a rank of 2, and so on. While parametric analysis focuses on the difference in the means of the groups to be compared, non-parametric analysis focuses on the rank, thereby putting more emphasis differences of the median values than the mean (Nahm, 2016). Another factor contributes to asymmetrical distribution is when the dataset has definite number of outliers. As shown in Figure XX above, when distributions are symmetrical, the mean, median and mode coincide at the peak. When data are skewed or there are outliers, means may not represent typical values, as they will be located away from the peak of the distribution towards the outlying values. Hence for skewed distributions, the median may be a better value of the average. Amongst the commonly used non-parametric tests include The Kruskal-Wallis Test, The Mann-Whitney Test, Friedman's ANOVA, and The Wilcoxon Signed-Rank Test.

Example of Normal and Skewed Distribution



5.14.1 Choice of Statistical Analysis

For this study, non-parametric tests were performed since the characteristics of the present data did not meet the assumptions for a parametric test. The dependent variables were measured at ordinal (namely financial attitudes and financial behaviors) and nominal level (namely financial literacy), in which the data were not normally distributed. Besides low number of participants involved and completed the experiment (which is less than 200 sample), the existence of several mild outliers in the dataset was among the reasons of the skewed distributions of data (details of the analyses is discussed in Chapter 6).

The aim of this randomized control study was to examine the effectiveness and impacts of financial education programs towards the level of financial literacy, attitudes and behaviors. Hence, a one-way ANOVA using Kruskal-Wallis test was chosen as the preferred procedure as it allows comparing difference in outcomes of more than two groups under different conditions. Another point that meets the assumption of conducting the test was that the observations between the three groups are independent and they are not related to one another due to random allocation of participants in different groups (Field and Hole, 2002; Vargha and Delaney, 1998).

One limitation of conducting the Kruskal-Wallis test was that it tells the existence of difference in outcomes between groups, but does not tell which groups the difference lies (Field and Hole, 2002). Therefore, in order to know exactly to which groups does the intervention work for, a post-hoc analysis using the Mann-Whitney test was performed. However, the issue with conducting this test was the chance of building up a Type 1 errors, which is a "false positive" conclusion of saying there is an effect of intervention occurred when there is not (Field and Hole, 2002). To control for inflation in Type 1 errors, an adjustment to p-values was made

using Bonferroni Correction when multiple pair wise tests were performed on a single set of data (Napierala, 2012). To do this, the critical p-value (or α-value) was divided with the number of comparisons being made. The α-value in this study (which also typically used in social science research) was 5 percent with three groups were being compared, which gives a new α-value of 0.016 (0.05/3).

Other than that, Tomczak (2014) argued that reporting the p-value alone to confirm the existence of difference between groups is inadequate, as the computation highly depends on standard errors (SE). Since the amount of sample size has the connection with standard error, any increase or reduction in samples would also give effect to the p-value (Tomczak, 2014). A significant result might be due to higher sample size, but it does not tell the strength of relationship of the variables that were being tested, as well as the true meaning of the observed results. Therefore, for this research which involved only small sample size, adding a report on effect size seems to be beneficial, as it reports the size of the difference of the observed variables, which can be said as true measure of significance of the difference (Coe, 2002) and serve as indicator of future expectations of research results (Tomczak, 2014). Additionally, for interpreting quantitative reports, results on statistical significance (p-values) and substantive significance (effect size) are essential and needs to be reported (Sullivan *et.al.*, 2012). Following Cohen (1969) and Glass (1981), the measure of effect sizes between groups is classified as small (0.2), medium (0.5) and large (>0.8). The effect size for non-parametric test was calculated using Mann-Whitney U effect size calculation procedure using the formula as follows (Tomczak, 2014; Field and Hole, 2002):

$$\mathbf{r}_{\text{(intervention – control)}} = \frac{\mathbf{Z}}{\sqrt{\mathbf{n}}}$$

Where:

r : correlation coefficient where r assumes the value ranging from -1.00 to 1.00

Z : standardized value for the *U*-value (or the Z-score)

$\sqrt{n}$: square root of n (the total number of observations on which Z is based)

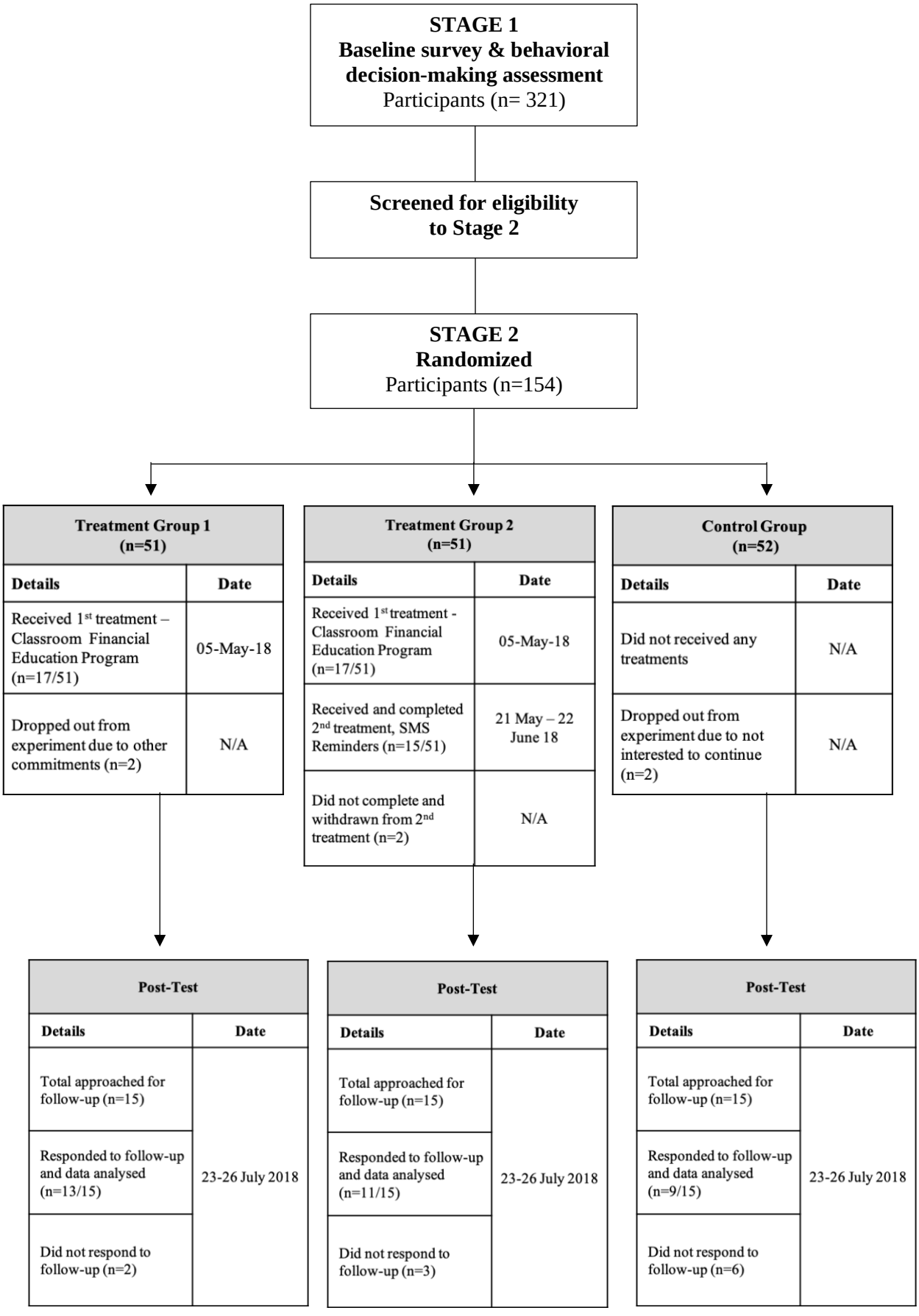
5.14.2 The use of median and mean rank values

As the distributions of data are not normally distributed in non-parametric test, it suggests that the median and mean values are not equal to one another. For example, mean value can be more than median if it is positively skewed which means it do not represent typical values and therefore, cannot be used to represent the value of the average. Therefore, for this study, the median was used to represent the value of the average, given the fact that in ordinal scales, differences between the measured values are not interpretable. The mean value obtained from ordinal data are not the same with continuous data, because it is not analysed based on raw scores. Therefore, it cannot be interpreted in the same sense as the means of observations measured on a continuous scale (Shah and Madden, 2003). The median value is not the only indicator being used to compare differences between groups. Sometimes, there are cases where the median values are identical but a statistically significant difference occurred between the groups (Hart, 2011). The data used for non-parametric analyses are based on original order of the values (or rank) and not based on raw scores. Therefore, the mean rank values obtained from the analysis were used to explain significant differences in the ranked position of scores of the groups involved. It tells us the average and total ranks in each condition (Field and Hole, 2003). As the scores are ranked from lowest to highest, the group with lower mean rank will have more lower scores in it than the group with the highest mean rank. Therefore, the mean rank values tell us which group had the lowest and highest scores.

5.15 Pilot Test

There were two fieldworks undertaken in order to obtain data for this study. The first fieldwork was for pilot purposes, whilst the second fieldwork was for mainstage data. The rationale for conducting pilot test was to ensure the instruments are 'fit' for real study especially for large-scale research, and to check if the recruitment methods are effective. By conducting pilot test, it helps in identifying issues pertaining to the design, increase internal validity of instruments and alarm the researcher on issues that need to be improved (Van Teijlingen *et. al.*, 2001). As the study employs experimental design, pilot study provides preliminary evidence on the efficacy of the interventions and helps to assess feasibility of the study in four aspects; process in recruiting participants, resource capacity, intervention delivery protocol and issues related to human and data management. Hence, discussion of pilot study in this chapter is limited to recruitment and intervention delivery process and issues raised during the study period. Analysis of reliability test and outcomes from the study is available in Chapter 6. Pilot test was conducted between mid April until May 2018 after the study received full ethical approval. A total of 321 students involved in stage 1 survey, with 154 participants scored below median point of self-control score and were invited to participate in stage 2. Although invitation to attend one-day financial education program was sent to participants in both intervention groups, only 34 attended (in total), giving to a low response rate of 33%. Delivery of second intervention (SMS reminders) started two weeks after financial education program ended, and were completed in one month. Post-intervention test was conducted at the end of July 2018, two months after the end of intervention period using online survey. A total of 6 participants dropped out from the study whilst 11 participants did not respond to invitation to post-intervention test. Hence giving a total of 33 participants (21%) involved in the study until the end. The figure below provides the diagram of pilot randomized trials. The diagram was developed from Montgomery *et. al.*'s (2018) CONSORT-SPI 2018 flow diagram.

Flow Diagram of Pilot Randomized Trial
(source: author)



5.15.1 Issues during Pilot Test

The process during pilot test period is not without limitations. The first issue identified was getting commitment from participants to attend financial education program. Participants who did not attend the program were tied up with other commitments, such as lectures, and fieldworks which contributes to the low participation rate. After running some investigations, it was found that the intervention session was scheduled during week 10 of the semester, whereby most students were busy meeting deadlines for assignments and dissertations submission, out for fieldworks and final examination preparation. Another reason to the low attendance was due to frequency of the session offered, which was only conducted once, hence lowering the chance of those who are interested to participate but could not make it due to other priorities. A significant number of participants who did not respond to post-test invitation and dropped out from the study worsened the problem, which potentially reduces the representativeness of the sample participating in the study (Hoerger, 2010). In particular, as participant dropout increases, the sample completing the study potentially becomes less representative of the recruited population, de- creasing the generalizability of the results of the study (Hoerger, 2010).

The initial plan for collecting data (both at pre and post-test) was using online survey method as it offers great advantages in terms of costs, time and access to groups or individuals (Wright, 2005). However, the method was found to be impractical given the limitation on network connection and IT facilities around campus, especially when involving large number of students per class. Some lectures were conducted at a hall that does not have proper facilities such as computers and wi-fi connection. The problems were not only affecting the data collection timeline, but also reduced the chance to achieve targeted number of samples. Likewise, at post- test data collection stage, participants were invited to fill up a survey and

was given a link to the survey via Whatsapp Messenger. Surprisingly, the answering time recorded from all participants was less than 5 minutes on average. Having such 'quick' feedback raises the concern on the quality of answers and reliability of the results. Given the average length of questions and contents that test their knowledge, numeracy and cognitive skills, it does not seem sensible for the survey to be answered within that very short time period.

5.15.2 Overcoming Threats in Pilot Stage: Lesson Learnt for Mainstage

The challenges occurred at pilot stage was useful for learning and function as a key to the success of the main study. Several measures were undertaken to minimize the possibility of having the same issues occurred at mainstage. This section describes the process involved in conducting mainstage data collection after considering issues during pilot stage. More detail on data analysis and results obtained from the fieldwork is outlined in Chapter 6.

At the 2nd fieldwork (for mainstage study), number of samples increased by 10% in both stages. The changes brought to a new targeted sample size of 428 participants for stage 1 (389 in pilot) and 74 participants for each group in stage 2 (67 in pilot). The purpose was to control for non-adherence (which can reduce representativeness of population) and also to secure retention of participants. Data collection for mainstage study started on October 2018, at the beginning of new semester II of 2018/2019 session whereby students at this point in time were not tight up with lectures and other commitments. A longer time period was allocated from 2 weeks (during pilot test) to 5 weeks to ensure participants have equal opportunity to attend the intervention session (i.e financial education program).

Baseline survey was conducted for one week, starting from 25th October to 2nd November 2018. Questionnaire was distributed to a total of 580 students from both science and non-science fields that took part in the survey. Prior to that, 10 minutes were allocated for briefing about the purpose of the survey and to get their consent to participate in the study. A total of 491 students agreed to participate, gave their consent and completed the survey. Baseline data were entered and analysed using the Statistical Package for the Social Sciences (SPSS v.25) computer software. All participants were coded into numbers (from 1 to 491), which is used as reference to randomized participants into different groups. A total of 252 participants (out of 491) scored below median point of 2.5882 of the self-control score, and were recruited to participate in stage two of the experiment. The remaining participants with above median point on the other hand, were not called up as their participation in stage two did not fit with the purpose of the study. From the randomization process, 84 participants were equally and randomly allocated into each group.

Financial education program was planned and delivered on three different sessions after considering the problem with low attendance rate in pilot stage. Participants were given an option to attend to any session according to their available time. It was conducted on weekend; 17th November 2018 (Saturday), 18th November 2018 (Sunday) and 24th November 2018 (Saturday) as students are normally tight up to attending lectures and other academic commitments on weekdays. To control for experimenter bias (since the program is delivered by the researcher), all three sessions were conducted in same length of time, using same contents and delivery methods. Additionally, participants who attended the program were offered 25 mySDP points. MySDP or also known as Student Development Points is a system that indicates students' active involvement in any programs organised by the university, or any organisations. Earning more points will give higher chance for students getting a place in

college accommodation. The overall score will also be used as 2nd transcript which is useful for finding jobs after graduation.

A small activity was added in the financial education program which was not introduced in pilot stage. During the program, participants were given a chance to win mysterious prizes. The aim of this activity was to maintain participants 'interest, focus and engagement throughout the program. In order to win, they were required to 'save' money in order to 'pay' and claim the prize (Appendix 14). Using Monopoly money, participants were 'paid' based on their involvement in group discussions, and answers given during the segment. Active participants had the higher chance of being paid and accumulated more money to claim the prize, which was given only to one winner. The prizes offered were in the form of both monetary (£10 cash or equivalent to RM50) and non-monetary rewards (£10 Starbucks Gift Card). As a results of these strategies, participants' attendance to this program had significantly improved. A total of 128 participants attended and completed the program, given a total attendance rate of 76%, significantly higher than 33% during pilot stage (Table 4.8).

Table 4.8: Participants' Rate of Attendance

Items	**All Groups**		**Intervention Group 1 (FinEdu)**		**Intervention Group 2 (FinEdu & SMS)**	
	Pilot	Mainstage	Pilot	Mainstage	Pilot	Mainstage
Invited	102	168	51	84	51	84
Attended	34	128	17	60	17	68
Rate of Attendance	33%	76%	33%	71%	33%	81%

5.16 Conclusion

This study used experimental design in order to conduct analysis and to answer the objectives of the study. The purpose is check for causal effects that of the interventions on the participants' financial knowledge, attitudes and behaviours. It is important to note that Changes in behaviours may not only happened due to manipulation of interventions, but may also be explained by other factors which gives wrong interpretation to research outcomes. therefore threats to internal and external validity were considered in order to minimize the chance for alternative explanation. The experiment involve two stages. Stage 1 is a period for pre-test data collection, where baseline survey on financial literacy and financial behaviour was conducted. As the target participants for this study are low self-control young adults, therefore behavioural decision-making assessment was executed concurrently with the baseline survey. Stage 2 on the other hand, involved selection of participants with low self-control score, randomization to groups and delivery of interventions. There were two experimental groups that received interventions, namely intervention group 1 and intervention group 2. Intervention group 1 received only one intervention, which is financial education program using classroom method. Intervention group 2 on the other hand, received both classroom financial education program and financial education SMS reminders as additional interventions. Participants that did not receive any interventions on the other hand, were placed in control group. Several issues were identified during the pilot test which include lack of participations and sampling issues. Several methods were undertaken to improve the data collection at main stage. The results shows an improvement in participants' rate of attendance at main stage data collection with several

CHAPTER 6

DATA SCREENING AND BASELINE CHARACTERISTICS

6.1 Introduction

This chapter provides the first part of analysis of the mainstage dataset which covers the discussion on data screening process, the appropriate statistical methods for inferential analysis, and baseline characteristics of participants that took part in this study. The data screening process starts with discussion on missing values, followed by identifying potential data outliers, and test of normality for each targeted outcomes of the study, which are financial literacy, attitudes and behaviors. The purpose of conducting these tests was to confirm the type of inferential statistics that will be used to analyze the mainstage dataset (either parametric or non-parametric tests) so that the results of this study are valid. The chapter then continues with descriptive analysis of participants' self-control score, which involved comparison on demographic characteristics between participants with high and low self-control. with discussion on baseline characteristics of participants in both treatments and control group that completed the experiment. The final section presents the summary of the findings.

6.2 Missing Values

Missing value is defined as the data value that is not stored for a variable in the observation of interest. It may occur in the event when the targeted sample did not take part in the survey (total non-response) or participants did not provide complete answers to all survey items (Brick and Kalton, 1996). Apart from that, participant dropouts are one of the main contributing

factors to missing values for trial research (Unnebrink and Windeler, 2001). As the problem is inevitable and cannot be eliminated, the best way to handle it is by applying preventive techniques that reduces the chance to occur. Such technique according to Kang (2013), can be done through proper research planning in terms of methodology design, and data collection plan. As Unnebrink and Windeler (2001) pointed out, the strategy of dealing with missing values must be employed at the maximum effort and "be laid down in advance in the study protocol" before the application of sophisticated analysis techniques is performed. For this study, several measurements have been undertaken to keep missing values at minimum, based on Scharfstein *et. al.* (2012)'s suggestion on handling missing values for trial research. One of it is to develop detailed documentation prior to starting of the research.

Before the start of both pilot and mainstage data collections, a detailed documentation was prepared with the aim to give clear instructions to participants on how the study will be conducted. Documents such as participants' information sheet explains how participants will be recruited and screened, how the treatments will be delivered and how the data will be collected, and analyzed. Consent form was prepared to obtain participants' agreement to involve in this study voluntarily and to avoid selection bias. Before data was collected, all participants were given information sheet and consent form, which contain complete details about the study as well as the procedures involved. The details provided include background of the researcher, research aims, design of the research, risk, benefits and implications to participants should they decide to take part, confidentiality and anonymity, data protection as well as information on ethical clearance.

One strategy was planning the data collection in two stages; pilot and mainstage. As discussed in chapter 5 (research methodology), one aim of conducting pilot study was to check for feasibility of the study that covers the aspects of recruiting participants, resource capacity, treatment delivery protocol and issues related to human and data management (Thabane et. al., 2010). Report from pilot study showed only 33 participants completed the experiment, with 6 dropouts and 11 non-responsive participants. To control for dropouts and non-adherence, number of samples were increased by 10%, and at the same time, improvement in delivery of the first treatment (classroom financial education program) was made. As a result, total number of participants completed the experiment at mainstage has improved to 162, with no dropouts. Table 6.1 and 6.2 below reports the number of missing values at both pilot and mainstage. Despite the effort of having preventive actions, missing values still occurred at mainstage. However, the values were kept at minimum level, which can be considered as sensible given the large number of participants involved in mainstage (n=162) than those in pilot stage (n=33).

Table 6.1: Missing Values at Pilot Stage (N = 33)

Instruments	No. of missing values	Items with missing values
Pre-Financial Literacy	1	FL14
Pre-Financial Behaviors	3	FB7, FB11
Pre-Financial Attitudes	0	-
Post-Financial Literacy	0	-
Post-Financial Behaviors	0	-
Post-Financial Attitudes	2	FAP4, FAP6

Table 6.2: Missing Values at Main Stage (N = 162)

Instruments	No. of missing values	Items with missing values
Pre-Financial Literacy	1	FL15
Pre-Financial Behaviors	4	FB6, FB10, FB11, FB12
Pre-Financial Attitudes	4	FA4, FA5, FA6, FA7
Post-Financial Literacy	5	FLP6, FLP11, FLP12, FLP16
Post-Financial Behaviors	2	FBP4
Post-Financial Attitudes	6	FAP3, FAP4, FAP5, FAP6, FAP7, FAP8

6.3 Data Outliers and Normality Tests

Outliers are suspicious observations in which the values lie outside the majority of other values. Having problematic observations can greatly influence the statistical analysis which leads to inaccurate results (Schwerman *et. al.,* 2004). Identification of potential outliers is important to check if the data has been incorrectly coded, errors from participants' response, or if it was due to random variation. The boxplot method was used to identify potential outliers from the data series before any further observation is made. The benefit of using boxplot is that it helps to simplify complex numerical information and interpretation of data (Cousineau and Chartier, 2010). Additionally, normality test was conducted to identify the shape of a distribution of the dataset; either skewed or normally distributed. Assessment of normality can be done using the two most common tests, namely Kolmogorov-Smirnov (K-S) test and Shapiro-Walk (S-W) test. For this study, the latter was chosen as preferred test due to its good power properties in detecting samples either from a normal or non-normal distribution (Ghasemi and Zahediasl, 2012; Mendes and Pala, 2003). Additionally, S-W test has been proven as the most powerful normality test than the former (Razali and Wah, 2011). The shape of a distribution was assessed by looking at a frequency distribution depicted in a histogram.

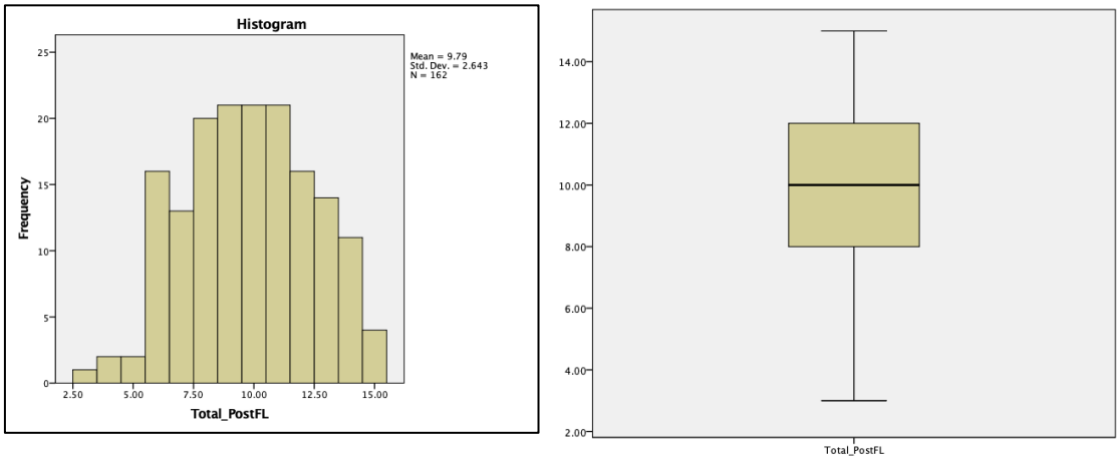
Table 6.3: Tests of Normality (Financial Literacy Scores)

	Shapiro-Wilk		
	Statistic	df	p-value
Total Financial Literacy Scores (Pre)	.974	162	.004
Total Financial Literacy Scores (Post)	.975	162	.005

The Shapiro-Walk test of normality was conducted to check if the total financial literacy scores are likely to follow some distribution in some population. The null-hypothesis is that the population is normally distributed, and otherwise. Null-hypothesis is rejected when the p-value

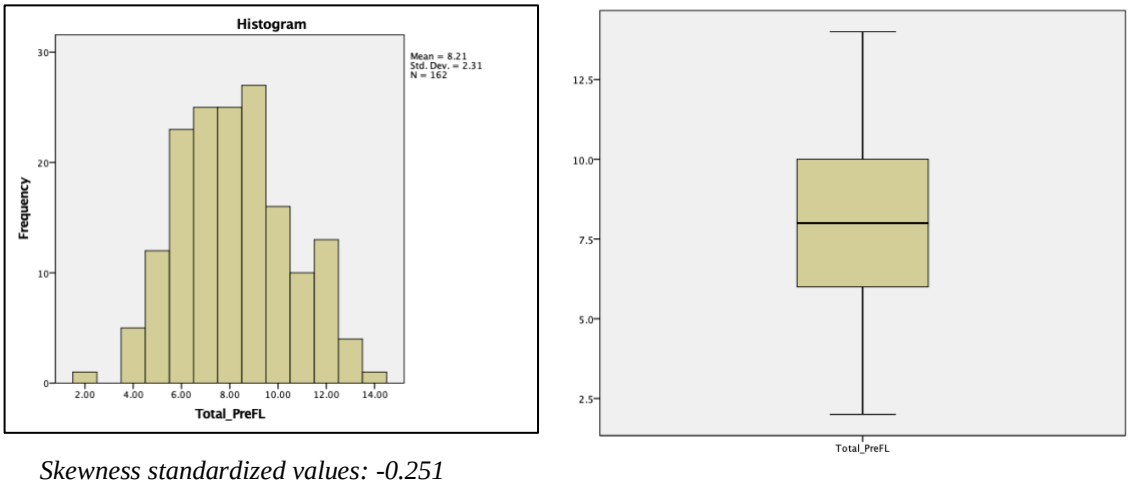
is less than alpha level of .05, which indicates that the data are not normally distributed. Results from Table 6.3 confirms that the frequency distribution of financial literacy scores do not exhibit a normal distribution, with p-values is less than .05 at pre-test (D (162) =.974, p=.004) and post-test level (D (162)=.975, p=.005). Hence, the null-hypothesis is rejected.

Figure 6.1: Total Financial Literacy Scores (Pre-Test)



Skewness standardized values: 0.969

Figure 6.2: Financial Literacy Scores (Post-Test)



Skewness standardized values: -0.251

Figure 6.1 and 6.2 depicts the histogram and boxplot of mean value of total financial literacy scores at pre and post-test level. Data distributions were nearly symmetrical, with little positive

and negative skewness at both levels, respectively. The distributions at pre-test level can be seen from the boxplot that shows a small positively skewed distribution (skewness standardized values 0.969), with no outliers identified. Similar skewed distribution result is reported at post-test level but in the negative direction, with a standardized skewness value of -0.251 and zero outliers.

6.4 Characteristics of Participants

Table 6.5: Comparison of Descriptive Characteristics of the Treatment and Control Groups

Participant Characteristics	T1 Group (n = 43)		T2 Group (n = 61)		Control (n = 58)	
	n	%	n	%	n	%
Gender						
Male	7	16.3	6	9.8	6	10.3
Female	36	83.7	55	90.2	52	89.7
Field of Study						
Science	10	23.4	9	14.7	13	22.4
Humanities	33	76.7	52	90.7	45	77.6
Family Income (p/month)						
Below RM3,860 (B40)	30	69.8	42	68.9	44	75.8
Between RM3,861-RM8,319 (M40)	9	20.9	14	22.2	10	17.3
RM8,319 and above (T20)	4	9.3	5	8.9	4	6.9
Source of Income						
Educational loans	15	34.8	23	37.7	21	36.2
Scholarship	6	13.9	5	8.2	5	8.6
Parents and family members	17	39.8	27	44.3	26	44.8
Part time job	3	6.9	3	4.9	3	5.2
Others	2	4.6	3	4.9	3	5.2
Father's Occupation						
Government sector	11	25.6	19	31.1	17	29.3
Private sector	8	18.6	15	24.6	6	10.4
Self-employed	14	32.5	8	13.2	23	39.6
Others	10	23.3	19	31.1	12	20.7
Mother's Occupation						
Government sector	8	18.6	16	26.2	11	18.9
Private sector	4	9.3	4	6.6	5	8.7
Self-employed	8	18.6	5	8.2	8	13.8
Others	23	53.5	36	59.0	34	58.6
Place of Origin						
Rural	26	60.5	29	48.3	36	63.2
Urban	17	39.5	61	51.7	21	36.8
Credit Card						
Yes	12	27.9	12	19.7	13	22.4
No	30	69.8	49	80.3	45	77.6

Savings Account						
Yes	39	90.7	59	96.7	52	91.2
No	4	9.3	2	3.3	5	8.8
Savings motive						
Security reason – keep money safe	8	18.6	12	19.6	10	17.2
Earn interest on saving	3	6.9	3	4.9	5	8.6
Save money for specific purchase	4	9.5	10	16.3	8	13.7
Emergency needs	8	18.6	11	18.3	10	17.5
For predicted future needs	8	18.6	8	13.1	10	17.2
Pay bills or debts	2	4.6	4	6.5	3	5.2
Transfer money	10	23.2	13	21.3	10	17.2
Others	0	0.0	0	0.0	2	3.4

Table 6.5 depicts the baseline demographic characteristics of 162 participants that completed the experiment. Majority of participants in the treatments and control groups were female, given the high number of female students enrolled to the university. As of 2017, total percentage of female students' enrolment was 66% (or 12,119) more than half compared to 34% (or 6,382) of male students' population (MOHE, 2017). This long-existence gender gap issue is not only happening within the UMS context, but also in other higher learning institutions across Malaysia. At national level, the total percentage of female students' enrolment in all Public Universities were 62%, as opposed to the small male students' population of 38% (MOHE, 2017).

In terms of field of study, majority of participants in all groups were from humanities stream, with those from science stream counted for less than 30% of the sample. Majority of participants in all groups came from a family with average monthly income equivalent or below than RM3,860 (£689) categorized as B40 group (or Bottom 40%). The B40 group also consists of low-income households than earns below than the national's poverty line income of RM950 per month. Middle income (or M40) and higher income group (or T20) on the other hand, accounted in about 20% and 10% of the sample, respectively.

Moreover, majority of participants in all three groups are living on education loans, and money received from parents and family members. Participants who received scholarship and do part time jobs accounted less than 15% and 10% of the sample, respectively. Meanwhile, parents' occupations vary across different groups and employment sectors. Majority of participants' father in treatment 1 and control groups are self-employed, followed with almost balance of employment distribution in other sectors. On a contrary, father's occupation of participants in treatment 2 group do not earn living by themselves but rather working either in the government or private sector. Interestingly, mother's occupation of participants in all three groups were mostly classified in the "others" category (between 53% - 60%); either doing a freelance work, own a business, house wife, or working as unpaid family worker.

On a different note, a little more than half of participants in treatment group 1 and control group were born and live in the outskirts of the city. However, the percentage distribution of participants in treatment group 2 who originated and live in the urban and rural areas were almost equal. The baseline survey includes some information about participants' use of financial services. Most of the participants from all groups do not own a credit card, given their status as full-time students with no regular income from employment. However, majority have savings account which serves for various purposes, but mainly used for transfers of money, security reasons, emergency needs, and for specific purchase.

6.5 Conclusion

The data screening process involved an analysis on missing values, test of normality for each of the targeted outcomes. The purpose is to check for appropriate statistical methods for inferential analysis, and baseline characteristics of participants that took part in this study. the results showed that despite the effort of having preventive actions, missing values still occurred at mainstage, which is something difficult to avoid. The chapter also discussed the characteristics of participants that involved in this study. Majority of participants in the treatments and control groups were female, came from low-income family background. The analysis also showed that majority of the participants are living on educational loans and money received from parents and family members. The baseline survey includes some information about participants' use of financial services. Most of the participants from all groups do not own a credit card, given their status as full-time students with no regular income from employment. However, majority have savings account which serves for various purposes, but mainly used for transfers of money, security reasons, emergency needs, and for specific purchase.

CHAPTER 7

THE EFFECTS OF TRADITIONAL FINANCIAL EDUCATION PROGRAM ON FINANCIAL LITERACY LEVEL

7.1 Introduction

The previous chapter presented the initial part of data analysis which focused on examining the appropriate statistical methods to be used to analyze the dataset, and baseline characteristics of participants involved in the experiment. Meanwhile, this chapter discusses the second part of the analysis, which aims to provide the understanding on the effectiveness of financial education program (conducted in classroom method) on participants' level of financial literacy.

It starts with frequency analysis of financial literacy scores, whereby the aim is to get earlier picture of impact from the program by looking at the number of correct answers given by participants before and after the program was conducted. The analysis then continues with examining the short-term effects of the classroom program on participants' level of financial numeracy and financial knowledge (served as the two dimensions of financial literacy) – which is the main highlight of this chapter. Using non-parametric statistics, the analysis involved comparison of financial literacy scores between participants from the two interventions group (who attended and completed the program) and the control group. The last section provides summary of the chapter.

7.2 Frequency Analysis of Financial Literacy Scores

As mentioned previously in Chapter 5, financial literacy in this study is conceptualized based on two main dimensions; 1) understanding of personal finance knowledge (knowledge test) and participants' ability to use and apply the knowledge (numeracy test). A total of 16 questions were used to measure financial literacy which consists of several measurement categories including time value of money, risk and return, diversification, investments, loans and inflation.

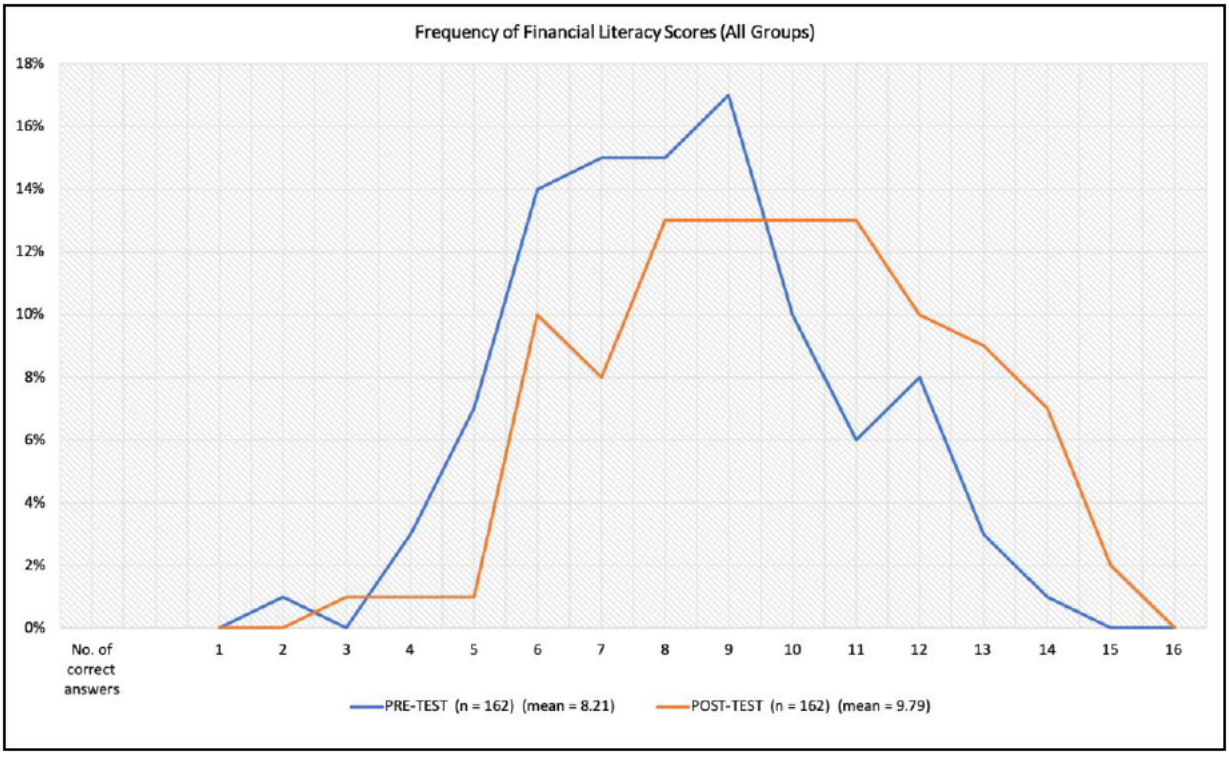
7.2.1 Summary of correct answers (all groups)

Table 7.1 and Figure 7.1 provides the frequency of questions answered correctly from participants of all groups. At pre-test, only one percent of participants answered two (min) and fourteen (max) questions correctly, with no zero score. Distribution of scores were mainly between 6 to 9 correct answers. Additionally, less than 20 percent of the participants were not able to answer more than 10 questions. This is further supported with the mean value of 8.21 which indicates that on average, most participants (or two-third) were only able to answer approximately half of the questions (from total 16) correctly. Interestingly, two months after the experiment ended, there was a positive swing on the distribution of correct answers. This time around, the distribution of scores were mainly in between 8 to 13 correct answers. The increased mean value of 9.79 at post-test (from 8.21 at pre-test) indicates that on average, participants were able to answer more than half of the total 16 questions correctly after the program was delivered. Additionally, participants who scored more than 10 correct answers was about 41 percent of the samples, a significant increase from 18 percent recorded prior to the delivery of the program. The minimum and maximum correct answers at post-test level were 3 and 15, respectively.

Table 7.1: Frequency of Financial Literacy Scores (All Groups)

	PRE-TEST (n = 162) (mean = 8.21)		POST-TEST (n = 162) (mean = 9.79)	
No. of correct answers	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)
1	-	-	-	-
2	1	1	-	-
3	-	-	1	1
4	5	3	2	1
5	12	7	2	1
6	23	14	16	10
7	25	15	13	8
8	25	15	20	13
9	27	17	21	13
10	16	10	21	13
11	10	6	21	13
12	13	8	16	10
13	4	3	14	9
14	1	1	11	7
15	-	-	4	2
16	-	-	-	-

Figure 7.1: Frequency of Financial Literacy Scores (All Groups)



Nonetheless, the tabulation of financial literacy scores varies across the two dimensions. Table 7.2 below provides the summary of participants who answered financial numeracy questions correctly. More than half participants were able to answer the first four questions on division, inflation and interest rates correctly prior the program taking place. Given the already satisfactory figures at pre-test, a much-improved correct answers were evident two months after the intervention period ended, except for Q2 (inflation) which shows no improvement. Questions on division and interest rate (Q1 and Q3) were perceived as easy, given the fact that more than 80 percent of participants answered these questions correctly at pre-test and post-test levels.

Table 7.2: Frequency of Correct Answers for Financial Numeracy Questions

No.	Question	Measurement Category	Pre-Test (%)	Post-Test (%)	Overall Result
1	Imagine that five brothers are given a gift of RM1,000. If the brothers have to share the money equally how much does each one get? [ ] More than RM200 **[√] Exactly RM200** [ ] Less than RM200 [ ] Do not know	Division	83	97	Improved
2	Imagine that you get a gift of RM1,000 and you put it in the drawer at home for 12 months. After one year how much could you buy for this money? [ ] More. [ ] The same amount **[√] Less than they could buy today** [ ] Do not know	Inflation	59	50	No changes
3	You lend RM50 to a friend one evening and he gives you RM50 back the next day. How much interest has he paid on this loan? [ ] RM20 [ ] RM30 **[√] None** [ ] Do not know	Interest rate	91	95	No changes
4	Suppose you put RM100 into a saving account with a guaranteed interest rate of 2% per year. You don't make any further payments into this account and you don't withdraw any money. How much would be in the account at the end of the first year, once the interest payment is made? [ ] RM100 [ ] RM120 **[√] RM102** [ ] Do not know	Interest rate plus principle	48	75	Improved

However, participants seemed to have difficulty when it comes to more advanced questions. Less than 40 percent correctly answered Q5 and Q6, an advanced interest rate and credit card debt payment questions which are perceived as being the most difficult. Although these two topics were covered at the program, it did not seem to improve participants skills when encountered with situations particularly that involve credit payments.

No.	Question	Measurement Category	Pre-Test (%)	Post-Test (%)	Overall Result
5	And how much would be in the account at the end of five years? Would it be: **[√] More than RM110** [ ] Exactly RM110 [ ] Less than RM110 [ ] Do not know	Compound interest rate	35	38	No changes
6	Suppose you owe RM3,000 on your credit card. You pay a minimum payment of RM30 each month. If the annual percentage rate is 12% (or 1% per month), how many years would it take you to eliminate your credit card debt if you made no additional new charges? [ ] Less than a year [ ] Between 5 and 10 years [ ] Between 10 and 15 years **[√] The debt is never repaid**	Loan	7	10	No changes

Table 7.3 below provides a similar story on frequency of financial knowledge scores. Prior to delivery of the program, participants perceived good understanding on the basic concept of risk and return tradeoff (Q7, Q8) and inflation (Q13). More than half of the participants (or 66 percent) knew that high inflation meant the cost of living was increasing, suggesting an awareness of simple economic terms. However, they only seem to know the definition of inflation than knowing what impact it has on their role as consumers. This can be seen from the low score of 46% (Q12) and 48% (Q14) on these two questions that tested their knowledge on the time value of money and impact of inflation on purchasing power. Moreover, participants' level of knowledge on diversification seemed to be average. Almost half of the participants were aware on the benefits of spreading money into different types of assets, which

is a basic concept of diversification (Q9=49%; Q10=44%). However, they found it hard to understand when the question started to be more technical that involved stock and capital market investments (Q11=16%), with more than two-third of the participants failed to answer this question correctly. Meanwhile, topics on loans and use of credit card were perceived as being difficult. Only less than half of the participants were able to provide the correct answers (Q15=36%; Q16=44%).

Table 7.3: Frequency of Correct Answers for Financial Knowledge Questions

No.	Question	Measurement Category	Pre-Test (%)	Post-Test (%)	Overall Result
7	An investment with a high return is likely to be high risk. [√] **True** [ ] False [ ] Do not know	Risk Return trade-off	69	86	Improved
8	Normally, which of these assets exhibits the highest fluctuations over time? [ ] Savings accounts [√] **Stocks** [ ] Bonds	Risk Return trade-off	80	81	No changes
9	If an investor spreads their money among different assets, the risk of losing a lot of money… [ ] Increase [√] **Decrease** [ ] Stay the same	Diversification	49	65	Improved
10	It is usually possible to reduce the risk of investing in the stock market by buying a wide range of stocks and shares. [√] **True** [ ] False [ ] Do not know	Diversification	44	52	Slightly improved
11	"Buying a single company's stock usually provides a safer return than a stock mutual fund." - Is this a true or false statement? [ ] True [√] **False** [ ] Do not know	Capital market investment	16	35	Slightly improved
12	Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account? [ ] More than today [ ] Exactly the same [√] **Less than today** [ ] Do not know	Time value of money	46	60	Improved

No.	Question	Measurement Category	Pre-Test (%)	Post-Test (%)	Overall Result
13	High inflation means that the cost of living is increasing rapidly. **[√] True** [ ] False [ ] Do not know	Inflation	66	90	Improved
14	Assume a friend inherits RM10,000 today and his brother inherits RM10,000 three years from now. Who inherits more? **[√] My friend** [ ] His brother [ ] Exactly the same [ ] Do not know	Time value of money & Inflation	48	52	
15	A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan is less. **[√] True** [ ] False [ ] Do not know [ ] Refuse to answer	Loans	36	35	No changes
16	Suppose you want to make a RM1,000 purchase with your credit card. The retailer tells you that you will be charged an extra 2% fee for using your credit card. Your sister buys the same item in the shop next door for RM1,000. She is charged a flat rate RM15 fee for using her credit card. Who paid a higher credit card fee? **[√] You** [ ] Your sister [ ] Do not know	Use of credit	44	60	Improved

Two months after the program, the impact can be seen from the improvement of participants' knowledge on certain topics, particularly on defining the concept of inflation (Q13, pre=66%, post=90%) and basic concept of risk and return (Q7, pre=69%, post=86%). What is interesting was the improvement in scores of a more advanced questions, such as allocation money on different assets (Q9, pre=49%, post=65%) impact of inflation on consumer's spending power (Q12, pre=46%, post=60%) and credit card usage (Q16, pre=44%, post=60%). Meanwhile, participants still find it difficult to understand the differences between investing in company stock and stock mutual fund (Q11, pre=16%, post=35%) and the concept in mortgage payments

(Q15, pre=36%, post=35%). These two questions which previously perceived as being difficult, showed the least improvement in correct answers.

Notice that participants scored higher percentage on questions that involved theoretical or conceptual part of the knowledge but less on the practical side. It is something that makes sense as students normally obtained conceptual knowledge in classroom education. To obtain better understanding on the difficult questions (such as mortgage payments and stock/capital market investments) perhaps requires the students to have hands-on experience and direct engagement with the financial markets; something they are yet to be exposed to. Having such direct exposures would not only improve financial literacy and skills, but would also impact their tolerance to risk (Beal and Delpachitra, 2003). However, majority of the participants involved in this study are full-time students and living on student loan and money received from parents and family members.

Overall, the result found less improvement in financial numeracy scores before and two months after the program was conducted. However, participants' knowledge on selected financial topics showed improvements particularly on defining financial concepts. Questions pertaining to credit market (mortgage and credit card usage and payments) were perceived as difficult and showed no improvement in correct answers. The aim of this section was to provide early picture of effects from the program. Therefore, it only provides frequency analysis of financial literacy scores from a total of 162 participants that completed the experiment. The results only tell the existence of different scores before and after the program was conducted, but did not report any significant difference between groups. The next section of the chapter (section 7.3) discusses the short-term effects of the program by examining the significance level and differences between the interventions and control groups.

7.3 Program Effects on Financial Numeracy

This section aims to confirm whether the financial education program had an effect on participants' financial literacy by examining the differences in scores between the intervention and control group. Similar to previous section, discussions on the analysis are separated into two dimensions of financial literacy used in this study, which are financial numeracy and financial knowledge.

Question 1-6 of the financial literacy survey measured participants' numeracy skills which requires them to calculate some of basic financial concepts. Various outcome variables were used as proxies to numeracy, which includes ability to understand the concept and calculate questions pertaining to interest rates and principle, compound interest rates, division, future values and inflation, and loans. Table 7.4 below presents the difference in total financial numeracy scores.

Table 7.4: Comparison of Financial Numeracy Scores between Intervention Groups and Control Group

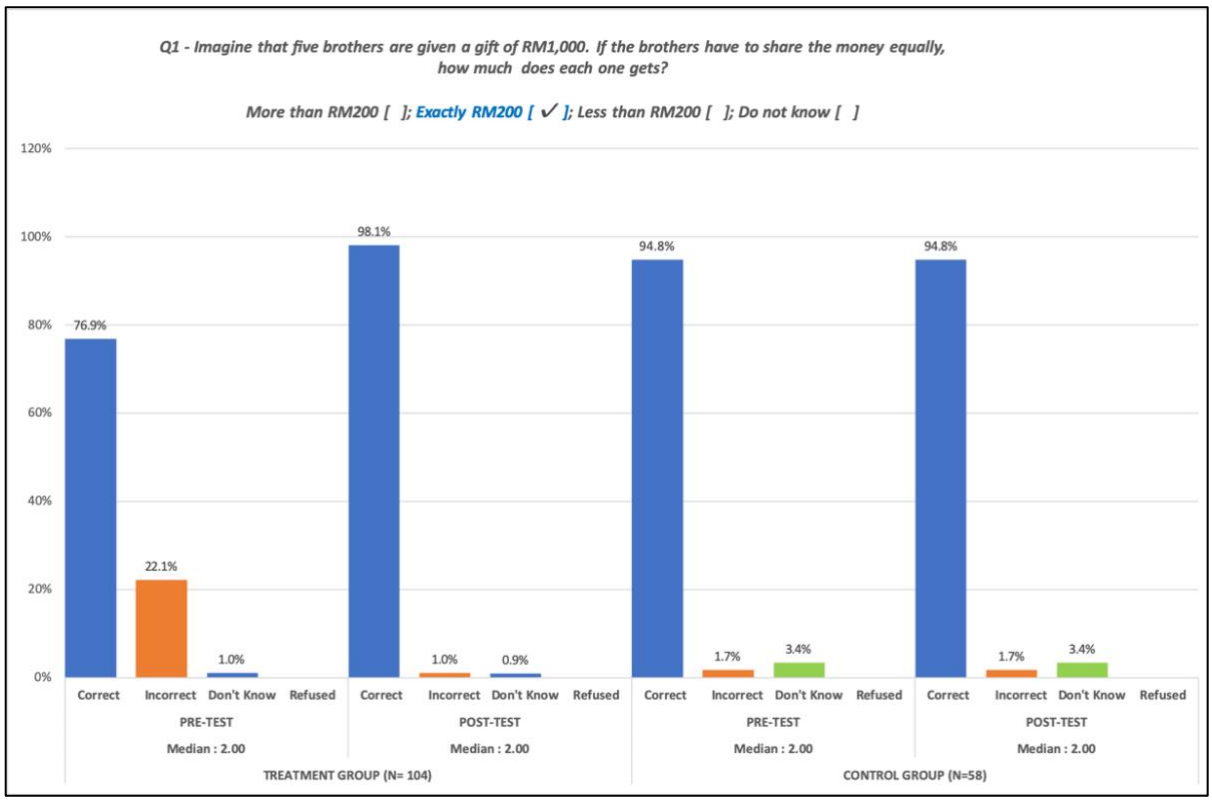
	Pre-Test	Post-Test
Mann-Whitney U	2520.500	2214.500
df	2	2
P-value (2-tailed)	.372	.140
Median	3.000	4.000
z-score (effect size, r)	-.430 (-0.034)	-1.604 (-0.126)
Mean rank	T = 76.74 C = 79.89	T = 83.36 C = 75.58

Overall, the results showed no sign of difference occurred between the interventions and control group, two months after the program was delivered (p-value pre-test=.372; p-value post-test=.140). The insignificant p-value showed that both groups report comparable levels of financial numeracy which suggests that the financial education program had little effect on participants' financial numeracy skills. However, despite the insignificant results, there was a

small positive change in mean rank values of participants who attended to the program (pre= 76.74; post=83.36). Interestingly, the increase in effect size from 0.03 (at pre-test) to 0.126 (at post-test) indicates that the program had actually raised participants' level of understanding on certain concepts, although the size of difference was relatively small. This was supported by the change in median values from 3.000 (at pre-test) to 4.000 (at post-test) which indicates an improvement in total numeracy scores (min=1, max=6). On the other hand, the small declined mean rank value of the control group from 79.89 (at pre-test) to 75.58 (at post-test) indicates that participants who were not exposed to the program had given fewer correct answers (as opposed to the intervention group) which contributed to a lower average numeracy score.

The figures below provide the details of answers to each numeracy questions. At pre-test level, majority of participants from both groups were able to answer questions pertaining to division (Q1 on Figure 7.2) which is an easy question. However, at pre-test, there was a significant difference in the ranked position of scores between both groups (p-value= 0.003) whereby participants in intervention group scored much lower correct answers (77%) than those of control group (95%). Interestingly, the program seems to have helped participants to better understand the topic, with the correct answer increased by 21 percentage points to 98% at post-test. Perhaps, this was due to the group activity conducted in solving few problems pertaining to time value of money, which is a fundamental part in understanding the concept of inflation. Here, participants were given few questions to be answered in group before the lecture was given. The purpose was to grab participants' attention on the topic to be delivered by giving them a case of problem before the start in which the answers were discussed during the lecture. The score from participants in control group on the other hand, remained unchanged at 95% as they did not receive the intervention (also, the score was already high). As the score from both groups was almost identical, no significant difference between the two groups was evident at post-test (p= 0.253, z= -1.143).

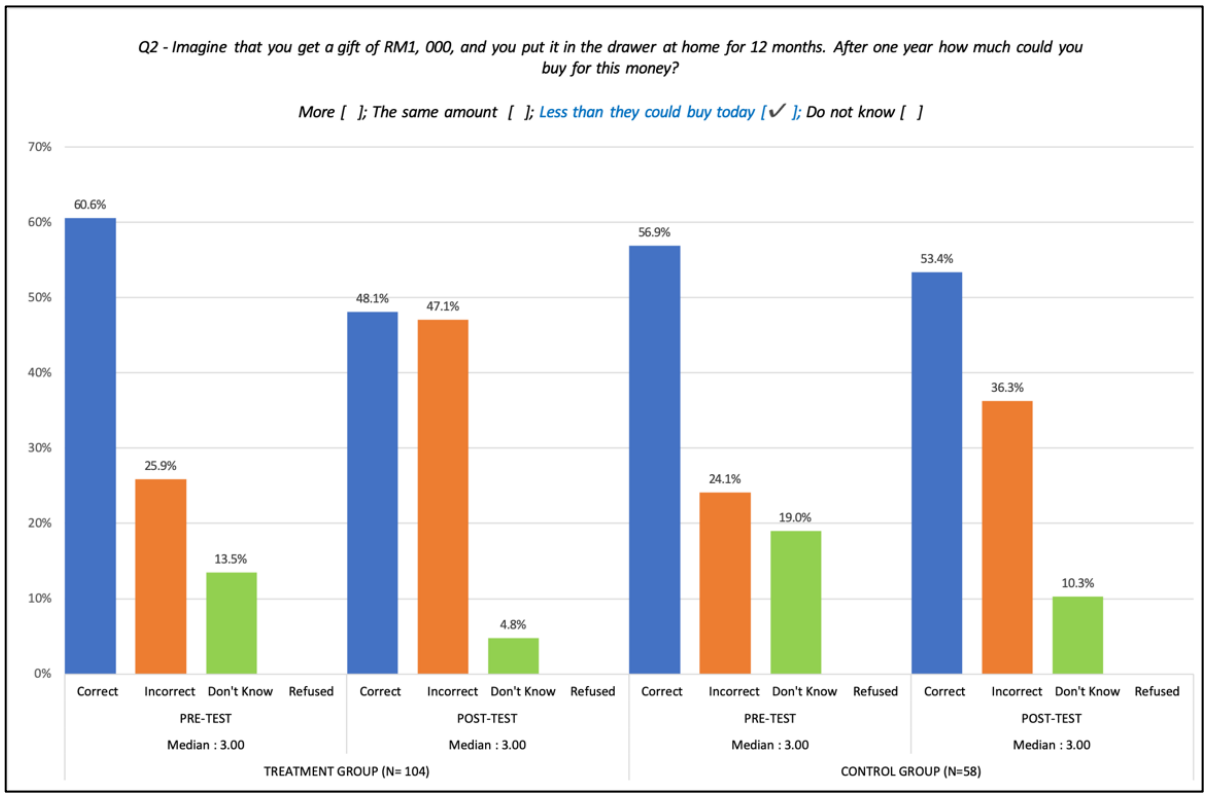
Figure 7.2: Q1 on Division



P-value (pre, post) = 0.003,0.253; Z-score (pre, post) = -2.923,-1.143
Mean rank (pre, post) = Intervention (76.31, 82.44), Control (90.81, 79.81)

However, Q2 on inflation tells quite an opposite story (Figure 7.3). At pre-test, just about more than half participants of both groups answered this question correctly (intervention pre-test=61%, control pre-test=57%) which signifies indifference in scores between the two groups (p-value pre-test= 0.532). Surprisingly, the score given by participants in intervention groups dropped to 48% two months after receiving the program, with more incorrect answers were given. The answers from control group on the other hand, remained almost identical as pre-test (control post-test= 53%). No significant difference was evident between the two group at post-test level (p= 0.120, z= -1.555).

Figure 7.3: Q2 on Inflation



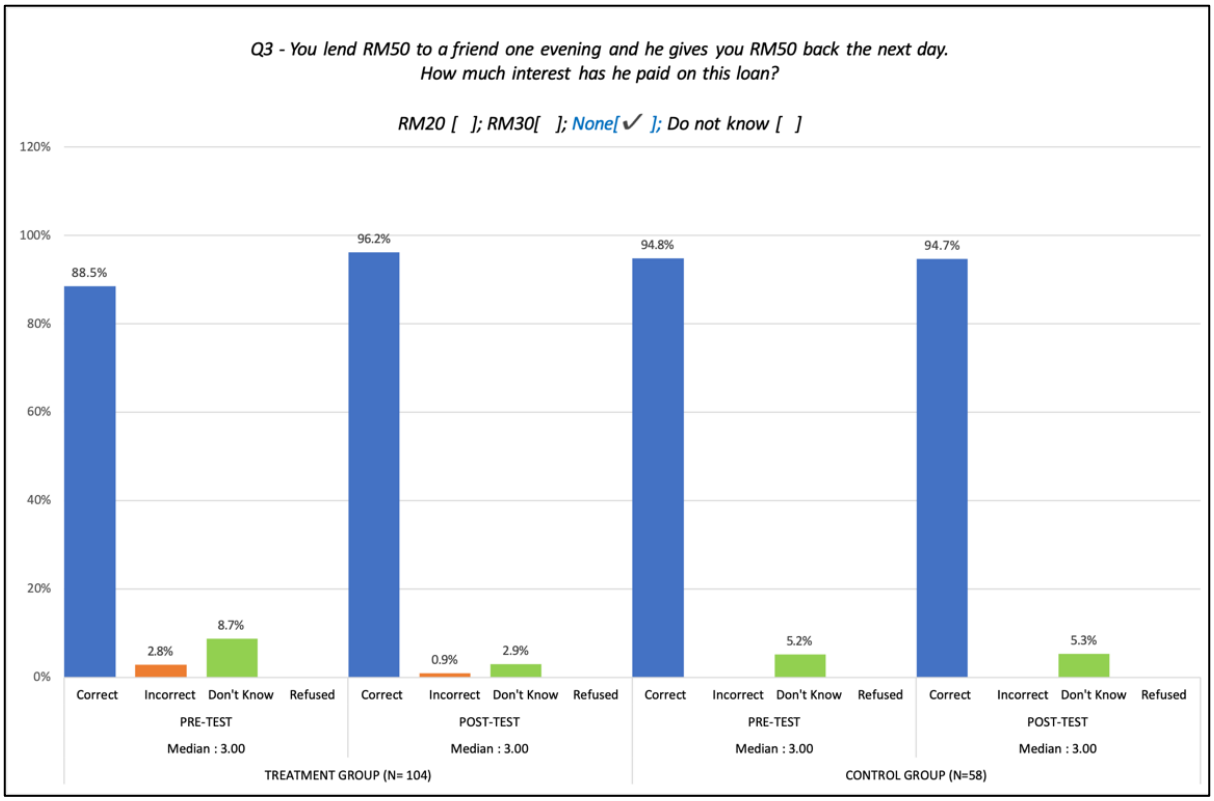
P-value (pre, post) = 0.532 , 0.120; Z-score (pre, post) = -0.625 , -1.555
Mean rank (pre, post) = Intervention (79.98, 76.69), Control (84.22, 87.39)

One plausible reason to the significant drop in correct answer was that participants might probably get confused when answering the question with no inflation rate provided. At the program, discussion on the concept of time value of money (which included compounding and discounting values) was delivered based on content provided by Petty *et. al.* (2015). Part of the activity (as explained earlier) was a two-ways discussion with participants about how inflation could affect consumer's purchasing power. To better understand this topic, few examples that involved inflation rate were given which require participants to solve it in a group. Besides having direct discussion with participants, a video presentation about the concept was also provided to give them a clear picture in understanding the topic. Therefore, it was suspected that participants might get confused when there was no inflation rate given in the survey question, especially after attending the program which they were exposed with cases that

involved the use of inflation rate before. The question was part of the OECD INFE Core Questionnaire adopted from Atkinson and Messy (2012). The average correct answer to this question was about 70% which involved samples from 14 countries across 4 different continents. However, despite the high scores, this study was based on cross-sectional data whereby observations were made from different groups at a single point in time (which does not involve manipulation of variables), and therefore the element of "confusion" to answer the question is less likely to happen.

On a separate note, results from Figure 7.4 below shows no significant difference in scores between the two groups for basic interest rate question at pre-test level (p-value= 0.876), as participants from both groups possessed good knowledge on interest rate (intervention pre-test= 89%, control pre-test= 95%). Similar to Q1, this question was perceived as being easy as it tested simple concept in interest rate payment which does not require complex calculation. Discussion on interest rate calculation and payment was included as part of the main topics of Inflation and Time Value of Money delivered at the afternoon session of the program. Participants' knowledge in this area was not significantly affected by the program (intervention post-test= 96%, control post-test= 95%), as the question had already scored high percentage of correct answers prior to the intervention taking place. This answered to the insignificant difference of results between the two groups two months after the program was conducted (p-value post-test= 0.455)

Figure 7.4: Q3 on Interest Rate

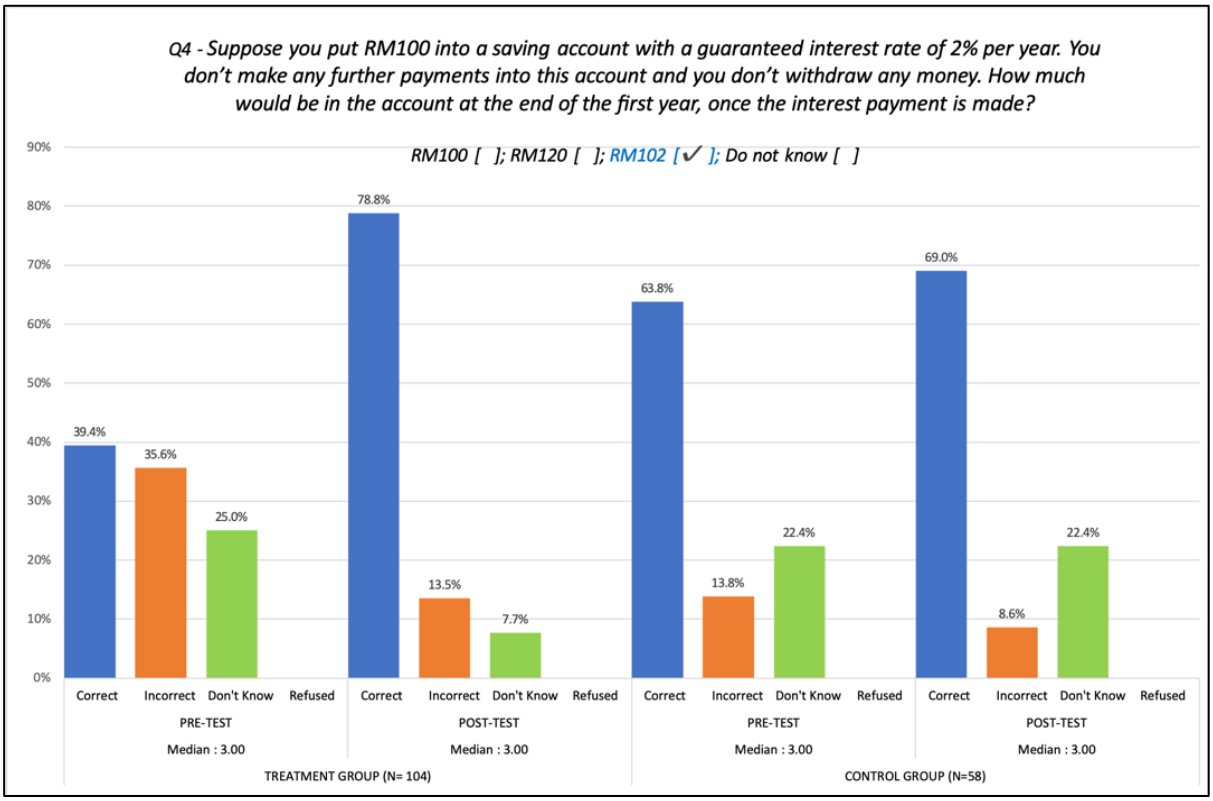


P-value (pre, post) = 0.876 , 0.455; Z-score (pre, post) = -0.156 , -0.747
Mean rank (pre, post) = Intervention (81.72, 79.83) Control (81.11, 81.71)

Meanwhile, more than half of participants in the intervention group was not able to do compound interest rate calculation (Q4) which is part of fundamental concept in financial management (Figure 7.5). Two third of participants in control group on the other hand, possessed good knowledge on this topic which contributes to a significant difference between the two groups before the program was conducted (p-value pre-test= 0.065). However, results from post-test indicate that their ability to understand the concept and deal with compound interest rate calculation (Q4) had tremendously improved two months after the program. The proportion of participants answered the question correctly increased by 40 percentage points to 79% in the intervention group, compared to a very small increase 5 percentage points (or 69%) in the control group. Moreover, the proportion of participants in intervention group who do not know the answer dropped approximately about 17 percentage points to 8% (from 25%

at pre-test), whilst 22% in the control group remained unsure. The huge gap had further brought to a significant difference in scores between the two groups, which is the only significant proxy for financial numeracy (p-value post-test=0.010), and produced a small size effects in improving participants knowledge about basic compound interest rate payment (z-score=-2.593,r=0.204).

Figure 7.5: Q4 on Compound Interest Rate

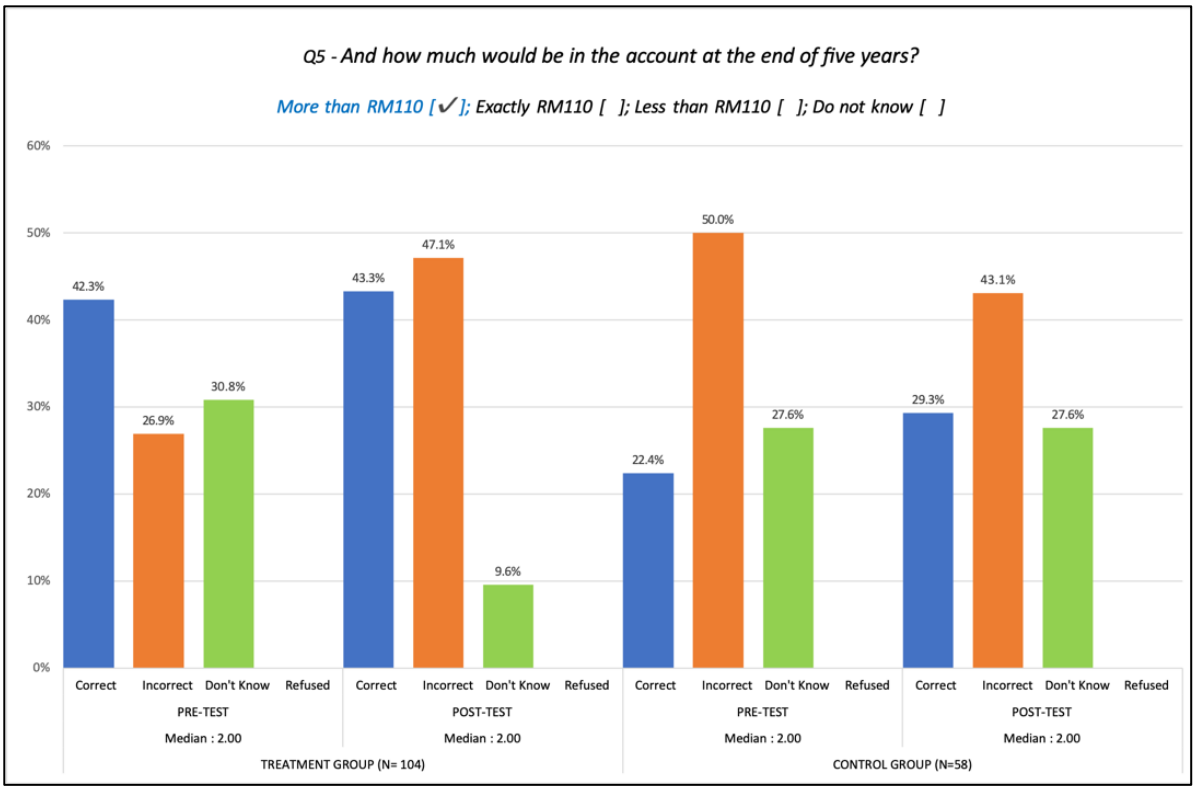


P-value (pre, post) = 0.065 , 0.010; Z-score (pre, post) = -1.844 , -2.593
Mean rank (pre, post) = Intervention (74.43, 84.37), Control (94.17, 76.36)

However, participants seem to have problem answering a similar question pertaining to future value of compound interest (Q5). As can be seen at pre-test (Figure 7.6), less than half of the participants in both groups answered the question correctly, with about one third were unsure about the answer. Despite the low scores, there was a statistically significant difference in both groups (p-value pre-test= 0.011) due to the fact that participants in the intervention group

scored 20 percentage points higher correct answer (or 42%) than those of control group (22%). The program however was not effective on improving participants' knowledge about this topic. At post-test, a small significant difference between the two groups can be seen due to the large gaps in correct and do not know answers (significant at 10% level, p-value post-test= 0.080). But still, if we look at the participants in the intervention group, the percentage of correct answers remained identical (43%) with the result obtained at pre-test (42%). A lot of participants attempted to answer this question after receiving the program, which brought to a drop in proportion of "do not know" answers to 21 percentage points (from 31% at pre-test to 10% at post-test). Unfortunately, almost half of them failed to answer it correctly (47%). Note that Q4 and Q5 examined a similar concept of compound interest rate. In terms of difficulty, although both questions do not require complex calculation, Q5 was slightly advanced which requires them to memorize the formula to calculate the future value of compound interest. Furthermore, as the question involved a longer time frame, it requires participants to have decent understanding about the concept as well as adequate amount of time to answer the question. Therefore, it is suspected that the low scores might due to lack of time allocated to participants to focus on answering the question.

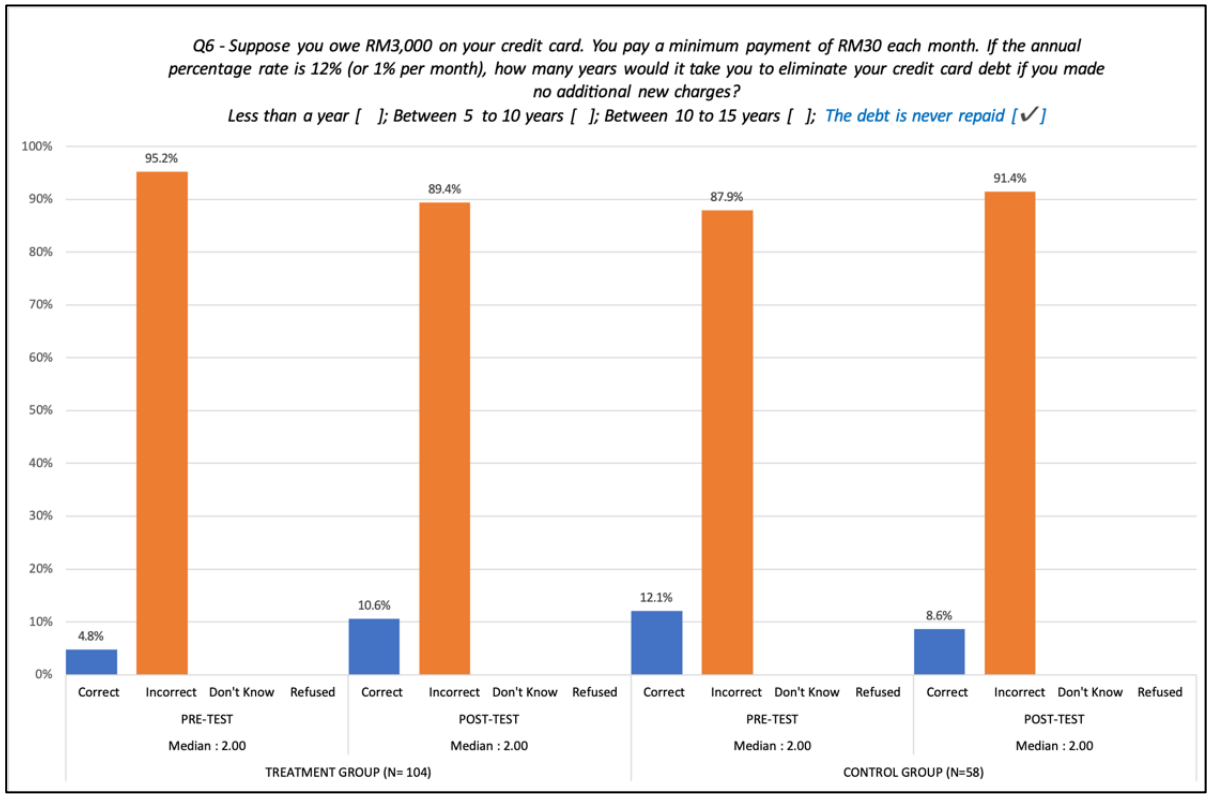
Figure 7.6: Q5 on Future Value of Compound Interest Rate



P-value (pre, post) = 0.011 , 0.081; Z-score (pre, post) = -2.534 , -1.747
Mean rank (pre, post) = Intervention (87.27, 85.55), Control (71.16, 74.24)

Perhaps the alarming issue is testing the participants' capacity to do credit card payment calculation (Q6). Similar to previous results, the program was not able to help participants make decision to avoid huge burden on credit card debts (Figure 7.7). Although the incorrect answers of intervention group reduced to 9 percentage points (or 89% at post-test), the effect size was not significant and relatively small (z-score post-test= 0.641, r= 0.050). No significant difference on credit card payment score was found between the intervention and control group at pre-test and post-test (p-value pre-test, post-test= 0.101, 0.522). The trend of answers from both groups was almost similar, whereby nearly 9 out of 10 answered this question incorrectly before and after the program was delivered, which perceived as being the most difficult.

Figure 7.7: Q6 on Credit Card Payment



P-value (pre, post) = 0.101 , 0.081; Z-score (pre, post) = -1.641 , -0.641
Mean rank (pre, post) = Intervention (77.25, 79.36) Control (89.11, 83.91)

Overall, the program showed no differences in the ranked position of numeracy scores between the intervention and control group, signifying no effects on participants' financial numeracy skills. This can further be seen from the analysis made on every question, with no significant differences in scores were evident between both groups. However, the program was found to be effective on improving participants' skills to calculate basic compound interest rate (Q4), which was the only numeracy questions that showed difference between the two groups. For most questions, the trend of answers (from participants in both groups) were almost similar at pre-test and post-test level, and the knowledge level varies across questions (either very good, fair, and poor). Interestingly, the study found that lack of information in the survey questions

has the potential to change participants' perception about the question being asked and the way how they answer the question, particularly after receiving the intervention.

7.4 Program Effects on Financial Knowledge

The remaining questions of the financial literacy survey measured the participants' understanding on advanced financial concepts, where the focus is more towards knowledge on financial words, symbols and operations. This time around, the questions are more advanced than the previous basic numeracy questions. The topics covered in the program equipped participants with theoretical knowledge in order to develop better understanding of relationship between risk and return, macroeconomics parts of finance (such as inflation), savings and investments, diversification, and to establish a good personal financial planning and budgeting. Table 7.5 below presents the difference in total financial knowledge scores before and after the financial education program was delivered.

Table 7.5: Comparison of Financial Knowledge Scores between Intervention Groups and Control Group

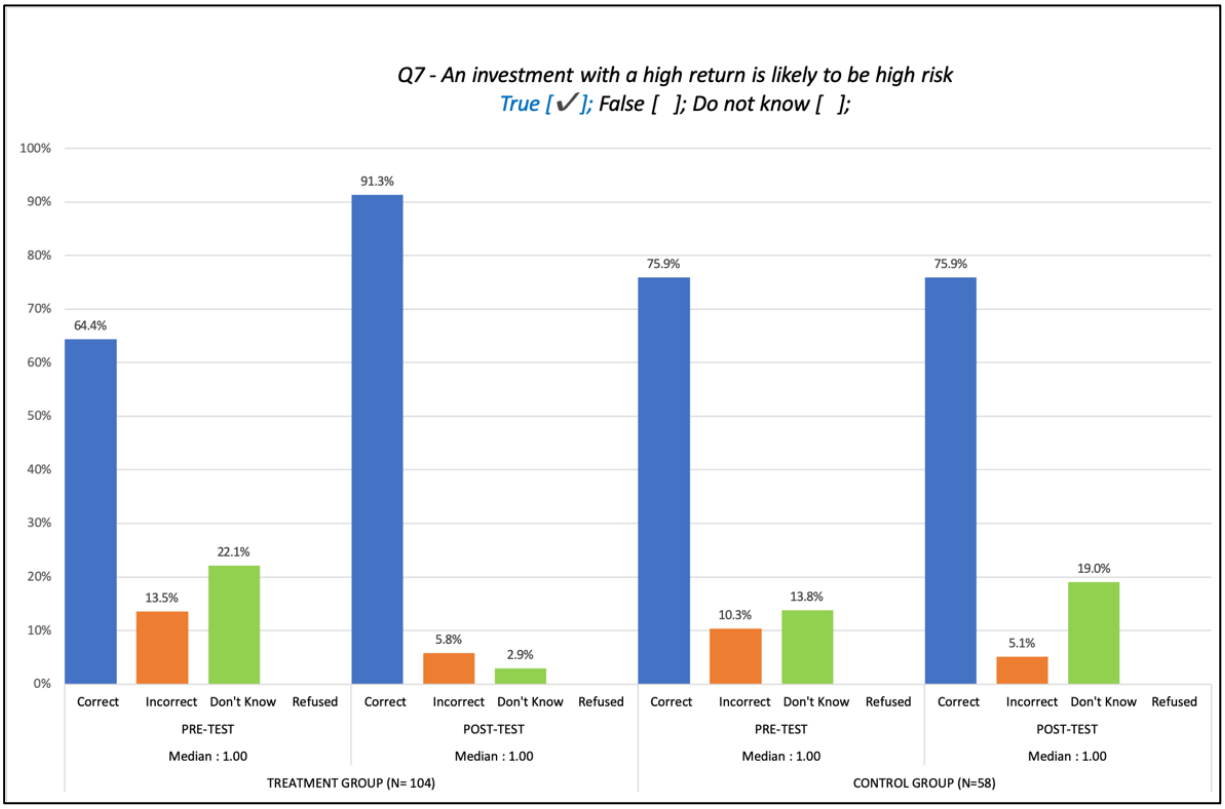
	Pre-Test	Post-Test
Mann-Whitney U	2522.00	2001.00
df	2	2
P-value (2-tailed)	.080	.000***
Median	5.000	6.000
z-score (effect size)	-1.753 (-0.1377)	-3.580 (-0.2813)
Mean rank	T = 76.75 C = 90.02	T = 91.26 C = 64.00

In contrast to previous results on numeracy, the program seems to have improved participants' level of financial knowledge. Result from the Mann-Whitney U test indicates a significant difference of knowledge between participants who attended to the financial education program with those who did not, with an improved average score of 5.000 (pre-test) and 6.000 (at post-

test). The program had significantly produced a small to medium size effects in improving participants' knowledge on advanced financial topics (pre-effect size= 0.137; post effect size= 0.281). The difference in mean ranks value indicates that the level of financial knowledge of the intervention group had far better improved from the low mean rank score of 76.75 (at pre-test) to the highest mean rank score of 91.26 (post-test), quite an opposite result with those in control group (pre= 90.02; post= 64.00). Based on 162 observations, it can be concluded that financial literacy through delivery of financial education program produced a significant effect on knowledge.

Ten individual questions served as proxies to financial knowledge were further examined. There were two topics that have a significant difference of scores between the interventions and control group, which are risk and return tradeoff (Q7) and diversification (Q9, Q10, Q11). With regards to Q7 that tested participants' understanding on investment risks, about 2/3 of the intervention group participants (or 64%) were able to identify the relationship between the risk and the potential return of an investments correctly (Figure 7.8). Although the score was already high at pre-test, the financial education program has further improved the percentage of correct answers (91%) and reduced the percentage of participants who were not able to provide the answers (from 35.6% to 8.7%). In short, participants' knowledge about risk and return tradeoff was significantly higher after attending to the program compared to the control group, but with a small effect size (U=.007, p= .007, effect size= -0.212). Meanwhile, participants in control group did provide a high correct answer at pre-test. This showed that participants' knowledge level on this question was already good. However, as they were not exposed the program, no change in the percentage rate of correct answers was recorded after the intervention period ended.

Figure 7.8: Q7 on Risk and Return Trade-off

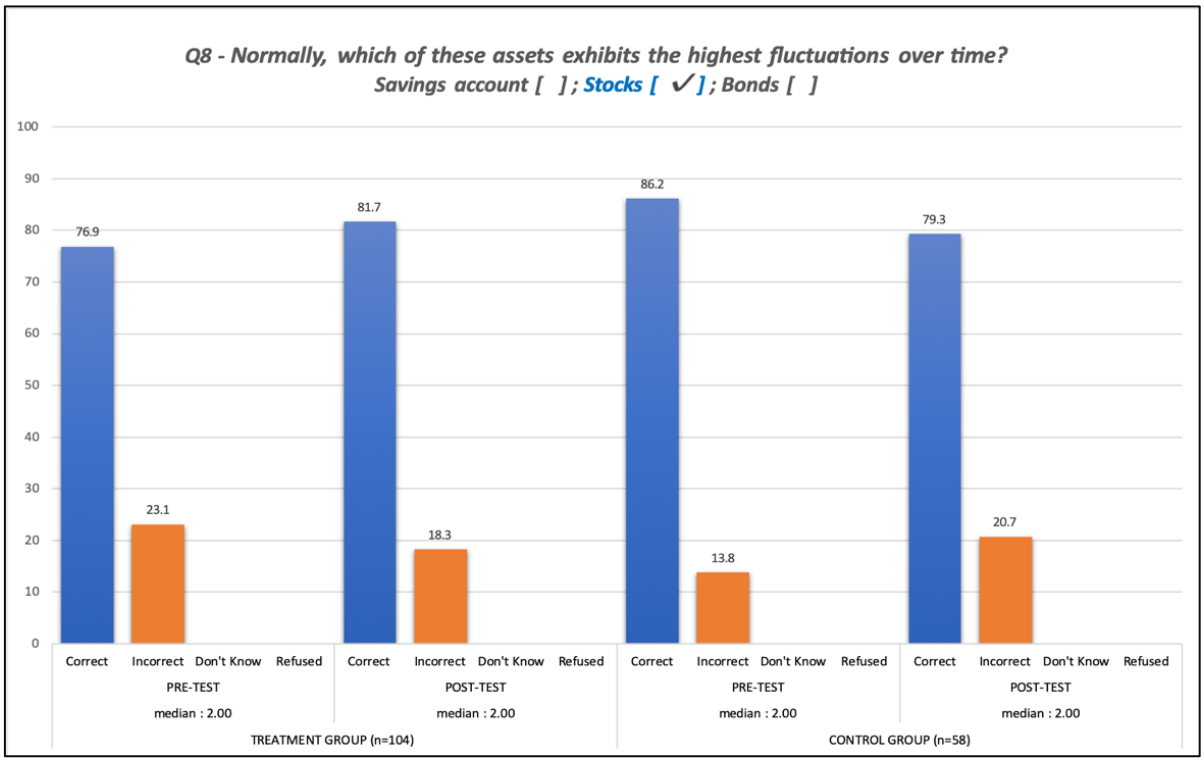


p-value (pre, post) = 0.134 , 0.007; z-score (pre, post) = -1.498 , -2.699
mean rank (pre, post) = Intervention (78.18, 85.99), Control (87.45, 73.45)

However, Q8 (Figure 7.9) that measures a similar concept on risk and return (with a focus on asset fluctuations) showed no sign of difference between groups (U=2543, p= .708). About more than two third of participants from both groups get the answers right, which gave a similar pattern of correct answers at both pre and post-test stage. Although a little increase in correct answer from the intervention group can be seen from the graph at post-test (82%), the overall size of difference with the control group was too small (effect size= -0.030). In a nutshell, both results on Q7 and Q8 revealed that most participants have good foundation on the subject of relationship between risk and return of an investment, even before the program was delivered. One plausible reason to this is participants' familiarity about the subject. If we refer back to baseline characteristics report provided in the earlier chapter, majority of participants are Bumiputera, or the indigenous people of Malaysia who mostly involved in unit trust investment

called the Amanah Saham Bumiputera (or ASB). ASB is a unit trust scheme issued by one of the government's biggest asset management agencies, the PNB (Permodalan Nasional Berhad). The nature of this trust fund is that the price is fixed at the time of purchase until it is sold. Unit holders are given a competitive long-term return whilst at the same time, the risk tolerance is kept at a minimal level. The aim was to inculcate investing habit and to preserve equity and investment of the Bumiputera. Whether they are active or non-active investors, having directly involved in this fund helps participants to understand the subject better.

Figure 7.9: Q8 on Risk and Return Trade-off (asset fluctuations)

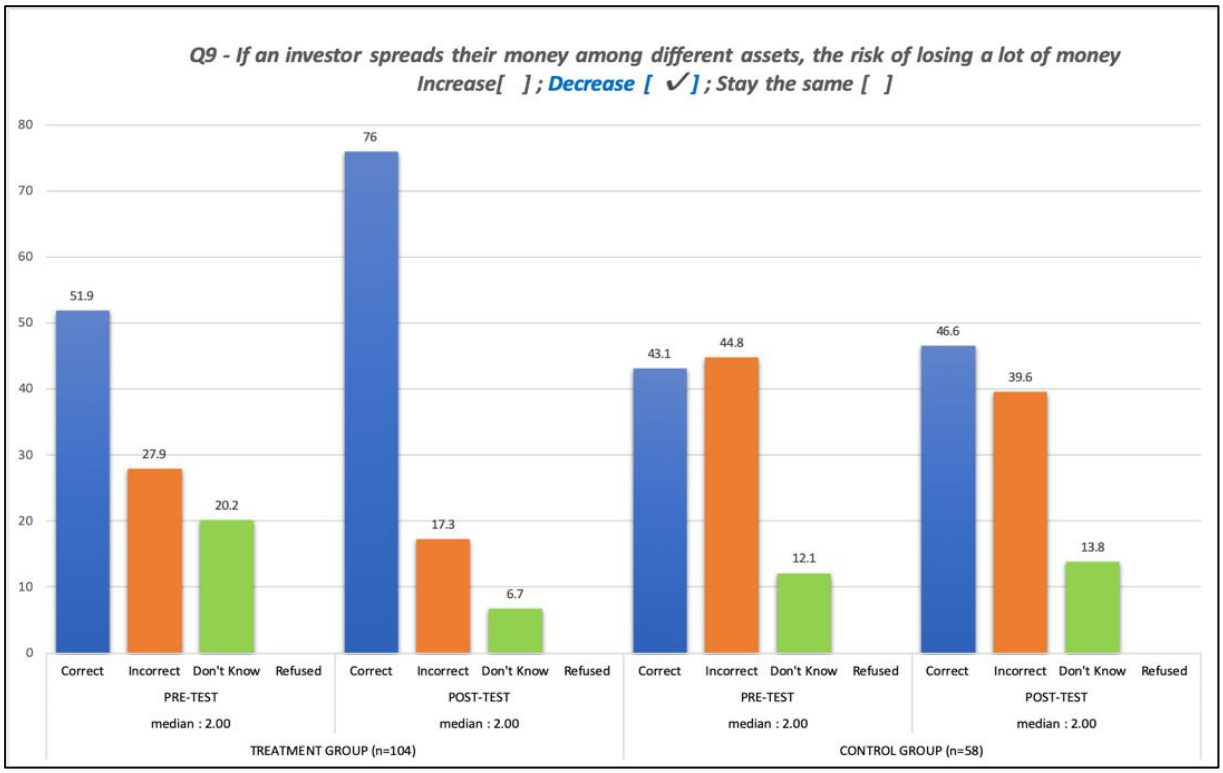


p-value (pre, post) = 0.156 , 0.708; z-score (pre, post) = -1.418 , -0.374
mean rank (pre, post) = Intervention (78.81, 82.20), Control (86.33, 80.24)

The effect from the program on financial knowledge was also due to increase awareness of the notions of risk diversification. Among the diversification questions, the best answer was Q9 (Figure 7.10) on spreading money among different asset, of which the difference in score was significant at 5% level (U=2129, p= .000). The mean rank for control group dropped from 76.91 (pre-test) to 66.21 (post-test) and was significantly lower than the intervention group (90.03). The percentage of participants in the intervention group who answered the question correctly had improved from 52% to 76%, with a much lower rate of those who were not able to answer correctly or do not know the answer. The trend of answers from the control group remained almost identical with pre-test.

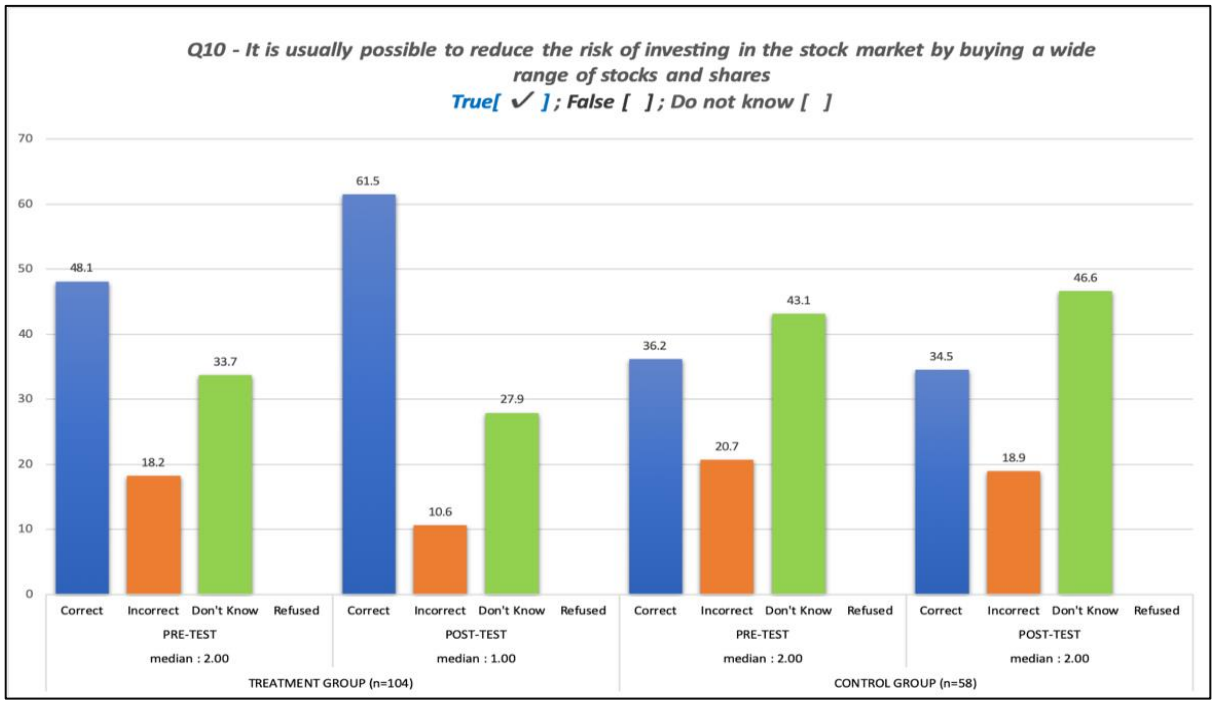
Figure 7.10: Q9 on Diversification (asset allocation)

p-value (pre, post) = 0.283 , 0.000; z-score (pre, post) = -1.073 , -3.762
mean rank (pre, post) = Intervention (84.06, 90.03), Control (76.91, 66.21)



Q10 measured a similar concept of "not putting all eggs in one basket" strategy, but more specific on stock market investments (Figure 7.11). However, it received much less frequent correct answers as opposed to Q9. But still, the difference in score between the two groups was evident, significant at 5% level (U=2543, p= .001). On the other hand, the answer for Q11 (Figure 7.12) had quite an opposite trend with the previous two, in which more than 50% of participants state they do not know the answer. The program had an effect on reducing this figure, and significantly improved the percentage rate of correct answer from a low 15% to 43% as opposed to the control group which showed no sign of improvement (U=2543, p= .001).

Figure 7.11: Q10 on Risk Diversification (Stock Investments)



p-value (pre, post) = 0.146 , 0.001; z-score (pre, post) = -1.455 , -3.294
mean rank (pre, post) = Intervention (84.94, 89.35), Control (75.33, 67.43)

7.5 Conclusion

Overall, the study found no impact of the program on participants' financial numeracy skills. The pattern of answers given by the experimental groups were more or less the same with those of control group prior and after the program was conducted. Additionally, both groups possessed good numeracy skills particularly questions on division and interest rate, possibly due to the nature of the questions which are quite straightforward and easy to understand. The financial education program does help participant to understand better the compound interest which is the only question that has significant difference with control group, with 37 different points from the treatment group. However, it seems that participants have difficulty to answer more advance questions on future value compound interest and loan which requires a decent understanding about the concepts, and the program does not seem to help much on improving the scores of these two questions.

The financial education program has had an impact on participants' financial knowledge, in which a statistically significant difference was evident between the experimental group and the control group two months after the program was conducted. Additionally, the program had significantly produced a small to medium size effects in improving participants' knowledge on advanced financial topics. Going specific into financial topics, all participants possessed good understanding on the concept of risk and return tradeoff, which indicates their familiarity about the topic. Another important finding is that the program had significantly improved participants' understanding on the concept of diversifications which covers the aspects of asset allocations, stock investment and mutual fund.

CHAPTER 8

IMPACT OF INTERVENTIONS ON FINANCIAL ATTITUDES AND FINANCIAL BEHAVIOURS

8.1 Introduction

From the previous analyses, the study so far has presented the descriptive statistics of participants involved in this study, as well as non-parametric statistics of the effects of classroom financial education program on financial literacy. This chapter moves on to explore the changes on financial attitudes and behaviours produced by the interventions using a difference in different approach based on the size of difference at two points in time. Three approaches were used to conduct the analysis:

1) First, paired sample t-test (using the Wilcoxon Signed Rank Test) was used to explore statistically significant changes within each of the groups in terms of the difference between pre and post-test scores.
2) Second, one-way ANOVA was used to assess the differential effect; whether there are statistically significant differences between the Intervention groups (financial education program and SMS reminders) and the Control group. A Bonferroni post-hoc test was conducted to identify between which groups does the difference occur. Bonferroni correction was applied to control for inflation in Type 1 error, and therefore all effects are reported at .0167 level of significance.
3) Third, the General Linear Model analysis (using one-way ANCOVA) was conducted to consider other potential explanatory variables that may influence or have had an

impact on the observed differences. The variables considered in the analysis are as followings:

a) Gender of participants.
b) Participants' field of study (measured according to their majors either economic/business major and non-economics/business major).
c) Family income background (measured based on the family income levels; low, medium or high-income level)

Section 8.2 until 8.4 will present the statistical analysis of intervention impacts on participants' attitudes measured in three domains namely savings, money management and budgeting. To check if these perceived attitudes are further translated into actions, section 8.5 until 8.7 present the results of the impacts of both interventions towards financial behaviours. The final section provides summary of the chapter.

8.2 The Impact of Interventions on Attitudes Toward Savings

Three financial attitudes with regards to savings were examined based on the degree to which they agree or disagree with 1) their perceived believe as a saver and a spender; 2) the importance of savings; and 3) making sure to have money saved for rainy days.

Overall, the additional SMS reminders has had a differential impact on participants' attitude on being a saver than a spender, the importance of saving and saving money for rainy days. The intervention also was found to have differential impacts compared to the Control group on savings attitude except for saving money for rainy days.

Table 8.1: t-test and One-Way ANOVA results on attitude toward savings

Financial Attitudes (Savings)	Differences between pre- and post-surveys			Difference in difference between IV1 and Control	Difference in difference between IV2 and Control
	IV1	IV2	Control		
	Sig.	Sig.	Sig.	Sig.	Sig.
I am more of a saver than a spender	.114	**.000**	**.035**	1.000	**.000**
Saving is not really important	.439	**.000**	**.006**	.150	**.000**
I always make sure I have money saved for rainy days	.754	**.013**	.502	1.000	.770

Table 8.1 shows that there was no statistically significant difference for the Intervention 1 group between pre- and post-test in all the three savings attitudes suggesting that their perceived attitude on savings is not affected by the financial education program. The Intervention 2 group (with additional SMS reminders) on the other hand, has a statistically significant difference in all three aspects of savings attitude between pre- and post-test at the 1% level, whilst the Control group has a statistically significant difference in terms of attitude on being a saver at 5% level (p=.035) and acknowledging the importance of saving at 1% level (p=.006).

The difference in difference analysis shows that the difference between the Intervention 1 and Control groups was not statistically significant for all the three savings attitudes. However, the additional SMS reminders appear to have differential impact on the Intervention 2 group when compared to the Control group, which is statistically significant at the 1% level (p= .000) for attitude on being a saver than a spender and the attitude on the importance of saving. However, no statistically significant difference was evident in regards to attitude on saving for rainy days between the Intervention 1 group and Control group (p=1.000) and Intervention 2 group and

Control group (p=.770), which means that neither one of these interventions have an impact on changing the participants' attitude on saving money for emergency purposes.

Figure 8.1: "I am more of a saver than a spender"

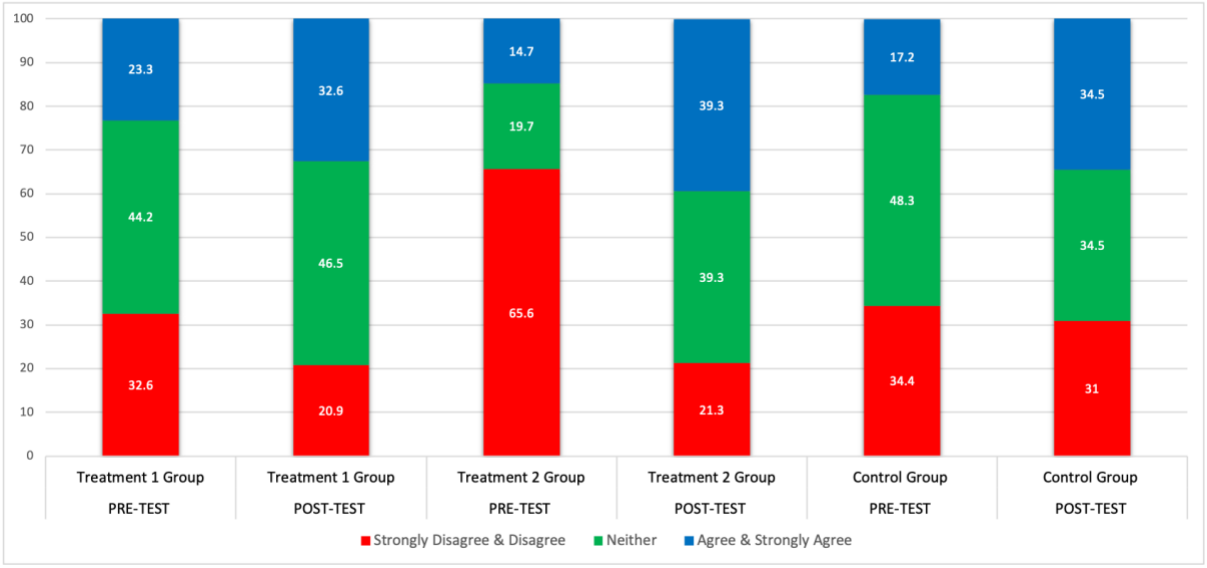


Figure 8.2: "saving is not really important"

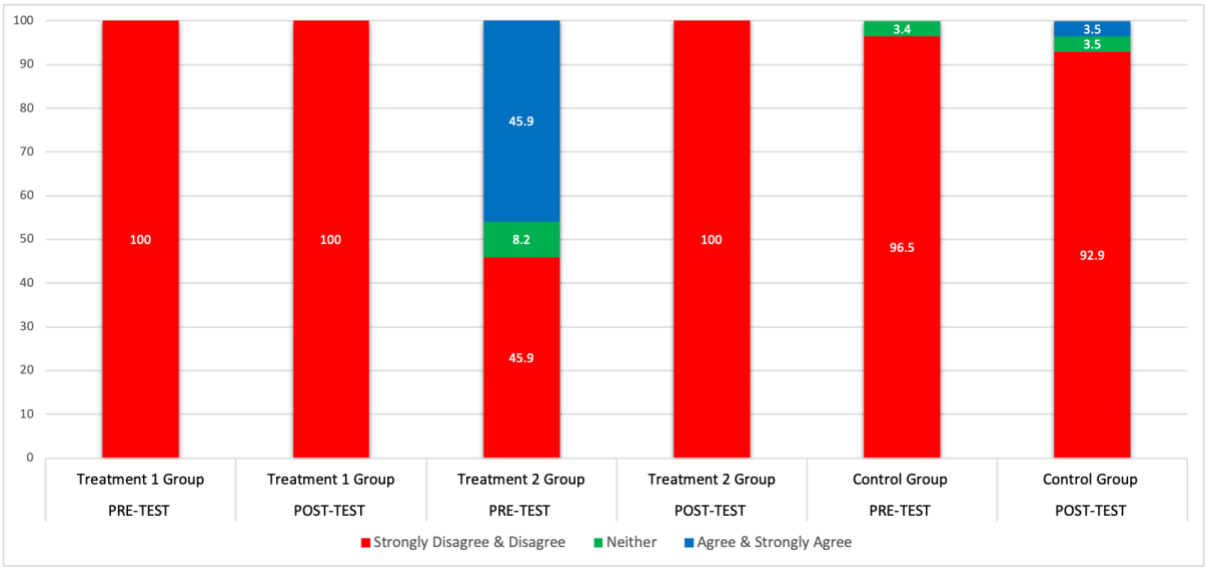
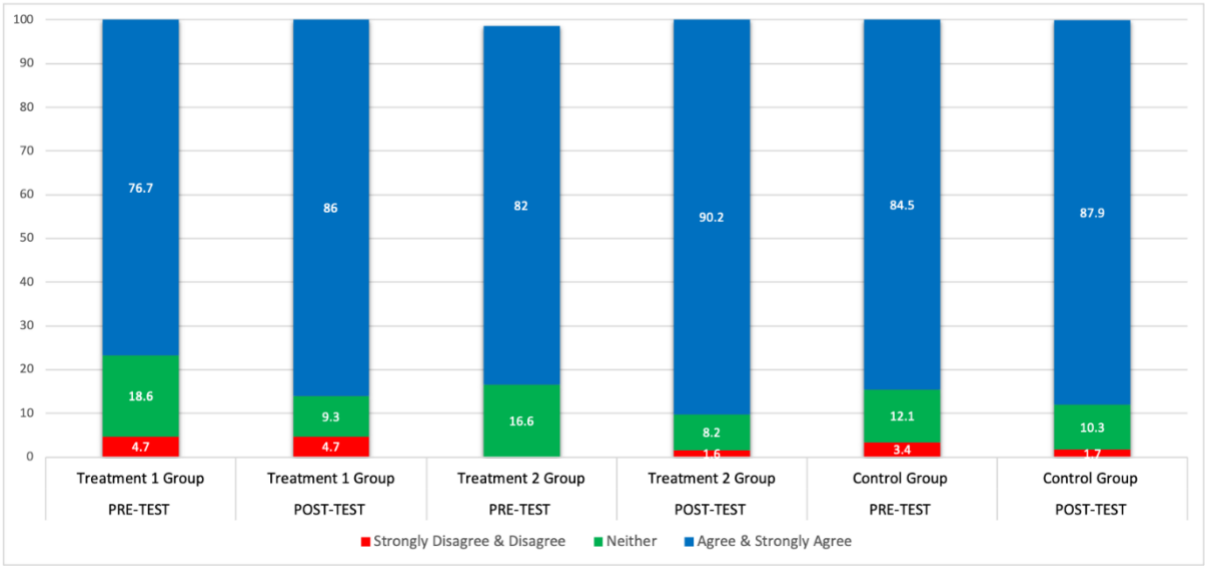


Figure 8.1 shows that the proportion of participants in the Intervention 2 group who perceived themselves as being a saver more than a spender increased by 25 percentage points to 39.3% after receiving the additional SMS reminders compared to those who only received the

financial education program, which only saw an increase of 9 percentage points in the Intervention 1 group.

Similar intervention effects on the Intervention 2 group can be seen from Figure 8.2 on *"saving is not really important"*. This question was negatively worded from the original *"saving is really important"* to avoid acquiescence response bias; participants' tendency to just simply agree with all statements without considering the content of the item. At pre-test, 45.9% of participants of the Intervention 2 group did not think savings really matter to them which in line with their attitude of being a spender than a saver prior to the interventions (quite the opposite with the Intervention 1 group and Control group). However, there was a change in participants' perceived attitude following the interventions that helps them to recognize the value of savings. The proportion of participants in the Intervention 2 group that indicated their disagreement with the statement increased by 54.1 percentage points to 100%, which signifies the positive impact of the additional SMS reminders on their spending habits.

Figure 8.3: "I always make sure I have money saved for rainy days "



Meanwhile, Figure 8.3 shows that participants of all groups perceived good attitude on saving money for rainy days before and after the experimental period. Prior to interventions, all participants agreed that savings for emergency purposes is important and that they make sure to have money allocated for it. Hence, it is not surprising to see that this attitude is not significantly affected by the types of financial information received even after the interventions was delivered albeit the 9-percentage point increase in the Intervention 1 group (86%), and 8.2 percentage point increase in the Intervention 2 group (90.2%). The Control group recorded a 3.4 percentage points increase (87.9%), the least among the three groups.

Table 8.2: General Linear Model (Attitude on Savings)

Attitude (Savings)	INTERVENTION FACTOR		OTHER EXPLANATORY VARIABLES		
	IV1 and Control	IV2 and Control	Field of Study	Income Background	Gender
I am more of a saver than a spender	1.000	**0.003**	0.123	0.807	0.284
Saving is not really important	1.000	**0.000**	**0.000**	0.212	0.061
I always make sure I have money saved for rainy days	1.000	0.746	0.823	0.191	0.748

The General Linear Model (Table 8.2) shows the results of attitudes on saving whilst controlling for field of study, family income background and gender. The model confirms that participants' attitude on being a saver than a spender is impacted by the additional SMS reminders (p= .003) and is not influenced by either their field of study (p=0.123), family income background (p=0.807) or gender (p=0.284). Meanwhile, attitude on the importance of saving is impacted by the additional SMS reminders (p=0.000) and also by their field of study (p=0.000), suggesting that participants' education background especially those with economics

and business majors have an influence on improving their perceived believe on the importance of savings. Family income background and gender on the other hand, have no influence and did not have a statistically significant impact on all the three attitudes on savings.

8.3 The Impact of Interventions on Attitudes Toward Money Management

Two financial attitudes in regards to money management were examined based on the degree to which they agree or disagree with 1) being organized in managing daily cash flows *(I am very organized when it comes to managing my money every day)* and 2) the importance to make a spending plan *(planning for spending money is essential to successfully managing one's life)*.

Table 8.3: t-test and One-Way ANOVA results on attitude toward money management

Financial Attitudes (Money Management)	Differences between pre- and post-surveys			Difference in difference between IV1 and Control	Difference in difference between IV2 and Control
	IV1	IV2	Control		
	Sig.	Sig.	Sig.	Sig.	Sig.
I am very organized when it comes to managing my money every day	**.001**	**.000**	**.027**	.602	.083
Planning for spending money is essential to successfully managing one's life	0.356	**.000**	0.67	1.000	**.005**

The financial education program has had differential impact on participants' attitude in managing daily cash flows. Table 8.3 shows that the Intervention 1 group has a statistically significant difference at the 1% level (p=.001) between pre- and post-test. However, the difference in difference analysis shows no evidence of differential impact of the program when compared to the Control group (p=.602). There were no significant changes for the Intervention 1 group and Control group between the pre- and post-test scores. Meanwhile, the additional SMS reminders was found to have differential impacts on participants' attitudes in managing

daily cash flows and the importance to make a spending plan. The differences between pre- and post-test for Intervention 2 group were significant at the 1% level (p=.000) for both attitudes on money management. Additionally, the difference in difference analysis shows a statistically significant difference between the Intervention 2 group and Control group (p= .005) on the importance to make a spending plan.

Figure 8.4: "I am very organized when it comes to managing my money every day"

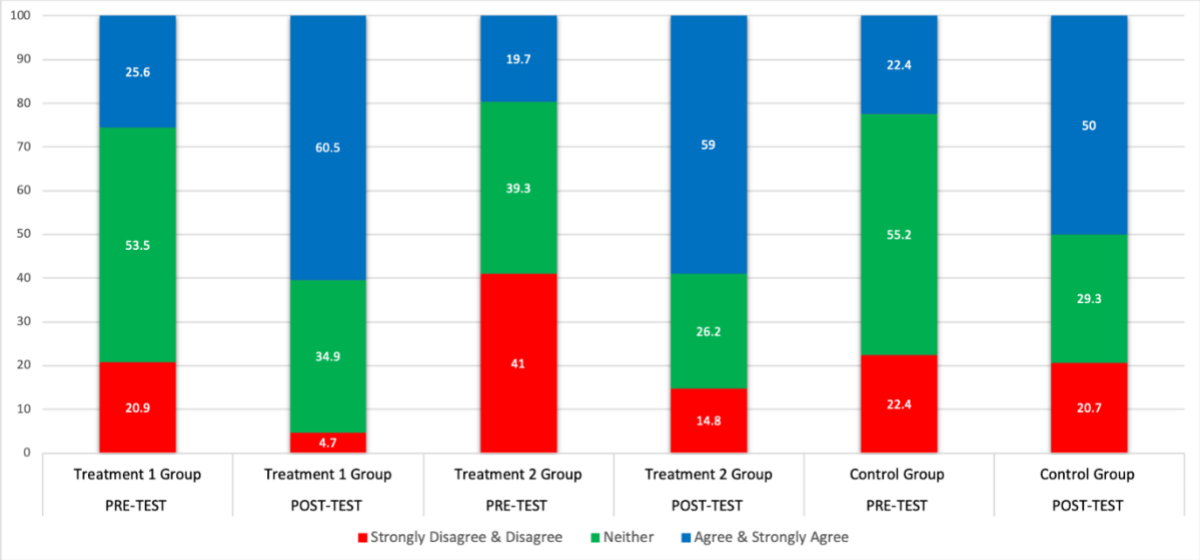
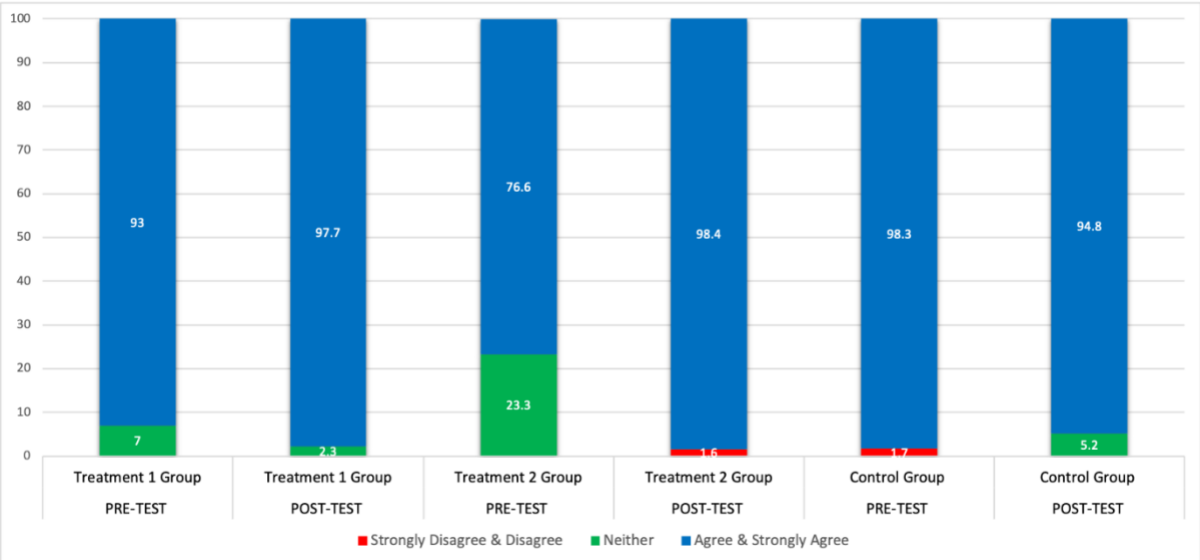


Figure 8.5: "Planning for spending money is essential to successfully managing one's life"



The impacts of the interventions can be seen from the responses of each group between the pre- and post-experimental period. Figure 8.4 shows that the proportion of participants in the Intervention 1 group whom perceived to be organized in managing daily cash flows increased by 35 percentage points to 60.5% (from 25.6%). Interestingly, the response from the Intervention 2 group who received the additional SMS reminders shows a significant increase by 39 percentage points to 59% (from 19.7%). The Control group recorded a 27.6 percentage points increase to 50% (from 22.4%), the least among the three groups. Meanwhile, more than 90% participants of the Intervention 1 group and the Control group showed their agreement when asked about the importance to make a spending plan prior to the delivery of interventions, except for the Intervention 2 group who scored the lowest of 76.6% (Figure 8.5). However, this figure increased by 21.8 percentage points to 98.4% after the SMS reminders was delivered, suggesting that the additional intervention does help to improve their attitude on making a spending plan. The Intervention 1 group on the other hand, had a small increase of 4.7 percentage points to 97.7%.

Table 8.4: General Linear Model (Attitude on Money Management)

Attitude (Savings)	INTERVENTION FACTOR		OTHER EXPLANATORY VARIABLES		
	IV1 and Control	IV2 and Control	Field of Study	Income Background	Gender
I am very organized when it comes to managing my money every day	.557	.108	.886	.754	.596
Planning for spending money is essential	1.000	.085	**.000**	.513	0029

After controlling for other potential explanatory variables, the General Linear Model (Table 8.4) shows that neither the interventions, or their field of study, or income background or gender significantly influence participants' attitude in managing daily cash flows. However, contradicted with the difference of difference analysis in Table 8.3, participants' attitude on the importance to make a spending plan was not actually influenced by the additional SMS reminders, but by their field of study (p=.000).

8.4 The Impact of Interventions on Attitudes Toward Budgeting

Two financial attitudes with regards to budgeting was examined based on the degree to which they agree or disagree with 1) the importance of having a written budget for a successful financial management and 2) their believe on budgeting is helpful. This section will explain the analysis for each question in detail.

Figure 8.6: "A written budget is absolutely essential for a successful financial management"

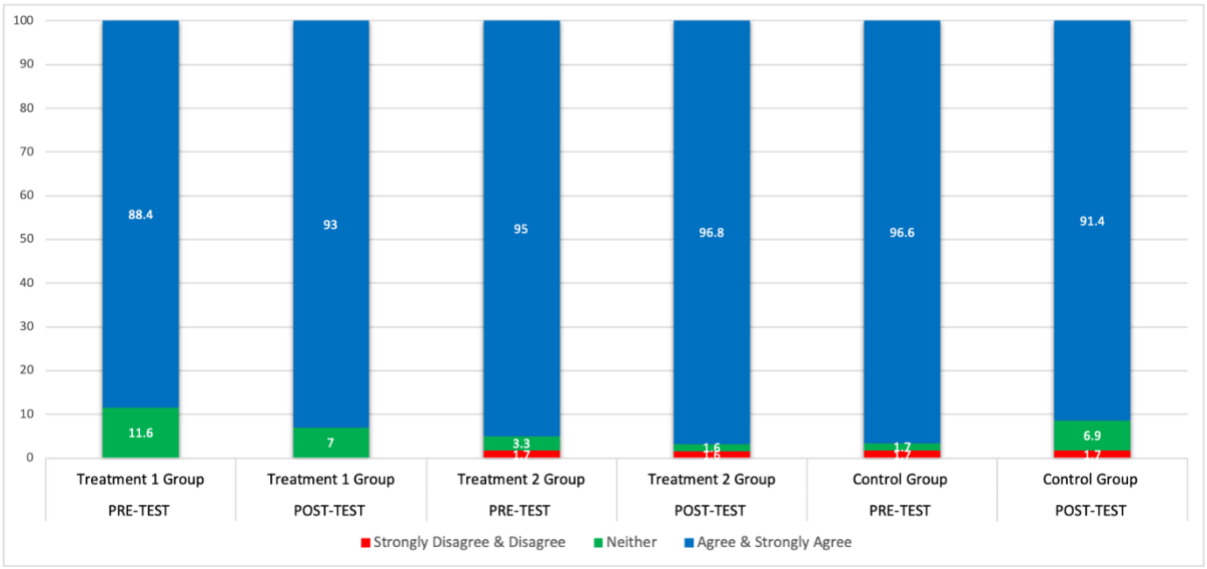
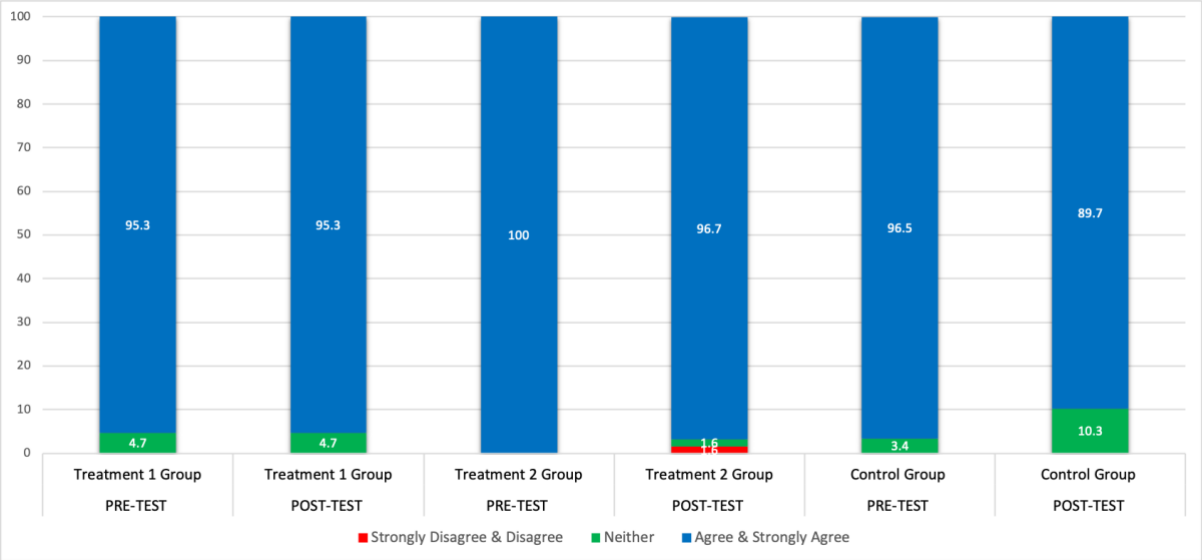


Figure 8.7: “I believe budgeting is helpful”



In general, participants from all groups felt that having a written budget is important for a successful financial management and they have a strong believe that budgeting is helpful. Figure 8.6 and Figure 8.7 shows that on average, the proportion of participants in the Intervention 1 group, Intervention 2 group and Control group who agreed & strongly agreed with these two questions was about 90% between the pre- and post-test periods; hence no differential impacts on attitude towards budgeting was evident for the Intervention 2 group and the Control group. Nonetheless, a small significant change can be seen as a result of the financial education program. The proportion of participants in the Intervention 1 group who perceived that having a written budget is important increased by 4.6 percentage points to 93% (Figure 8.6).

Table 8.5 t-test and One-Way ANOVA results on attitude toward budgeting

Financial Attitudes (Budgeting)	Differences between pre- and post-surveys			Difference in difference between IV1 and Control	Difference in difference between IV2 and Control
	IV1	IV2	Control		
	Sig.	Sig.	Sig.	Sig.	Sig.
A written budget is absolutely essential for a successful financial management	**0.037**	0.140	0.747	1.000	1.000
I believe budgeting is helpful	0.552	0.695	0.549	1.000	0.707

Table 8.6: General Linear Model (Attitude on Budgeting)

Attitude (Savings)	INTERVENTION FACTOR		OTHER EXPLANATORY VARIABLES		
	IV1 and Control	IV2 and Control	Field of Study	Income Background	Gender
A written budget is absolutely essential for a successful financial management	0.324	1.000	0.174	0.066	0.673
I believe budgeting is helpful	1.000	1.000	0.404	0.085	0.52

As depicted in Table 8.5, Intervention 1 group shows a statistically significant difference at the 5% level (p=.037) between the pre- and post-surveys. However, there was no statistically significant difference observed between the Intervention 1 and Control groups. On a similar note, there was no significant changes observed within the Intervention 2 group and the Control group between pre-and post-tests due to the fact that majority of the participants stated their agreement in both aspects of budgeting attitudes. This is mirrored in the difference in difference analysis that shows no differential impact of the interventions between Intervention 2 group and Control group. After controlling for other potential explanatory variables, the General

Linear Model (Table 8.6) shows that neither the interventions, or their field of study, or income background or gender significantly influence participants' attitude in both aspects of budgeting.

8.5 The Impact of Interventions on Behaviour Toward Savings

Three financial behaviours with regards to savings were asked in both pre and post-test surveys based on the degree to which they perceived to perform behaviours on 1) saving money for rainy days; 2) doing regular monthly savings; and 3) doing advance savings.

Table 8.7 t-test and One-Way ANOVA results on behaviour toward savings

Financial Behaviours (Savings)	Differences between pre- and post-surveys			Difference in difference between IV1 and Control	Difference in difference between IV2 and Control
	IV1	IV2	Control		
	Sig.	Sig.	Sig.	Sig.	Sig.
I save money for rainy days	4.42	**0.000**	0.851	1.000	**0.000**
I regularly set aside money each month for savings	**0.063**	**0.000**	0.194	1.000	0.824
I begin saving well in advance for big events like Christmas	0.138	0.23	**0.019**	1.000	0.031

The financial education program had significantly impacted participants' behaviour in setting aside money regularly each month for savings. Table 8.7 shows that the Intervention 1 group has a statistically significant difference at the 10% level (p=0.063) on perceived behaviour in doing regular monthly savings between the pre- and post-tests. However, no significant difference was evident in other aspects of saving behaviour. Additionally, the difference in difference analysis shows no statistically significant difference between the Intervention 1 group and the Control group in all three aspects of saving behaviours.

Interestingly, the participants' perceived savings behaviour improved when the additional SMS reminders was delivered. Between the pre- and post-tests, there was a statistically significant difference at 1% level (p=.000) in the Intervention 2 group on saving money for rainy days and setting aside money regularly each month for saving. The difference in difference analysis shows a statistically significant difference between the Intervention 2 group and the Control group at the 1% level (p=.000) on saving for rainy days, but not on regular monthly savings and advance savings.

Figure 8.8: "I save money for rainy days"

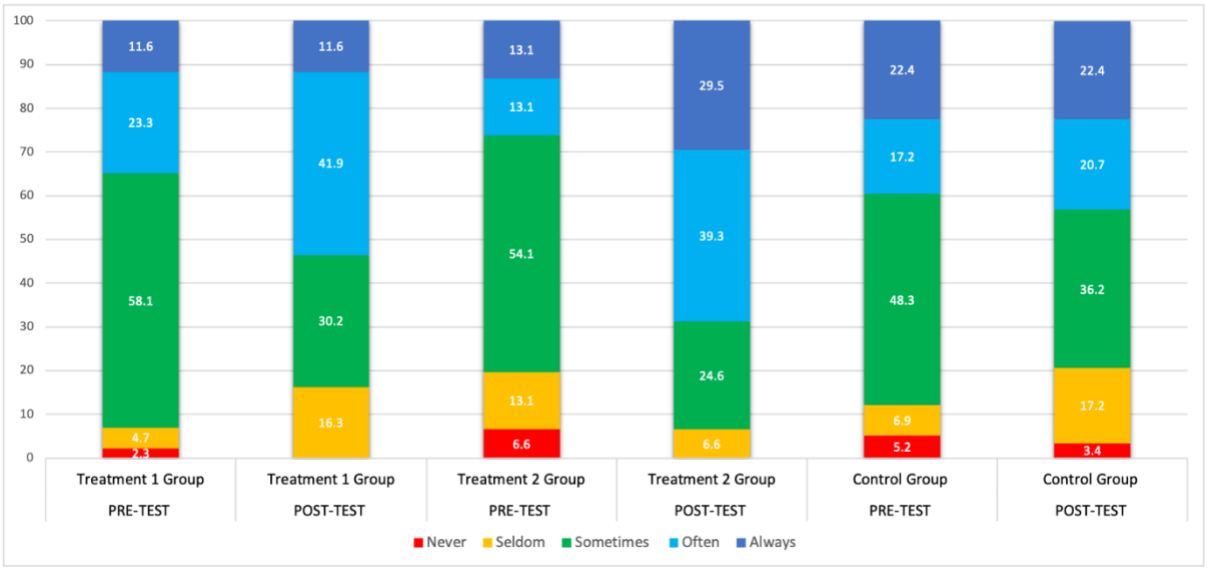


Figure 8.8 shows that 34.9% of participants in the Intervention 1 group either often or always perceived to save money for rainy days prior to the delivery of financial education program, but this had increased to 53.5% after the intervention was delivered. Interestingly, a much bigger changes can be seen in the Intervention 2 group, with a percentage rate increased among the participants who either often or always perceived to save money for rainy days from 26.2% to 68.8%. The respective numbers in the Control group increased by only 43.1% (from 39.6%). The biggest percentage change is in those participants who often save for rainy days,

whichincreased from 13.1% to 39.3% in the Intervention 2 group; an increase of 26.2 percentage points, compared with an increase of only 18.6 percentage points (41.9%) in the Intervention 1 group and 3.5 percentage points (20.7%) in the Control group.

Figure 8.9: “I set aside money each month for savings”

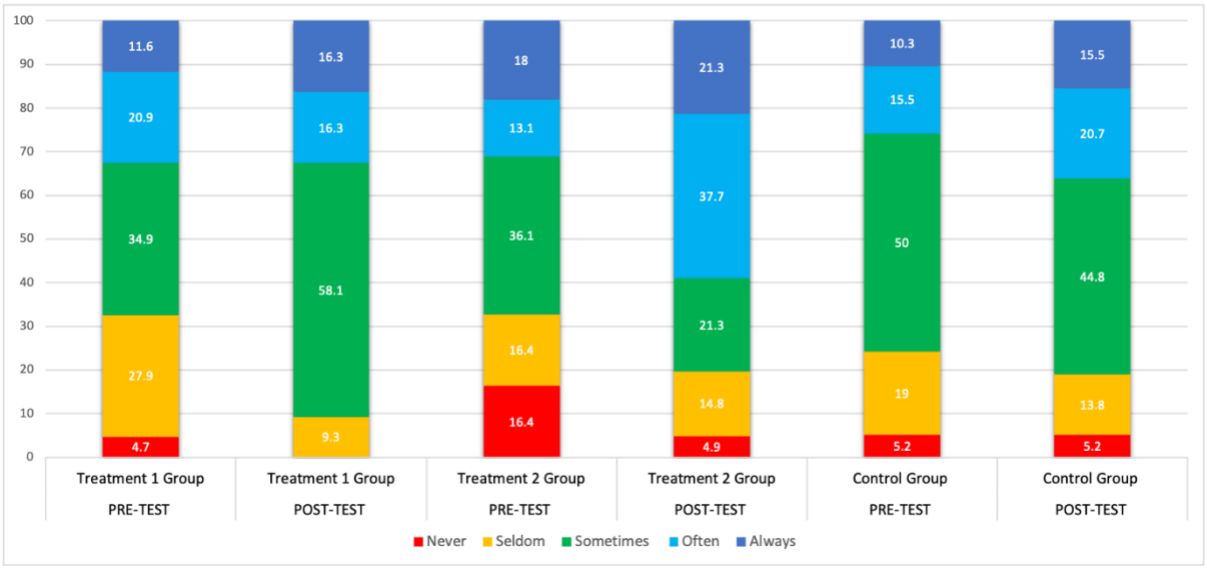
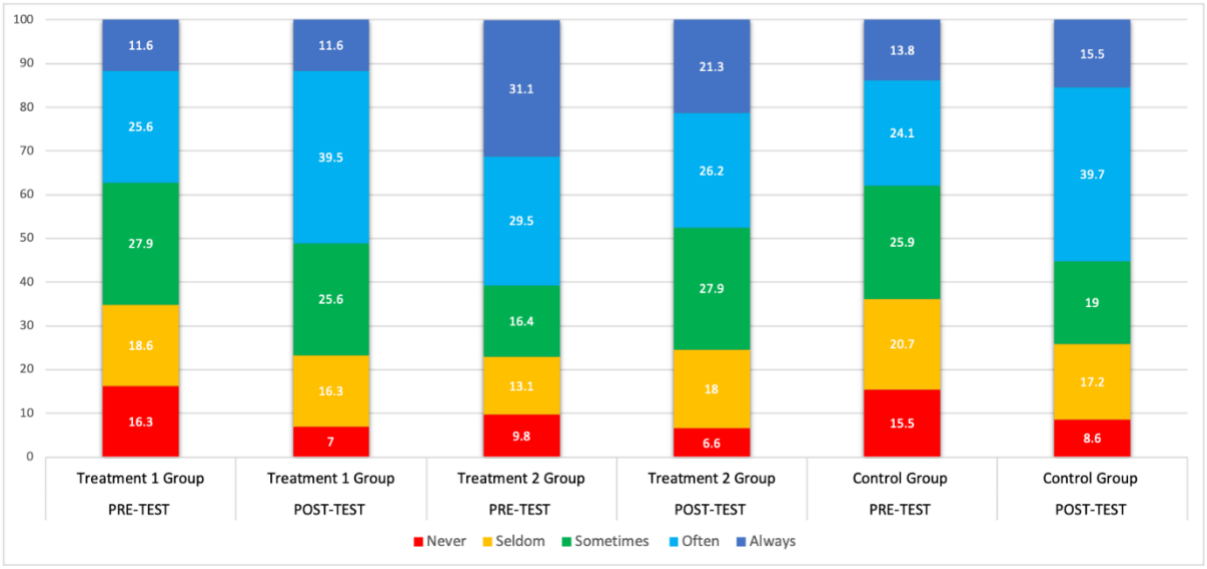


Figure 8.9 depicted the participants’ responses at pre- and post-tests on doing regular savings. At pre-test, 32.5% of the participants in the Intervention 1 group perceived to either often or always putting aside some money every month for savings, and the percentage of responses (32.6%) did not seem to change after the financial education program was delivered. However, there was a behaviour change from seldom to sometimes in setting aside money each month for savings. At pre-test, 27.9% of the Intervention 1 group participants perceived they seldom do monthly savings, but this had reduced to 9.3% after the intervention. Instead, participants who sometimes perceived to do regular monthly savings increased from 34.9% to 58.1% after the delivery of the program – an increase of 23.2 percentage points between the pre- and post-test. Meanwhile, another behaviour change on regular monthly savings can be seen after the additional SMS reminders was delivered. At pre-test, about 31.1% of participants in the

Intervention 2 group either often or always perceived to set aside money each month for savings, and this had increased to 59% after the additional intervention was delivered – an increase of 27.9 percentage points between the pre- and pre-tests. The respective numbers in the Control group increased by only 10.4 percentage points to 36.2% at post-test (from 25.8%). The impact of SMS reminders resulted in behaviour change from 'sometimes' to 'often' in setting aside money each month for savings. The percentage of the Intervention 2 group participants who perceived sometimes setting aside money for savings reduced from 36.1% to 21.3% between the pre- and post-tests. Instead, the participants who perceived often in doing regular monthly savings increased from 13.1% to 37.7%; an increase of 24.6 percentage points

Figure 8.10: "I begin saving well in advance for big events like Christmas"



Meanwhile, Figure 8.10 depicted the participants' perceived behaviours on doing advance savings for big events like Christmas. Overall, there was a mixture of answers ranging from never to always from all the three groups. Although no significant difference was found between the pre- and post-tests, the proportion of participants in the Intervention 1 group who often and always begin saving well in advance for big events increased by 13.9 percentage points to 51.1% (from 37.2%) following the financial education program. This compares with

a drop of 13.1 percentage points in the Intervention 2 group to 47.5% (from 60.6%), suggesting that the SMS reminders was not that effective to influence participants' behaviours in doing advance savings. The Control group has the most percentage points increase of 17.3 from 37.9% to 55.2%.

Table 8.8: General Linear Model (Behaviour on Savings)

Behaviour (Savings)	INTERVENTION FACTOR		OTHER EXPLANATORY VARIABLES		
	IV1 and Control	IV2 and Control	Field of Study	Income Levels	Gender
I save money for rainy days	1.000	**.000**	.110	.022	.765
I regularly set aside money each month for savings	1.000	.300	.783	.898	.837
I begin saving well in advance for big events like Christmas	1.000	.127	.905	.169	.029

The General Linear Model (Table 8.8) confirms that the participants' behaviour in saving money for rainy days is impacted by the additional SMS reminders (p=0.000) and was not influenced either by the field of study (p=.110), income-levels (p=.022) or gender (p=.765). These three variables did not have any significant influence on participants' behaviour in setting aside money each month for savings (regular savings) and saving well in advance for big events like Christmas (advance savings) too.

8.6 The Impact of Interventions on Behaviour Toward Money Management

Four financial behaviours with regards to money management were asked in both pre and post-test surveys based on the degree to which they perceived to perform behaviours on 1) comparing prices *(I compare prices to every shop when purchasing)*; 2) paying bills on time *(I pay my bills on time)*; 3) stay within spending plan *(I stay within my spending plan)*; and 4) keeping written or electronic record of expenses *(I keep a written or electronic record of my expenses)*.

Table 8.9 t-test and One-Way ANOVA results on behaviour toward money management

Financial Behaviours (Money Management)	Differences between pre- and post-surveys			Difference in difference between IV1 and Control	Difference in difference between IV2 and Control
	IV1	IV2	Control		
	Sig.	Sig.	Sig.	Sig.	Sig.
I compare prices to every shop when purchasing	.561	**.000**	.319	1.000	**.011**
I pay my bills on time	**.034**	**.000**	.278	1.000	**.008**
I stay within my spending plan	.831	**.000**	**.064**	.951	.454
I keep a written or electronic record of my expenses	**.040**	**.000**	.794	.761	.213

In terms of behaviour towards money management, the financial education program has had positive impact on participants' behaviour in paying bills on time and keeping written record of expenses. Table 8.9 shows a statistically significant difference between pre- and post-interventions at the 5% level in the Intervention 1 group on paying bills on time (p= .034) and keeping written record of expenses (p=. 040). However, behaviour changes in comparing prices when purchasing (p=.561) and stay within spending plan (p=.831) are not statistically significant. The difference in difference analysis shows that the difference between the

Intervention 1 and Control groups was not statistically significant for all the four money management behaviours.

Meanwhile, significant behaviour changes as the results from the additional SMS reminders can be seen in all aspects of money management behaviours. Between the pre- and post-tests, there was a statistically significant difference at the 1% level in the Intervention 2 group in terms of comparing prices (p=.000), paying bills on time (p=.000), staying within spending plan (p=.000) and keeping a written or electronic record of expenses (p=.000). The difference in difference between the Intervention 2 group and the Control group was statistically significant for behaviour in comparing prices to every shop when purchasing (p=.011) and paying bills on time (p=.008). In the other aspects, the difference between the groups was not statistically significant.

Figure 8.11: "I compare to every shops when purchasing"

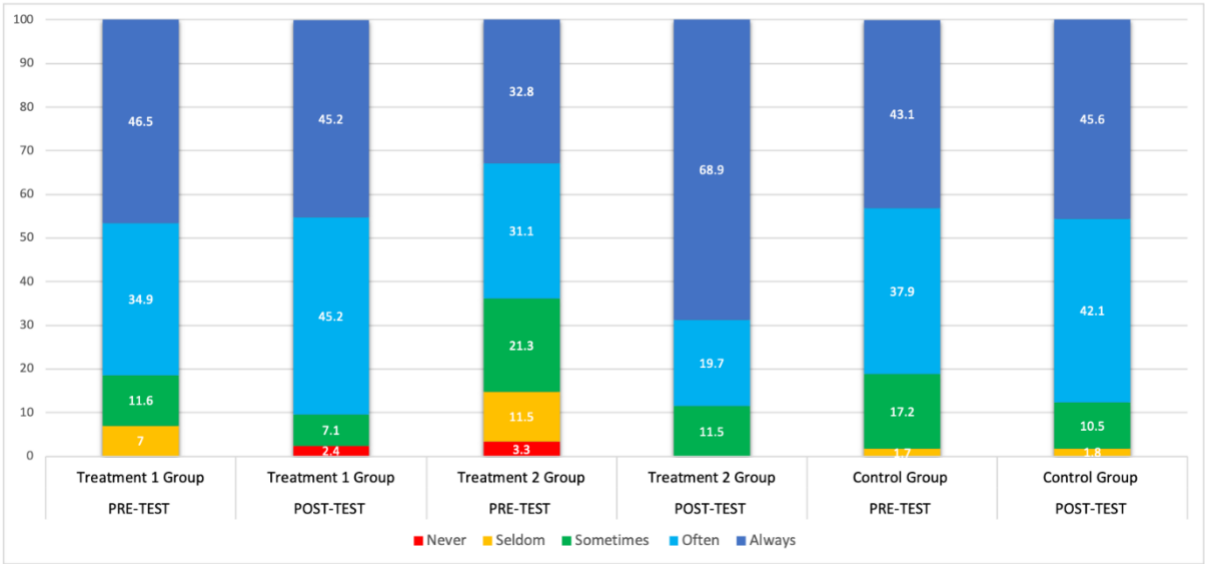
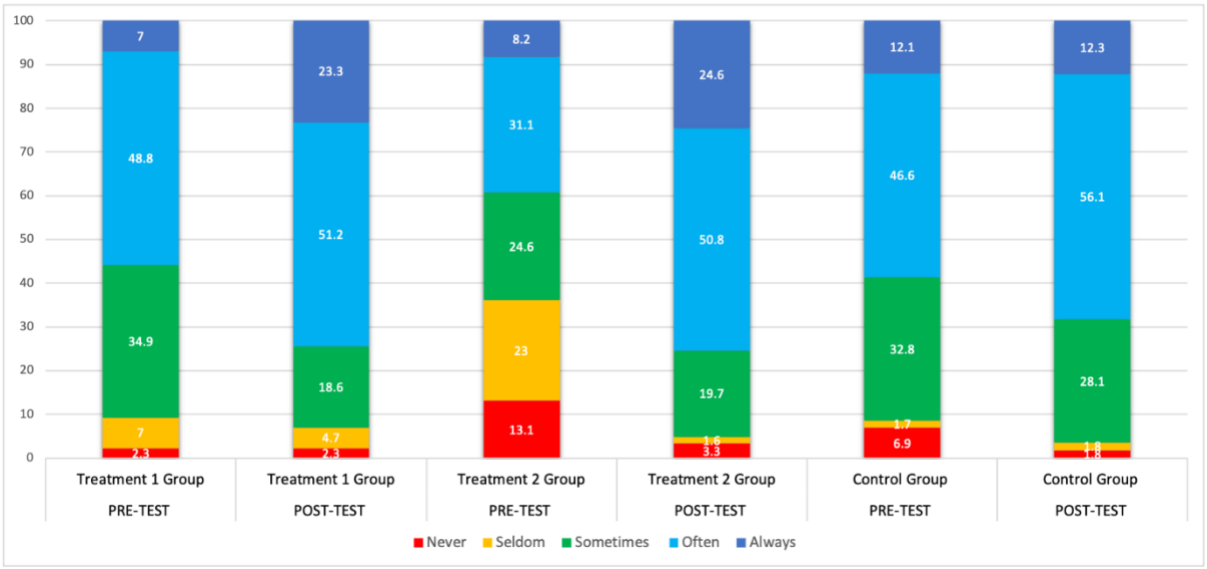


Figure 8.11 shows that the proportions of the participants in the Intervention 1 group that either often or always compare to every shop when purchasing increased by 10 percentage points to 90.4% (from 81.4%) following the financial education program. However, much bigger

changes can be seen among the participants in the Intervention 2 group with 24.7 percentage points increased to 88.6% (from 63.9%) after the additional SMS reminders was delivered. This compared with an increase of only 6.7 percentage points in the Control group. The biggest percentage change is in those participants who always compare prices between shops when purchasing, increased from 32.8% to 68.9% in the Intervention 2 group (additional SMS reminders); an increase of 36.1 percentage points, compared with a drop of 1.3 percentage points (45.2%) in the Intervention 1 group and an increase of only 2.5 percentage points (45.6%) in the Control group.

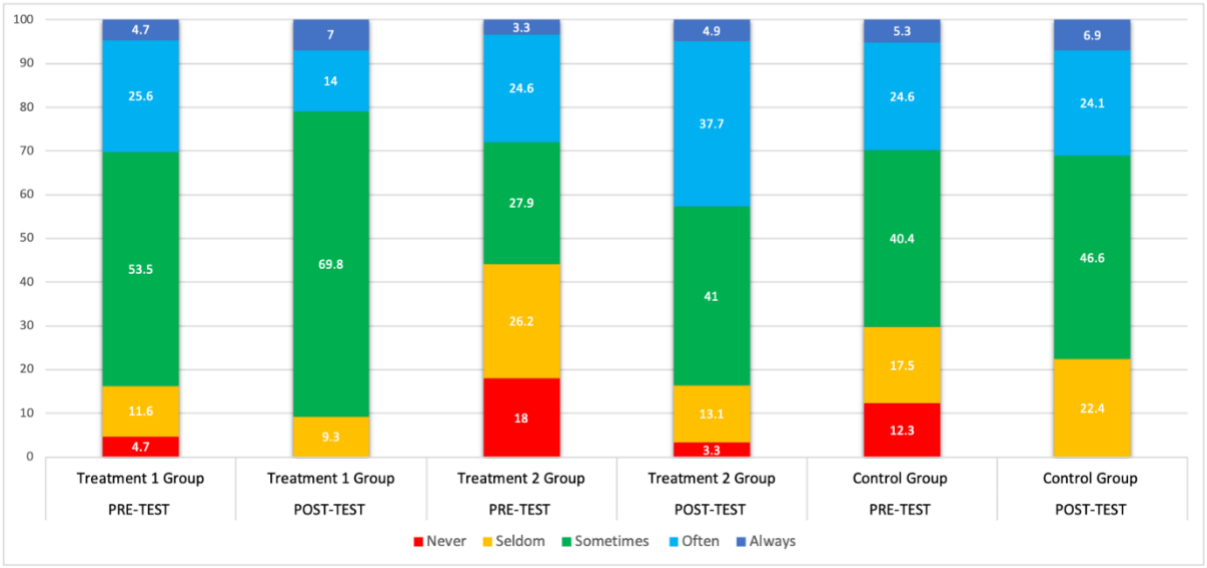
Figure 8.12: "I pay my bills on time"



On behaviour towards paying bills on time, 74.5% of participants in the Intervention 1 group perceived to either often or always paying their bills on time, an increase of 18.7 percentage points from 55.8% prior to the delivery of the financial education program. Participants who received the additional SMS reminders (Intervention 2 group) has the biggest percentage points change of 36.1, from 39.3% to 75.4% in between the pre- and post-intervention. This compared with an increase of only 9.7 percentage points in the Control group. The biggest percentage

change is in those participants who always compare prices between shops when purchasing, increased from 32.8% to 68.9% in the Intervention 2 group (additional SMS reminders); an increase of 36.1 percentage points, compared with a drop of 1.3 percentage points (45.2%) in the Intervention 1 group and an increase of only 2.5 percentage points (45.6%) in the Control group.

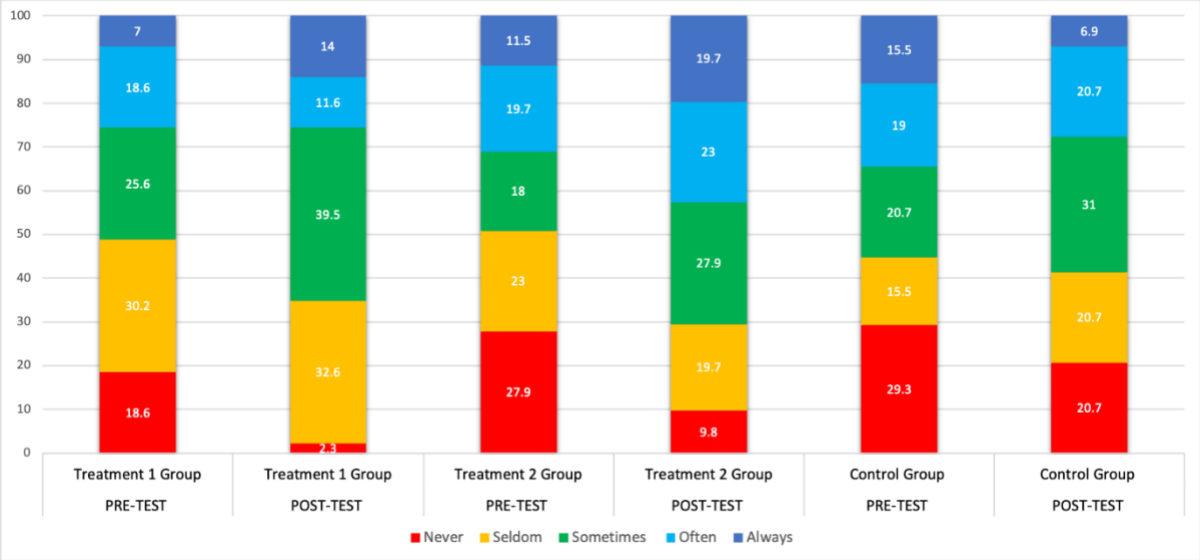
Figure 8.13: "I stay within my spending plan"



With regards to spending control, majority of participants felt that they sometimes stay within their spending plan. Figure 8.13 shows that the proportions of participants in the Intervention 1 group that perceived either often or always stay within spending plan dropped by 9.3 percentage points to 21% (from 30.3%) following the delivery of the financial education program. Majority of participants in the Intervention 1 group felt that they sometimes are able to stay within their spending plan – an increase of 16.3 percentage points from 53.5% to 69.8%. Meanwhile, the proportions of participants in the Intervention 2 group that perceived either often or always stay within spending plan increased by 14.7 percentage points to 42.6% (from 27.9%) following the intervention, indicating the effectiveness of the SMS reminders in stimulating participants' behaviour to control their spending behaviour and to stay within

spending plan. This compared with an increase of only 1.1 percentage points in the Control group. In between the pre- and post-tests, the additional SMS reminders also reduces the percentage rate of participants who answered "seldom" (from 26.2% to 13.1%) and never (from 18% to 3.3%) in staying within their spending plan.

Figure 8.14: "I keep a written or electronic record of my expenses"



A significant behaviour changes on keeping a written or electronic record of expenses can be seen as the results of both interventions; the financial education program and additional SMS reminders (Figure 8.14). In between the pre-and post-tests, the proportion of participants in Intervention 1 group who answered "never" to keeping a record of expenses reduced by 16.3 percentage points to only 2.3% (from 18.6%). Similar results can also be seen in the Intervention 2 group with a reduction of 18.1 percentage points from 27.9% to only 9.8%, compared to the Control group with a reduction of only 8.6 percentage points. A change behaviour can be seen when participants' answers changed from being "never / seldom" to "sometimes / often / always. The proportion of participants who perceived "sometimes" in keeping a record of expenses increased by 13.9 percentage points in the Intervention 1 group

(39.5%), 9.9 percentage points in the Intervention 2 group (27.9%), and 10.3 percentage points in the Control group (31%).

Meanwhile, the proportion of participants who keep a written record of expenses increased among participants who received the additional SMS reminders. In between the pre- and post-tests, 42.7% of participants in the Intervention 2 group perceived to either often or always keeping a written or electronic record of their expenses, an increase of 11.5 percentage points from 31.2% prior to the delivery of SMS reminders. This compares with 25.6% of participants who only received the financial education program (Intervention 1 group) with no percentage points changes in between the pre- and post-tests. The biggest percentage change is in those participants who always keep a record of expenses, which increased from 11.5% to 19.7% in the Intervention 2 group (additional SMS reminders); an increase of 8.2 percentage points, compared with an increase of only 7 percentage points (14%) in the Intervention 1 group and a reduction of 8.6 percentage points (6.9%) in the Control group.

Table 8.10: General Linear Model (Behaviour on Money management)

Behaviour (Savings)	INTERVENTION FACTOR		OTHER EXPLANATORY VARIABLES		
	IV1 and Control	IV2 and Control	Field of Study	Income Levels	Gender
I compare prices to every shop when purchasing	1.000	**.006**	.261	.297	.498
I pay my bills on time	1.000	**.029**	.090	.304	.086
I stay within my spending plan	1.000	.369	.967	.309	.812
I keep a written or electronic record of my expenses	.349	.150	**.010**	.577	.504

The General Linear Model (Table 8.10) confirms that the additional SMS reminders influenced participants' behaviours in comparing prices when purchasing (p=.006) and paying bills on time (P=.029) and was not influenced either by the field of study, income-levels, or gender. Although there was a significant behaviour changes as the results from the additional SMS reminders on behaviour pertaining to staying within spending plan (from previous analysis in Table 8.9), there was no behaviour change when compared with the Control group (p=.369), even after controlling for other potential explanatory variables. Meanwhile, participants' behaviour pertaining to keeping records of expenses is not affected by the interventions, but by their field of study (p=.010).

8.7 The Impact of Interventions on Behaviour Toward Budgeting

Two financial behaviours with regards to budgeting were asked in both pre and post-test surveys based on the degree to which they perceived to perform behaviours on 1) making a monthly budget *(I make a monthly budget)*; and 2) ability to stick to the budgeting plan *(I am able to stick to the budget)*.

Table 8.11: t-test and One-Way ANOVA results on behaviour toward budgeting

Financial Behaviours (Budgeting)	Differences between pre- and post-surveys			Difference in difference between IV1 and Control	Difference in difference between IV2 and Control
	IV1	IV2	Control		
	Sig.	Sig.	Sig.	Sig.	Sig.
I make a monthly budget	.479	**.000**	**.028**	1.000	1.000
I am able to stick to the budget	.293	**.000**	**.069**	1.000	**.016**

Analyses from Table 8.11 suggests that financial education program alone do not have significant impacts on participants' budgeting behaviours. Between the pre- and post-tests, there was no statistically significant difference in the Intervention 1 group in terms of making a monthly budget (p=.479) and the ability to stick to the budgeting plan (p=.293). Additionally, the difference in difference analysis shows no statistically significant difference between the Intervention 1 group and the Control group in all aspects of budgeting behaviours.

However, the additional dose of education in the form of SMS reminders contributed to a significant change in the participants' budgeting behaviours. Between the pre- and post-tests, there was a statistically significant difference at the 1% level in the Intervention 2 group on participants' behaviours in making a monthly budget (p=.000) and the ability to stick to the budgeting plan (p=.000). Similarly, the Control group has a statistically significant difference in terms of making a monthly budget at the 5% level (p=.028) and the ability to stick to the budgeting plan at the 10% level (p=.069). The difference in difference analysis shows a statistically significant difference between Intervention 2 group and Control groups at the 1% level in terms of ability to stick to the budgeting plan (p=.016).

Figure 8.15: “I make a monthly budget”

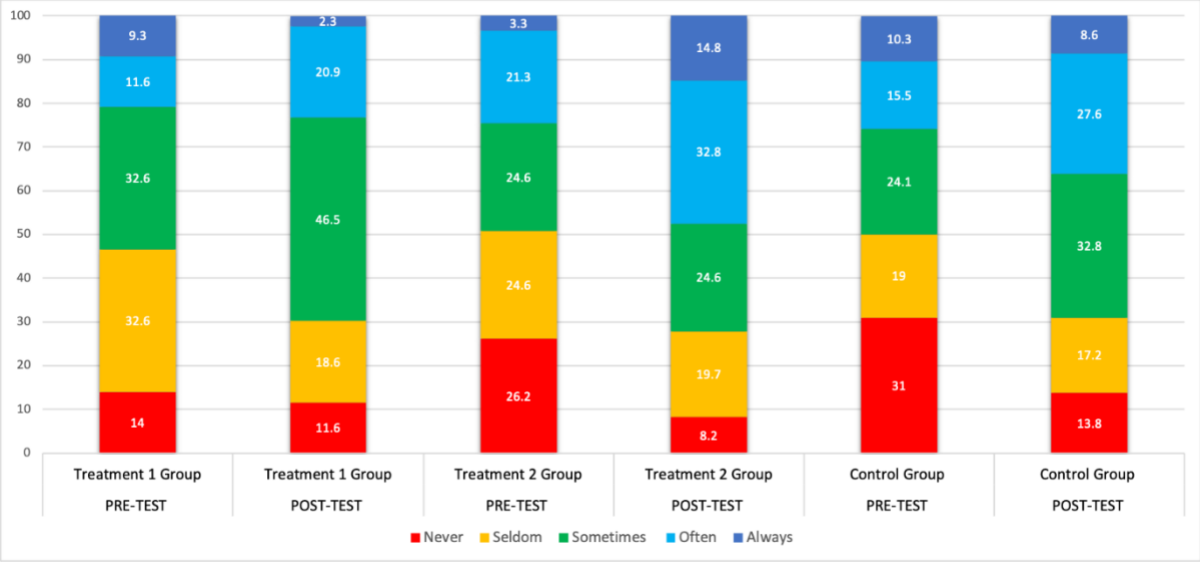


Figure 8.15 depicts participants’ responses when asked if they make a monthly budget. Overall, participants’ behaviour in making a monthly budget is still on average, with answers ranging from never to always prior and after the interventions were delivered. Only 23.2% of participants in the Intervention 1 group perceived to either often or always make a monthly budget at post-intervention, a small increase of 2.3 percentage points from 20.9% prior to the delivery of the financial education program. However, participants who received the additional SMS reminders (Intervention 2 group) has the biggest percentage points change of 22 points, from 24.6% to 47.6% in between the pre- and post-intervention. This compared with an increase of only 10.4 percentage points in the Control group. The effects of the interventions can also be seen among those who barely make a monthly budget. The proportion of participants who perceived either never or seldom in making a monthly budget reduced by 16.4 percentage points in the Intervention 1 group (30.2% from 46.6%) and 22.9 percentage points in the Intervention 2 group (27.9% from 50.8%). Meanwhile, the Control group recorded a reduction of 19 percentage points to 50% (from 31%).

Figure 8.16: “I am able to stick to the budget”

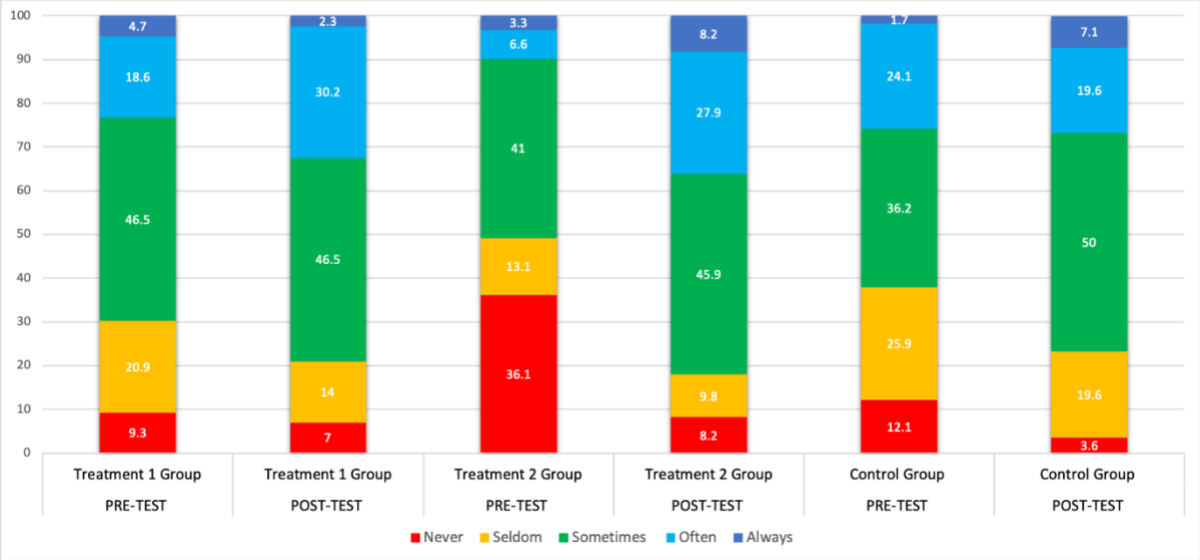


Figure 8.16 depicts the participants’ perceived behaviour on their ability to stick to the budgeting plan. Between the pre-and post-tests, almost half of participants of all groups think that they sometimes are able to stick to their budgeting plan. However, the effects of the interventions can be seen particularly after receiving the SMS reminders. The proportion of participants in the Intervention 1 group who are often or always able to stick to the budget increased by only 9.2 percentage points to 32.5% (from 23.3%) following the financial education program. However, much bigger changes can be seen among participants in the Intervention 2 group with 26.2 percentage points increased to 36.1% (from only 9.9%) after the SMS reminders were delivered. This compared with an increase of only 0.9 percentage points in the Control group. There was also a huge percentage drop among those who are barely able to stick to the budgeting plan. The biggest change is in the Intervention 2 group, whereby the proportion of participants who never or seldom able to stick to the budget reduced by 31.2 percentage points to 18% (from 49.2%) following the additional SMS reminders. This compared with only 9.2 percentage points drop in the Intervention 1 group to 21% (from 30.2%).

Table 8.12: General Linear Model (Behaviour on Budgeting)

Behaviour (Budgeting)	INTERVENTION FACTOR		OTHER EXPLANATORY VARIABLES		
	IV1 and Control	IV2 and Control	Field of Study	Income Levels	Gender
I make a monthly budget	.827	1.000	.087	.351	.893
I am able to stick to the budget	1.000	**.011**	.714	.064	.112

Although there was a behaviour improvement between the pre-and post-tests within each group, the General Linear Model (Table 8.12) confirms that participants' behaviour in making a monthly budget when compared with the Control group is neither affected by both interventions, their field of study, income levels or gender. However, the participants' ability to stick to the budgeting plan improved following the delivery of additional SMS reminders (p=.011) and the behaviour change was not influenced by their field of study, income levels or gender.

8.8 Conclusion

Interesting findings were found on the impacts of the treatments towards financial attitudes and financial behaviours. In regards to financial attitudes, it was found that the financial education program alone does not have significant impact when compared to the Control group in all aspects of financial attitudes. However, participants' attitudes on the importance of having a written budget and being organized in daily money management had gradually improved and were significant between the pre-and post-tests. Other aspects of financial attitudes that have no significant difference but shows small improvements between the pre-and post-tests include

1) attitude on being a saver than a spender, 2) have money saved for rainy days, 3) the importance to plan for spending money, and 4) believe that budgeting is helpful. It is important to note that, the insignificant difference was not mainly due to ineffectiveness of the financial education program alone. Another reason was due to the high scores given by participants during the pre-and post-tests. For example, majority (or 100%) of participants in the Intervention 1 group stated their disagreement with the statement "saving is not really important" at pre- and post-tests, which makes no difference in terms of scores following the delivery of the financial education program. This indicates that with or without the program being delivered, participants already have good attitude on the importance of savings. Similarly, at pre- and post-tests, more than 90% of participants stated their agreement on statements pertaining to attitudes on money management (whether planning for spending money is essential in managing one's life), and budgeting (whether a written is essential for a successful financial management and whether budgeting is helpful).

The study found that participants' financial attitudes had further improved following the delivery of additional SMS reminders. Between the pre-and post-tests, there was a significant difference in all of the savings and money management constructs. In other words, participants who received the additional SMS reminders perceived to be more of a saver than a spender, acknowledged that saving is really important, always make sure they have money saved for rainy days, more organized in managing money and more aware on the importance to plan for spending money. Additionally, when compared with the Control group, participants' financial attitudes had improved particularly on savings (perceived believe to be more of a saver than a spender and the importance of savings) and money management attitude (the importance of planning for spending money). When controlling for other factors, the study also found that participants' attitude on the importance of savings was not only influenced by the additional

SMS reminders, but also by their field of study. In short, participants with business and economic majors have greater awareness that saving is important to them as opposed to those of other majors. Participants' field of study also have influence on attitude towards the importance to plan for spending money.

Similar with attitudes, in terms of financial behaviour, this study showed that participants who received the financial education program did not have significant difference when compared with the Control group in all of the behaviour constructs. However in between pre- and post-tests, there was a modest improvement and significant difference on behavior towards money management in terms of paying bills on time and keeping a written record of expenses. Meanwhile, participants who received the additional SMS reminders have the most improvements in behaviour changes, and appeared to translate their attitudes into behaviours in savings, money management and budgeting. In between the pre- and post-tests, the intervention has improved participants' behaviours in saving money for rainy days, setting aside money each month for savings (regular savings), comparing prices to every shop when purchasing, paying bills on time, staying within spending plan, keeping a written or electronic record of expenses, making a monthly budget and ability to stick to the budgeting plan. Moreover, there was a significant improvement and statistically significant difference between participants who received the additional SMS reminders with the Control group on behaviours in terms of saving for rainy days, comparing prices to every shop when purchasing, paying bills on time and ability to stick to the budgeting plan.

Although the financial education program has little effects on improving attitudes and behaviours, it is still relevant and should not be ignored. It is simply argued here that formal classroom education alone is not the only solution to further promote attitude and behaviour

change. As shown in this study, an additional dose of education in the form of SMS reminders is viable to nudge people to alter their decision-making behaviour independently without having to affect their freedom of choice and financial commitments.

CHAPTER 9

DISCUSSION AND CONCLUSION

9.1 Introduction

Looking back in Chapter 1, financialization has revolutionized the financial market system and changes the role of every stakeholder involved. Its implication adds pressure on individuals to be more responsible in managing their money effectively, and make better financial decisions. Making a financial decision has never been an easy task, and might jeopardize one's future financial well-being if it is not being made correctly. For this case, financial education plays an important role in helping individuals to be financially literate and have a prudent financial behaviour. However, the efficacy of the program alone is unclear, particularly on changing one's attitudes and behaviours. One might understand the importance of savings and to have spending control, but often struggle to translate it into actions. Instead of lack of knowledge, behavioural proponents suggest this is a psychological issue which might require additional effective intervention to have behavioural changes. This thesis aims to test the efficacy of the financial education program and additional SMS reminder interventions with the focus on university students in Malaysia. This thesis offers several numbers of contribution within the context of academic literatures and methodological approach of conducting the research. More specifically, the findings make a significant contribution to the understanding of SMS reminders as another potential self-control mechanism to circumvent behavioural changes and bridge the gap between knowledge, attitudes and behaviours. This final chapter presents the overall findings of this study.

9.2 Key findings and contributions

Research Question 1: What is the impact of traditional financial education program on the levels of financial literacy?

Financial Numeracy

Table 9.1: Summary of Financial Numeracy Different Points

No	Numeracy Questions	Measurement Category	Pre & Post Test Different Points
1	Imagine that five brothers are given a gift of RM1,000. If the brothers have to share the money equally how much does each one gets?	Division	T= 21 points C= 0 point
2	Imagine that you get a gift of RM1,000, and you put it in the drawer at home for 12 months. After one year how much could you buy for this money?	Inflation Rate	T= -13 points C= -4 points
3	You lend RM50 to a friend one evening and he gives you RM50 back the next day. How much interest has he paid on this loan?	Interest Rate	T= 7 points C= 0 points
4	*Suppose you put RM100 into a saving account with a guaranteed interest rate of 2% per year. You don't make any further payments into this account and you don't withdraw any money. How much would be in the account at the end of the first year, once the interest payment is made?	Compound Interest Rate	T= 39 points C= 5 points
5	And how much would be in the account at the end of five years?	Future Value of Compound Interest Rate	T= 1 point C= 7 points
6	Suppose you owe RM3,000 on your credit card. You pay a minimum payment of RM30 each month. If the annual percentage rate is 12% (or 1% per month), how many years would it take you to eliminate your credit card debt if you made no additional new charges?	Loan	T= 6 points C= -3 points

** Question that has significant difference between groups*

Following Huston (2010), financial literacy in this study is conceptualized based on two dimensions; 1) understanding of personal finance knowledge (knowledge test) and participants' ability to use and apply the knowledge (numeracy test). Overall, the study found no impact of the program on participants' financial numeracy skills. The pattern of answers given by the experimental groups were more or less the same with those of control group prior and after the program was conducted. Additionally, both groups possessed good numeracy skills particularly questions on division and interest rate, possibly due to the nature of the questions which are quite straightforward and easy to understand. The financial education program does help participant to understand better the compound interest which is the only question that has significant difference with control group, with 37 different points from the treatment group. However, it seems that participants have difficulty to answer more advance questions on future value compound interest and loan which requires a decent understanding about the concepts, and the program does not seem to help much on improving the scores of these two questions.

There are two possible explanations to this, in which the factors are related to one another. First, access to credit services, and second is lack of financial experiences. As described in Chapter 6 (data screen and baseline results), majority of the participants do not own a credit card. To obtain credit card approval in Malaysia, an individual must be over 18 years old, have good credit ratings, and a minimum yearly income of RM24,000 (or £4,500) (BNM, 2011). Given their status as full-time students with no regular income from employment, they are less likely to meet the criteria to apply for credit card. Question related to credit card payment is something that they do not often deal with as opposed to other topics, as they are yet to have the access to credit services. It is probably quite difficult to apply the knowledge obtained from classroom (although a related sub-topic on financial market and services was given during the

program) due to lack of real-time experience in using and paying credit cards debts. As mentioned by Johnson and Sherraden (2007), to promote better understanding, financial knowledge needs to be complemented with financial experiences, which can be obtained from any financial policies, instruments and services. Having these factors combined can further improve their skills and make financial education more effective. For instance, research has shown that those who actively participated in the management of an allowance, bank account, or other financial product as a young person, went on to save more as adults (Kotlikoff & Bernheim, 2001 as cited in Johnson & Sherraden, 2007).

The results are in line with existing literatures which argues that financial education does not impact financial numeracy skills, regardless of any forms and types of population. Recent study by Carpena *et. al.* (2017) found no effect of a five-week class-room based financial education program with additional pay for performance treatment among urban poor households in Gujarat, India. Similar results were also reported among youth clubs in Uganda (Jamison *et. al.*, 2014), and among migrant workers in Indonesia (Doi *et. al.*, 2014). While the overall score indicates no significant difference occurred between groups, some of the individual questions do have a significant impact towards participants' numeracy skills albeit the very low effect size. One possible reason to why financial education does not have any impact on numeracy skills is that most students are equipped with good foundation in mathematical skills, which is part of the requirement to enter the university. For record, the student-enrolment system at UMS (and at any public universities in Malaysia) requires students to pass the national higher education certificate (STPM) or diploma with a minimum CGPA of 2.00 and grade C in any 3 subjects including mathematics.

Financial Knowledge

Overall, the financial education program has had an impact on participants' financial knowledge, in which a statistically significant difference was evident between the experimental group and the control group two months after the program was conducted. Additionally, the program had significantly produced a small to medium size effects in improving participants' knowledge on advanced financial topics. Going specific into financial topics, all participants possessed good understanding on the concept of risk and return tradeoff, which indicates their familiarity about the topic.

Another important finding is that the program had significantly improved participants' understanding on the concept of diversifications which covers the aspects of asset allocations, stock investment and mutual fund. Diversification is an extension of risk and return. Before the program was delivered, there were mixed set of answers given by participants from both groups for all three questions. This suggests that while participants have good knowledge on the basic part of the topic, they became less familiar when it gets more advanced, especially when discussion on capital market investments is involved. Their exposure by far, is limited to unit trust fund, of which investing activity is mostly under the monitoring of their parents. Being full-time students with financial support received from loans and family members, they are yet to experience a more sophisticated financial market investments. The results corroborate the finding of recent study among college students in Italy (Brugiavini et. al., 2018). Using a similar design which involved 579 of college students, they found an effect of a short financial education course on overall performance in most domains of financial literacy such as inflation and interest rates, but no effect on diversification.

Table 9.2: Summary of Financial Knowledge Different Points

No	Numeracy Questions	Measurement Category	Pre & Post Test Different Points
1	*An investment with a high return is likely to be high risk.	Risk and Return Tradeoff	T= 27 points C= 0 point
2	Normally, which of these assets exhibits the highest fluctuations over time?...	Risk and Return Tradeoff (asset fluctuations)	T= 5 points C= -7 points
3	*If an investor spreads their money among different assets, the risk of losing a lot of money…	Diversification (asset allocation)	T= 24 points C= 4 points
4	*It is usually possible to reduce the risk of investing in the stock market by buying a wide range of stocks and shares	Diversification (stock investment)	T= 14 points C= -1 points
5	*"Buying a single company's stock usually provides a safer return than a stock mutual fund." - Is this a true or false statement?	Diversification (company stock vs mutual fund)	T= 28 point C= 2 points
6	Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?	Inflation	T= 19 points C= 5 points
7	High inflation means that the cost of living is increasing rapidly …	Basic inflation	T= 30 points C= 13 point
8	Assume a friend inherits RM10,000 today and his brother inherits RM10,000 three years from now. Who inherits more?	Inflation & time value of money	T= 6 points C= 0 points
9	A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan is less.	Loan (mortgage)	T= 0 points C= -4 points
10	Suppose you want to make a RM1,000 purchase with your credit card. The retailer tells you that you will be charged an extra 2% fee for using your credit card. Your sister buys the same item in the shop next door for RM1,000. She is charged a flat rate RM15 fee for using her credit card. Who paid a higher credit card fee?	Loan (credit card)	T= 25 points C= -3 points

* *Question that has significant difference between groups*

Research Question 2: What are the impacts of the traditional financial education program and additional SMS reminders on financial attitudes?

Overall, in terms of attitude, this study showed that the financial education program has little impact on improving participants' financial attitudes. Nonetheless, the program was able to alter participants' attitude to be more aware on the importance of having a written budget and being organised in daily money management. Other than that, the program also contributed to a small improvement in attitude toward being a saver than a spender, having money saved for rainy days, importance to plan for spending money and budgeting. It was shown from the previous analysis that the financial education program was not effective in changing participants' perceptions on some of the attitude constructs. However, this was not the only reason. Prior to the delivery of the intervention, majority of the participants agreed that a certain attitude is important. For example, more than 90% of the participants either agree or strongly agree that budgeting is helpful, saving is important, planning for spending money is essential to successfully manage one's life, and having a written or electronic budget is essential for successful financial management. This contributed to either small or no significant difference when we compare the scores between the pre-and post-tests.

Participants' perception on financial attitudes has further improved when the additional SMS reminders was given shortly after the financial education program was conducted. There was a significant change in savings and money management attitudes prior and after the delivery of the interventions. Specifically, the additional SMS reminders have improved participants' perception to be more of a saver than a spender, acknowledged that saving is really important, always making sure they have money saved for rainy days, more organized in managing money

and are more aware on the importance to plan for spending money. Interestingly, when compared with the Control group, there was a significant difference in attitude towards savings and money management. Participants who received the additional SMS reminders tend to have better perceptions on being a saver than a spender, better perception on the importance of savings and the importance to plan for spending money compared to those who did not receive the interventions. When controlling for other factors, it was found that attitude towards the importance of savings and planning for spending money is not just impacted by the additional SMS reminders, but also by their field of study, particularly among those with business and economics majors. This suggests that education background is an important factor which can influence attitudes besides the interventions.

Research Question 3: What are the impacts of the traditional financial education program and additional SMS reminders on financial behaviours?

The study found that the financial education program produced only a small impact on financial behaviours. Unlike financial attitudes, the pattern of answers given before the intervention varies; either they never, sometimes or always perform the behaviours. This meant that although they agreed that certain attitudes were important, this did not mean they would be translated into behaviour. For example, the majority of the participants agreed or strongly agreed that saving is important and that they always make sure they have money saved for rainy days. However, in reality, majority did not save. In another example, majority believed that planning for spending money is important, but they did not do it. In between the pre-and post-tests, the financial education program only produced a significant change in behaviour in terms of paying bills on time and keeping a written or electronic records of expenses (money

management). There was no statistically significant difference in all aspects of financial behaviours when compared with the Control group.

A more significant behaviour change was found when the additional SMS reminders were delivered. Participants' significant changes in attitudes were consistent with their behaviours. In between the pre-and post-tests, the additional SMS reminders have improved financial behaviours in all aspects of savings, money management and budgeting. When compared with the Control group, there was a statistically significant difference in behaviours in terms of saving for rainy days (saving), comparing prices to every shop when purchasing, paying bills on time (money management) and ability to stick to the budgeting plan (budgeting). One plausible reason for the improved perception in saving attitudes and behaviours was due to the reminders they received, which encouraged less spending and focus on saving priorities. Moreover, it is believed that other saving reminders aiming at making savings a habit under various settings had further helped participants to realize the importance and need to have money saved. The improvement in money management and budgeting was perhaps due to reminders that encouraged better control of their money management from various aspects such as resisting the temptation to spend, tracking income and expenses, and identifying needs and wants.

9.3 Discussion of findings

From the analyses conducted, it is clear that the effectiveness of the two interventions is different. The financial education program alone produces small differences in attitudes and behaviours, whilst the combination of the program with additional SMS reminders produces much larger impacts. The small difference produced by the financial education program on behaviours came as no surprise and is in line with the existing literature. Prior literature in general, argued that it is difficult to elicit financial behaviour changes using traditional financial education alone. A study by Collin (2013) for example, found no significant effect of a mandatory financial education course for low-income families on savings. Another similar study by Carpena et. al. (2017) among urban households in India found that traditional adult financial education alone did not lead to substantial changes in longer-term behavioural changes on budgeting, savings and borrowings.

However, delivering financial education with innovative methods provides a much better impact on financial outcomes. For instance, a study by Drexler et. al. (2014) among microentrepreneurs in the Dominican Republic found that financial education oriented around simple financial management rule of thumb provided much more meaningful improvements in financial behaviours compared to those who participated in the traditional, principle-based financial education programs. Carpena et. al. (2017) in their study found that complementing financial education with financial goal setting and financial counselling yields to significant improvements in financial outcomes. The structure of financial education is an important element which might explain the weaker links between financial education with financial outcomes. It needs to be carefully evaluated and targeted to a specific group, as one size of the program does not fit all (Drexler et. al., 2014). To have more significant impacts, the delivery

of financial education needs to be different from the traditional approach. This could be done by using entertainment media to deliver messages (Berg and Zia, 2017), teacher training, study materials and participation awards (Bruhn et. al. 2016).

The financial education program conducted in this study followed all the suggested criteria. It was targeted at university students and the program contents were prepared according to the syllabus content of financial management course taught in most universities. All lessons involve two ways of communication between participants and speaker, and video presentations. This is to ensure the delivery of intervention is interesting and effective. One plausible reason for the ineffectiveness of the program conducted in this study was due to the nature of participants that have self-control problems (or present bias). Present biased individuals are commonly associated with having time-inconsistent preferences driven by the limited attention hypothesis– that is they are not fully attentive to all lumpy expenditure opportunities. In the self-control models, it is posited that individuals tend to consume more at present while fully accounting for all future expenditures (Karlan et. al., 2017). Hence, present biased individuals are associated with undesirable spending, borrowing and saving behaviour (Xiao, 2019).

The financial education program does not take into account the psychological elements of an individual as it merely focuses on financial management concepts, and less focuses on helping individuals to avoid present bias and make more effective financial decisions. As argued by Willis (2011), besides fundamental concepts, impatient individuals must also have their discount rates altered and overconfident people must be trained to be less confident. To achieve this, educative nudge (such as reminders) provides the opportunity to help individuals overcome self-control (or present bias), increase their capacity to act independently and make

their own choices that could increase their well-being. As predicted by Karlan et. al. (2010), reminders that mentioning savings, or a particular future expenditure is effective, particularly for time-inconsistent individuals. Findings from this study showed that the additional SMS reminders have helped participants to alter their perception on all aspects of attitudes and transformed them into behaviours. The larger impacts that the additional SMS reminders produced when combined with the financial education program corroborates the model predicted by Karlan et. al. (2010). The findings from this study are consistent with those of Carpena et. al. (2017) whereby additional interventions other than traditional classroom financial education program did provide significant impacts on financial behaviours. In their study, Carpena et. al. (2017) showed that the additional goal setting and financial counselling interventions (which complement the financial education program) had brought about a significant increase in monthly budgeting, informal savings, and formal savings at the bank.

On a different note, the findings from this study are unique to Malaysia perspectives. Numerous studies have attempted to explain the links between financial education, literacy, attitudes and behaviors which most of it have been predominantly correlational and do not support causal inferences. Presently, literatures that capture cause and effect relationship are much rather limited, particularly within the scope of developing countries. This study, to the authors knowledge, is the first to test two different interventions in a single experiment in Malaysia. In addition to that, this study is unique in that it aimed at testing the effectiveness of SMS reminders as additional nudging tools to improve financial attitudes and behaviours of young adults, which are yet to be tested within the Malaysian context. A number of innovative experimental design feature that was developed for this study provide greater learning opportunity and opens up an avenue for future behavioural intervention research in Malaysia. Other than that, the sample of this study is unique as it involves participants from different

ethnicity and cultural background. With a diverse cultural background among its population and a wide geographical dispersion of its population, evidence from this study enriched the current literatures involving many of the demographic and psychographic variables. During the designing stage of the experiment, several measurements have been undertaken to minimize the threats to internal and external validity which might give different interpretation to the outcomes. For instance, randomized controlled trial (RCT) was used to control for selection bias in order to ensure that subjects in one group have similar characteristics or equal with another group. Other than that, a double-blind strategy was used to control for response bias issue in which neither the participants nor the experimenters know who is receiving a particular intervention. Having said that, this study can be applied to other settings as it was conducted on a field experiment.

To generalised the findings to other context would depends on the relevance and needs for conducting the study. It is important to consider if there is any concern or particular situation in given countries, and if there are, it is best to ask what is interesting about the study, the questions of the study and to determine how best to study them. Several things need to be considered. It may be possible to generalised the findings if the definition of variables is conceptually equivalent between countries. For financial literacy, there is no standard definition as it is conceptualized differently in different countries. This study categorised financial literacy and financial knowledge as two different constructs, and that they are not the same. Financial knowledge is not equivalent to financial literacy, but an integral dimension of it. Whilst in some other countries, financial literacy is part of financial capability which has much broader concepts. However, the methodology (or the research design) can be replicated in different context, for example examining the impact interventions among young adults in different geographical areas with population of different cultures and ethnics.

9.4 Contributions of the study

Prior studies that examined the links between financial education, literacy and behaviours have been predominantly correlational. Much attention has been given on finding the direct associations between these variables where mostly were conducted using cross-sectional surveys. In cross-sectional study, a correlation that exists between variables does not mean that a change in one variable would cause the other variable to change, since observations are made at single point in time. Therefore, this study contributes to the body of literatures on findings the link between financial literacy, financial attitudes and financial behaviours using a different methodological approach which is experimental design. As the design of the study involved manipulation of variables, it allows for a conclusion about causality to be made – something of which correlational research cannot provide, and the results could bridge the gap in the current literature.

The findings of this study will rebound to the benefit of the country considering that behavioural economics is important in improving government policy and services to the people. A better understanding on the link between behavioural economics and individuals' financial behaviour would assist the government or relevant agencies to design more reliable financial planning and savings program that would instil positive saving and spending culture among Malaysian, particularly the young adults. Individuals who are able to deal with financial matters and save, are not only able to protect themselves from future financial shocks, but also help to stimulate economic growth. On a broader perspective, a country that has higher savings rate could hedge against financial crisis (Mahdzan and Tabiani, 2013), improve the country's standard of living and opens for greater opportunity for accumulation of wealth.

As for academic literature, the findings contributed to the body of knowledge demonstrating the importance of incorporating psychological principles into human decision-making process. It provided a clear picture on the effectiveness of interventions (namely financial education, in support with SMS nudges) in assisting individuals with self-control problems to achieve a greater financial practices and behaviours.

9.5 Limitations of the study

Several limitations were identified while the study was conducted. Since the study employs university students as the main sample, the outcome measurements are more on subjective manner which relied exclusively on student's perceived believe on financial behaviours that is being measured (or self-report). The study was not able to identify actual behaviour changes of students, for instance, an increase in actual savings amount from £50 to £100 every month. This was due to the fact that the participants involved in this study are full-time university students who are yet to start a career and do not earn regular monthly income.

Due to time constraint, the study was only able to track the student's short-term attitude and behaviour changes. Although it is acceptable to have a minimum two months period to track changes (to control for maturation bias), a much longer time gap to check for changes in outcomes is suggested, so that the real impact of interventions delivered could be well measured. Although several methods were conducted to reduce response bias, the study was not able to examine further the reliability of self-reported outcome measures over time due to limited time to complete the study.

Given that the samples are university students, the study was only able to track their knowledge on borrowings based on the financial literacy survey conducted at pre-and post-tests. An independent borrowing attitude and behaviour was absent from the experiment due to the fact that they are yet to earn regular income and have the access to financial services.

Another limitation is on location, whereby the study is only conducted in only one university in the state of Sabah, and not covering much bigger scope and geographical areas in Malaysia. with limited location, it further limits the number of samples that can be obtained for this study. Participants' access to network is another issue when the study was conducted. They were either not responsive or have difficulty to respond to invitation to interventions via the Whatsapp Messenger due to tight financial commitments in paying for mobile phone connection. Other than that, during the experimental period, some of the participants were at home located in remote areas which have limited access to network.

9.6 Suggestions for future study

To have a clear behaviour change in terms of outcomes, it is suggested for future study to consider young working adults as the sample. In addition to that, future study may also consider working with external partners such as financial institutions (banks) or relevant financial authorities in order to get more reliable dataset. By having collaboration with these institutions would help in getting bigger sample size, more real time data and increase the accuracy of the future reported outcomes. To have a collaboration like this would incur much resources in terms of time and cost, which limits the ability of the researcher to conduct this study on a bigger scale.

Further research may also consider employing questions pertaining to borrowing attitudes and behaviour using different set of samples, for instance young working adults. Having a dataset with more borrowing questions might be useful to verify the connection between present bias (or self-control) with borrowing attitude and behaviour. It is also suggested for future research to conduct the experiment on a larger scale covering much wider geographical areas. This can contribute to a more comprehensive findings with bigger opportunity of getting more samples to participate in the experiment.

9.7 Recommendations

Although a financial education programme alone does not significantly improve attitudes and behaviours, this does not mean that the programme should be discontinued. It is still important especially in creating awareness for the people to start have better control of their financial matters, and also helps to improve financial literacy. There needs to be a reform in the future traditional financial education program. The government should engage the program with other relevant stakeholders (such as financial service providers), which could provide hands on experience to young people. This could help to enhance their understanding on the "practical" side of the questions involving credit card usage, or mortgage and taxes for example. More alternatives can be introduced as a tool to increase awareness, for instance by giving the opportunity for people to be "regularly reminder" about controlling and managing their financials in a more efficient manner. This can be done by all parties. The government for example, could impart the use of SMS reminders as part of the national plan in strengthening the country's financial inclusion. This can be accomplished by sending regular reminders to all individuals about practising good financial habits, similar to what they are currently doing in reminding people to follow the Standard Operation Procedures during the Covid-19 pandemic (via the Malaysian National Security Council)

9.8 Conclusion

This study showed that the use of SMS reminders has the potential to nudge low self-control students to have a positive attitude and behaviour changes, while relying on traditional financial education program alone is not sufficient to help the students to translate their desired behaviours into actions. However, this does not mean financial education program is not important and should not be considered, as it has proven to help the students improve their financial literacy levels, particularly on the advanced financial management topics. In this case, the study suggests that financial education program is still needed, but should not be recognized as the only solution to bridge the gap between knowledge, attitudes and behaviours. Individual with self-control problem often have issues with inconsistency in decision-making preference (or present bias), which happens across time and various context. For instance, one might choose not to eat dessert after having dinner at a restaurant, but then changed their mind and order it after dinner, and only to regret after finished eating it. In this context, sending them to attend financial education course alone may give little (or no) impact on attitude and behaviours, because the program focuses on improving cognitive ability (knowledge), and does not deal with psychology. Therefore, sending additional frequent SMS reminders post-program might be useful as it addresses present bias, and might help individual to stay consistent in their decision-making preference by "bringing the future reward to present" (Xiao, 2019).

However, financial education and SMS reminders are just the mechanisms to help low self-control people making good financial decision, and it is known from this study that financial education alone has limited impact. What is more important is for one to be financially resilient and not to easily succumbed to psychological errors. For one to have such positive behaviours, it needs to be nurtured from young. As mentioned in Chapter 4 (Change Behaviours), there are many factors that can influence one's financial behaviours which should not be ignored. One

of the important factors is social influence, which involves the role of parents as agent to their children's financial socialization. In this case, parents play an important role in shaping their children's future financial behaviours. Financial education should start early from home, whereby parents should display good financial conduct and be a role model to their children. This can be done through family discussion over financial matters, or opening a child-friendly debit card that can teach them the value of savings. Besides parents, peer influence plays a role in shaping one's financial behaviour and this is important when the children start their life as university students. Prior research found that peer pressure has the potential to spoil the young adults dealing with financial matters. Therefore, it is very important for the students to be around with friends that can support and help to improve their finances.

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APPENDIXES

Consent to Participate in a Research Study
(Baseline Assessment)

1. The study

Title	"Nudging Financial Literacy and Behaviours Through Financial Education: Experimental Evidence Among Young Student Adults"
Researcher	Amer Azlan Abdul Jamal
Lead Supervisor	Professor Karen Rowlingson
Co-Supervisor	Dr. Lee Gregory

2. **Signatures of consent**

I, the undersigned, confirm that (please tick box as appropriate):

1.	I have read and understood the content of the participant information sheet for the study titled "Nudging Financial Literacy and Behaviours Through Financial Education: Experimental Evidence Among Young Student Adults" as provided in the Information Sheet.	☐
2.	I have been given adequate time to read the consent form and participation sheet in advance, and have the opportunity to ask questions about the research and my participation.	☐
3.	I voluntarily agree to participate in the research.	☐
4.	I understand I can withdraw within the stipulated time given by the investigator without giving reasons and that I will not be penalised for withdrawing nor will I be questioned on why I have withdrawn.	☐
5.	The procedures regarding confidentiality have been clearly explained (e.g. use of names, confidentiality of data, etc.) to me.	☐
6.	The use of the data in research, publications, sharing and archiving has been explained to me.	☐
7.	I understand that other researchers will have access to this data only if they agree to preserve the confidentiality of the data and if they agree to the terms I have specified in this form.	☐
8	I allow for the confidential data to be archived for 10 years available to other researchers for research and academic purposes.	☐
9.	I, along with the Researcher, agree to sign and date this informed consent form.	☐

Your Name: _____ Matric No: _____

Your Signature: _____

Consent to Participate in a Research Study
(Financial Education Program)

1. The study

Title	" Nudging Financial Literacy and Behaviours Through Financial Education: Experimental Evidence Among Young Student Adults "
Researcher	Amer Azlan Abdul Jamal
Lead Supervisor	Professor Karen Rowlingson
Co-Supervisor	Dr. Lee Gregory

2. **Signatures of consent**

I, the undersigned, confirm that (please tick box as appropriate):

1.	I have read and understood the content of the participant information sheet for the study titled "Nudging Financial Literacy and Behaviours Through Financial Education: Experimental Evidence Among Young Student Adults" as provided in the Information Sheet.	☐
2.	I have been given adequate time to read the consent form and participation sheet in advance, and have the opportunity to ask questions about the research and my participation.	☐
3.	I voluntarily agree to participate in the research.	☐
4.	I understand I can withdraw within the stipulated time given by the investigator without giving reasons and that I will not be penalised for withdrawing nor will I be questioned on why I have withdrawn.	☐
5.	The procedures regarding confidentiality have been clearly explained (e.g. use of names, confidentiality of data, etc.) to me.	☐
6.	The use of the data in research, publications, sharing and archiving has been explained to me.	☐
7.	I understand that other researchers will have access to this data only if they agree to preserve the confidentiality of the data and if they agree to the terms I have specified in this form.	☐
8.	I allow for the confidential data to be archived for 10 years available to other researchers for research and academic purposes.	☐
9.	I understand that I am not allowed to share the financial education materials that I received with anyone else, in which by doing so might affect the outcomes of the research.	
10.	I, along with the Researcher, agree to sign and date this informed consent form.	☐

Your Name: _____ Matric No: _____

Your Signature: _____

(Please leave this section blank – for office use only)

Name of researcher: _____

Signature of researcher: _____ Date: _____

Consent to Participate in a Research Study
(Treatment 2: SMS reminders)

1. The study

Title	"Nudging Financial Literacy and Behaviours Through Financial Education: Experimental Evidence Among Young Student Adults"
	Amer Azlan Abdul Jamal
Lead Supervisor	Professor Karen Rowlingson
Co-Supervisor	Dr. Lee Gregory

2. **Signatures of consent**

I, the undersigned, confirm that (please tick box as appropriate):

1.	I have read and understood the content of the participant information sheet for the study titled "Nudging Financial Literacy and Behaviours Through Financial Education: Experimental Evidence Among Young Student Adults" as provided in the Information Sheet.	☐
2.	I have been given adequate time to read the consent form and participation sheet in advance, and have the opportunity to ask questions about the research and my participation.	☐
3.	I voluntarily agree to participate in the research.	☐
4.	I understand that I can only withdraw at the first two weeks period where the reminders are being sent out, and not allowed to withdraw starting from the third week of treatment period. I understand the data that I have contributed if I withdraw after the third week will not be destroyed and will be used for reporting the results of the study.	☐
5.	The procedures regarding confidentiality have been clearly explained (e.g. use of names, confidential of data, etc.) to me.	☐
6.	The use of the data in research, publications, sharing and archiving has been explained to me.	☐
7.	I understand that other researchers will have access to this data only if they agree to preserve the confidentiality of the data and if they agree to the terms I have specified in this form.	☐
8.	I allow for the confidential data to be archived for 10 years available to other researchers for research and academic purposes.	☐
9.	I understand that I am not allowed to share the text messages or any other related materials that I received with anyone else, in which by doing so might affect the outcomes of the research.	☐
9.	I, along with the Researcher, agree to sign and date this informed consent form.	☐

Name: _____ Email Address: _____

Phone number: _____ Your Signature: _____

(Please leave this section blank – for office use only)

Name of researcher: _____ Date: _____

Participant Information Sheet

The Study

Title:	"Nudging Financial Literacy and Behaviours Through Financial Education: Experimental Evidence Among Young Student Adults"
Researcher:	Amer Azlan Abdul Jamal
Lead Supervisor:	Professor Karen Rowlingson
Co-Supervisor:	Dr. Lee Gregory

You are asked to participate in this study conducted in partial fulfilment of the requirements in PhD in Social Policy for **Amer Azlan Abdul Jamal**. In order to help you decide, this information sheet outlines why the research is being done and what it will involve. Please read the following sections carefully and feel free to ask for clarifications or questions.

What is the research about?

The purpose of this study is to examine the causal effects of financial education on financial behaviour of young student adults. Specifically, the study aims to examine the effectiveness of financial education program and SMS reminders as additional 'nudging tools' towards improving the level of financial knowledge, attitude, numeracy, budgeting, cash and savings management of university students.

This study will involve two stages:

The 1st stage is the assessment of behavioural decision-making and baseline survey of level of financial knowledge. Whilst 2nd stage will involve the delivery of financial education program and SMS reminders as treatments. About half of participants from the 1st stage will be randomly selected to receive the treatments. The other half participants however, will not be contacted again.

Two post-intervention tests will be conducted to check the effect of the treatments on financial literacy and financial behaviours. The tests will be conducted 2 months (1st test) and 6 months (2nd test) after the end of treatment period.

Who are the participants

This study will be conducted in Sabah, Malaysia and will focus on university students, which are students studying at Universiti Malaysia Sabah, Kota Kinabalu. Participants of the study are students from all faculties of the university's main campus in Kota Kinabalu, Sabah.

What will happen if I take part and what is involved?

1. If you agree to participate in the study, a 1-hour session on assessing student's level of financial knowledge and behavioural decision-making style will be scheduled.

2. Online registration is required for you to register for the session, and to confirm your participation. The link to the form is provided together in the email sent by the researcher.

3. You will receive e-mail after you have completed the online registration. The e-mail consists of research consent form (which needs your signature) and also registration form to book your assessment slot.

4. The assessment will be conducted in 10 different time slots and you may choose which session suits your availability to attend the session. You are only allowed to attend the session once.

5. The session's total estimated completion time is 1 hour. You will be given 20 minutes to complete the self-control assessment, another 20 minutes for financial knowledge survey and the remaining time is allocated for briefings. You are free to refuse to answer any of the questions that may make your uncomfortable.

6. About half of participants from this assessment will be randomly selected to the second stage of the study to receive the treatments. Participants in the treatment group will receive either only financial education program, or financial education program with SMS reminders.

7. If you are selected to the second stage of the study, you will hear from us again within one week after the assessment ended. If you do not hear anything from us after one week that means you are not selected to the next stage.

What are the risks involved?

It is estimated that there is no potential risk in this study. Your decision to participate will not affect your current or future relations with Universiti Malaysia Sabah.

What can I benefit from the study?

1. Your benefits will include **lunch voucher** that you will receive at the end of the 1st stage assessment, as a token of appreciation.

2. However, you will no longer eligible to receive the voucher should you decided to withdraw from the assessment.

3. Therefore to avoid further difficulties, any changes or withdrawal of participation should be informed to the researcher (Mr. Amer Azlan) as soon as possible prior to the commencement of the assessment.

4. You will not be penalised for deciding to withdraw from participating in the assessment. An early notification of cancellation is very much appreciated, as it would help to smooth the process in conducting the assessment. Should you have completed the assessment and you would like to withdraw your participation and data, you are free to do so up to one week after completion of the assessment.

5. If you are selected to receive the treatments in the 2nd stage of the study, you have the opportunity to participate in prize draw competition after the program and post-

interventions tests are being conducted. **Financial incentives worth RM300 will be given to two lucky winners** in which the winners will be selected randomly using computerized random draw software. This serves as a compensation for the inconvenience/expenses and time given for taking part in the experiment.

6. Additionally, the outcomes of the study will provide better understanding on the link between behavioural economics and individuals' financial behaviour. This would further assist the government to design more reliable financial planning program that would instil positive saving and spending culture among Malaysian, particularly the young adults. Moreover, the findings will contribute to the body of knowledge demonstrating the importance of incorporating psychological principles into human decision-making process.

Confidentiality and Anonymity

Data from the assessment will be considered confidential and information about you will be properly coded. Random numbers will be used (instead of your real name) for identification and data monitoring purposes. No identifiers linking you to the study will be included in any sort of report that might be published.

Data Protection and archiving

The records of the study will be kept private and confidential. Research records will be stored securely and only Mr. Amer Azlan Abdul Jamal and his supervisors will have the access to the records. All hardcopy records will be stored in a locked cabinet at home. All electronic data stored in personal laptop and cloud storage will be password and encryption protected. All data, whether physical or electronic, will be properly destroyed ten (10) years after the study ends.

Research dissemination

A major written output of the study is PhD thesis. The study may also be presented in academic conferences and be published in academic journals.

Who is conducting and funding the research?

Mr. Amer Azlan Abdul Jamal will solely conduct the research with support by the Centre of Household Assets and Saving Management (CHASM), University of Birmingham. He was born in Kuala Lumpur, Malaysia. Mr. Amer Azlan is a lecturer at Faculty of Business, Economics and Acoountancy at Universiti Malaysia Sabah. He is currently a Doctoral Researcher under the Centre of Household Assets and Saving Management (CHASM), College of Social Sciences, University of Birmingham, United Kingdom. The direct funders of his doctoral study are the Ministry of Higher Education of Malaysia and Universiti Malaysia Sabah.

Who has reviewed the study?

The study has clearance from the Humanities and Social Sciences Ethical Committee at the University of Birmingham.

For further information and other concerns, please contact:

Amer Azlan Abdul Jamal / Email: [redacted]

You can also contact the Academic Supervisor of the study as below:

Professor Karen Rowlingson / Email: [redacted]

Thank you for reading this information sheet and for considering taking part in the study.

Participant Information Sheet
(For financial Education Program)

1. The Study

Title	"Nudging Financial Literacy and Behaviours Through Financial Education: Experimental Evidence Among Young Student Adults"
Researcher	Amer Azlan Abdul Jamal
Lead Supervisor	Professor Karen Rowlingson
Co-Supervisor	Dr. Lee Gregory

You are asked to participate in this study conducted in partial fulfilment of the requirements in PhD in Social Policy for **Amer Azlan Abdul Jamal**. In order to help you decide, this information sheet outlines why the research is being done and what it will involve. Please read the following sections carefully and feel free to ask for clarifications or questions.

2. What is the research about?

The purpose of this study is to examine the causal effects of financial education on financial behaviour of young student adults. Specifically, the study aims to examine the effectiveness of financial education program and SMS reminders as additional 'nudging tools' towards improving the level of financial knowledge, saving pattern, budgeting and expense management of university students.

3. Who are the participants

This study will be conducted in Sabah, Malaysia and will focus on university students, which are students studying at Universiti Malaysia Sabah, Kota Kinabalu. Participants of the study are undergraduate students from all faculties of the university's main campus in Kota Kinabalu, Sabah.

4. What will happen if I take part and what is involved?

If you agree to take part in the study, you will be invited to attend 2-day free financial education program conducted by a qualified trainer in financial management field. The program will be conducted from 8am to 5pm at Dewan Kuliah Pusat, Universiti Malaysia Sabah. Two post-intervention tests (or follow up tests) will be conducted two month and six month after the financial education program has been conducted.

5. What are the risks involved?

It is estimated that there is no potential risk in this study. Your decision to participate will not affect your current or future relations with Universiti Malaysia Sabah.

6. What can I benefit from the study?

As a compensation for the inconvenience/expenses and time given for taking part in the experiment, you have the opportunity to participate in prize draw competition after the program and post-interventions tests are being conducted. Financial incentives worth RM300 will be given to two lucky winners in which the winners will be selected randomly using computerized random draw software.

Additionally, the outcomes of the study will provide better understanding on the link between behavioural economics and individuals' financial behaviour. This would further assist the government to design more reliable financial planning program that would instil positive saving and spending culture among Malaysian, particularly the young adults. Moreover, the findings will contribute to the body of knowledge demonstrating the importance of incorporating psychological principles into human decision-making process.

7. Confidentiality and Anonymity

Data gathered from this experiment will be considered confidential and information about you will be properly coded. Random numbers will be used (instead of your real name) for identification and data monitoring purposes. No identifiers linking you to the study will be included in any sort of report that might be published.

8.Data Protection and archiving

The records of the study will be kept private and confidential. Research records will be stored securely and only Mr. Amer Azlan Abdul Jamal and his supervisors will have the access to the records. All hardcopy records will be stored in a locked cabinet at home. All electronic data stored in personal laptop and cloud storage will be password and encryption protected. All data, whether physical or electronic, will be properly destroyed ten (10) years after the study ends.

9. Research dissemination

A major written output of the study is PhD thesis. The study may also be presented in academic conferences and be published in academic journals.

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Mr. Amer Azlan Abdul Jamal will solely conduct the research with support by the Centre of Household Assets and Saving Management (CHASM), University of Birmingham. He was born in Kuala Lumpur, Malaysia. Mr. Amer Azlan is a lecturer at Universiti Malaysia Sabah and currently a Doctoral Researcher at Department of Institute of Applied Social Studies, School of Social Policy, University of Birmingham, United Kingdom. The direct funders of his doctoral study are the Ministry of Higher Education of Malaysia and Universiti Malaysia Sabah.

11. Who has reviewed the study?

The study has clearance from the Humanities and Social Sciences Ethical Committee at the University of Birmingham.

For further information and other concerns, please contact:

Email :

You can also contact the Academic Supervisor of the study as below:

Professor Karen Rowlingson

Email:

Participant Information Sheet
(For SMS reminders)

1. The Study

Title	"Nudging Financial Literacy and Behaviours Through Financial Education: Experimental Evidence Among Young Student Adults"
Researcher	Amer Azlan Abdul Jamal
Lead Supervisor	Professor Karen Rowlingson
Co-Supervisor	Dr. Lee Gregory

You are asked to participate in this study conducted in partial fulfilment of the requirements in PhD in Social Policy for **Amer Azlan Abdul Jamal**. In order to help you decide, this information sheet outlines why the research is being done and what it will involve. Please read the following sections carefully and feel free to ask for clarifications or questions.

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3. Who are the participants

This study will be conducted in Sabah, Malaysia and will focus on university students, which are students studying at Universiti Malaysia Sabah, Kota Kinabalu. Participants of the study are undergraduate students from all faculties of the university's main campus in Kota Kinabalu, Sabah.

4. What will happen if I take part and what is involved?

If you agree to take part in the study, you will receive SMS reminders that contain messages on developing good financial conducts. The SMS will be sent twice a week for a period of 1 month. The SMS will be sent by investigator to you every Monday and Thursday using a newly registered phone number, which will only be used for this research. All messages will be sent over via the standard mobile messaging system as per scheduled dates. If you have problems with mobile phones, or are in locations that did not receive sufficiently strong network signals, the reminder messages will be re-sent over to you on the second and third days.

Two post-intervention tests will be conducted two month and six month after the treatment has been conducted. **Should you decided to withdraw from receiving the SMS reminders, you are allowed to do so during the first two weeks of period where the SMS are being sent out.** No participation withdrawal is allowed starting from the third week of treatment period onwards for the following reasons:

1) Late withdrawal would interrupt the experiment timeline that have been set up earlier, which could potentially disrupt the process in writing the research report.

2) Data of participants whom withdrew from the treatment will be destroyed and not be included as part of the outcomes of the research. Hence any late withdrawal would not only mean loss of potential data for reporting, but also would waste time and incur much cost to investigator in sending the SMS reminders.

5. What are the risks involved?

It is estimated that there is no potential risk in this study. Your decision to participate will not affect your current or future relations with Universiti Malaysia Sabah.

6. What can I benefit from the study?

As a compensation for the inconvenience/expenses and time given for taking part in the experiment, you have the opportunity to participate in prize draw competition after the program and post-interventions tests are being conducted. Financial incentives worth RM300 will be given to two lucky winners in which the winners will be selected randomly using computerized random draw software.

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Data gathered from this experiment will be considered confidential and information about you will be properly coded. No identifiers linking you to the study will be included in any sort of report that might be published.

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For further information and other concerns, please contact:
Amer Azlan Abdul Jamal
Email: [redacted]

You can also contact the Academic Supervisor of the study as below:
Professor Karen Rowlingson
Email: [redacted]

ASSESSMENT OF BEHAVIORAL DECISION-MAKING *PENILAIAN PEMBUATAN-KEPUTUSAN TINGKAH LAKU*	***For office use*** Score:

Email Address / *Alamat Emel*: ……

Phone Number /*Nombor Telefon***:** ……

Participant Number / *Nombor Peserta***:** ……

PART A – COMPLETE THE FOLLOWING INFORMATION
BAHAGIAN A - LENGKAPKAN MAKLUMAT BERIKUT

1. **What is your gender?** / *Apakah jantina anda?*

   [ ] Male / *Lelaki*
   [ ] Female / *Perempuan*

2. **What is the name of your faculty?** /*Apakah nama fakulti anda?*

   [ ] Faculty of Business, Economics and Accountancy
   Fakulti Perniagaan, Ekonomi dan Perakaunan

   [ ] Faculty of Science and Natural Resources
   Fakulti Sains dan Sumber Alam

   [ ] Faculty of Humanity, Arts and Heritage
   Fakulti Kemanusiaan, Seni dan Warisan

   [ ] Faculty of Psychology and Education
   Fakulti Psikologi dan Pendidikan

   [ ] Faculty of Engineering
   Fakulti Kejuruteraan

   [ ] Faculty of Computing and Informatics
   Fakulti Komputeran dan Informatik

   [ ] Faculty of Food Science and Nutrition
   Fakulti Sains Makanan dan Pemakanan

   [ ] Faculty of Medicine and Health Science
   Fakulti Perubatan dan Sains Kesihatan

3. **What is your age?** / *Apakah umur anda?* _____
4. **What is your ethnic background?** / *Apakah latar belakang etnik anda?*

[ ] Malay	[ ] Chinese	[ ] Indian
[ ] Kadazan / Dusun	[ ] Murut	[ ] Bajau
[ ] Brunei	[ ] Rungus	[ ] Bugis
[ ] Suluk	[ ] Sungai	[ ] Kadayan
[ ] Others		

5. **Which of these categories your family income usually falls into? /** *Berdasarkan pilihan dibawah, yang mana satukah kategori pendapatan keluarga anda?*
   [ ] Below RM2,000 a month / *Bawah RM2,000 sebulan*
   [ ] Between RM2,000 – RM2,500 a month */Antara RM2,000 – RM2,500 sebulan*
   [ ] Between RM2,501 – RM3,500 a month */Antara RM2,501 – RM3,500 sebulan*
   [ ] Between RM3,501 – RM5,000 a month */Antara RM3,501 – RM5,000 sebulan*
   [ ] Between RM5,001 – RM8,000 a month */Antara RM5,001 – RM8,000 sebulan*
   [ ] More than RM8,000 a month /*Lebih daripada RM8,000 sebulan*

6. **As a student, what is your source of income? (You may choose more than 1) /** *Sebagai seorang pelajar, apakah sumber pendapatan anda? (anda boleh pilih lebih daripada 1)*
   [ ] Educational loans / *Pinjaman pendidikan*
   [ ] Scholarship / *Tajaan*
   [ ] Parents and family members / *Ibu bapa dan ahli keluarga*
   [ ] Part time job / *Kerja sambilan*
   [ ] others (please specify) / *Lain-lain (sila nyatakan)* _____

7. **What is your parent's field of occupation?** */Apakah bidang kerja ayah dan ibu anda?*
   Father:
   [ ] Legislators, Senior Officials, or Managers
   [ ] Professionals
   [ ] Technicians
   [ ] Clerical workers
   [ ] Service workers or Shop/Market Sales workers
   [ ] Skilled agriculture and fishery workers
   [ ] Craft and related trade workers
   [ ] Plant and machine-operators and assemblers
   [ ] Self employed
   [ ] Others: _____

   Mother:
   [ ] Legislators, Senior Officials, or Managers
   [ ] Professionals
   [ ] Technicians
   [ ] Clerical workers
   [ ] Service workers or Shop/Market Sales workers
   [ ] Skilled agriculture and fishery workers
   [ ] Craft and related trade workers
   [ ] Plant and machine-operators and assemblers
   [ ] Self employed
   [ ] Others: _____

PART B – CHOOSE AND CIRCLE YOUR ANSWER
BAHAGIAN B – PILIH DAN BULATKAN JAWAPAN ANDA

NO.	**STATEMENTS /** *KENYATAAN*	**Strongly Disagree** */ Sangat tidak bersetuju*	**Disagree** */ Tidak bersetuju*	**Agree/** *Bersetuju*	**Strongly agree/** *Sangat bersetuju*	**Remarks**
1.	**I am good at resisting temptations.** *Saya pandai dalam menentang godaan.*	[1]	[2]	[3]	[4]	High SC
2.	**I have a hard time breaking bad habits.** *Saya mempunyai masalah dalam membuang tabiat buruk.*	[1]	[2]	[3]	[4]	(Reverse) Low SC
3.	**I am lazy.** *Saya seorang yang pemalas.*	[1]	[2]	[3]	[4]	(Reverse) Low SC
4.	**I do certain things that are bad for me, if they are fun.** *Jika sesuatu perkara itu memberi kesan tidak elok kepada saya tetapi ianya menyeronokkan, maka saya akan lakukannya.*	[1]	[2]	[3]	[4]	(Reverse) Low SC
5.	**I refuse things that are bad for me.** *Saya menolak perkara yang boleh memberi kesan buruk kepada saya.*	[1]	[2]	[3]	[4]	High SC
6.	**I wish I had more self-discipline.** *Saya berharap saya mempunyai lebih banyak disiplin diri.*	[1]	[2]	[3]	[4]	(Reverse) Low SC
7.	**People said that I have iron discipline.** *Kebanyakan orang mengatakan saya mempunyai tahap disiplin yang tinggi.*	[1]	[2]	[3]	[4]	High SC

8.	**Pleasure and fun sometime keep me from getting work done.** *Kesenangan dan keseronokan kadangkala menghadkan diri saya dalam menyiapkan tugasan.*	[1]	[2]	[3]	[4]	(Reverse) Low SC
9.	**I have trouble concentrating.** *Saya mempunyai masalah dalam menumpukan perhatian.*	[1]	[2]	[3]	[4]	(Reverse) Low SC
10.	**I am able to work effectively toward long-term goals.** *Saya mampu untuk bekerja secara efektif terhadap matlamat jangka panjang.*	[1]	[2]	[3]	[4]	High SC
11.	**Sometimes I can't stop myself from doing something, even if I know it is wrong.** *Kadangkala saya tidak dapat berhenti dari melakukan sesuatu, walaupun saya tahu ianya adalah salah.*	[1]	[2]	[3]	[4]	(Reverse) Low SC
12.	**I often act without thinking through all the alternatives.** *Saya sering bertindak tanpa berfikir melalui semua alternatif.*	[1]	[2]	[3]	[4]	(Reverse) Low SC
13.	**I am impulsive and tend to buy things even when I can't really afford them.** *Saya seorang yang impulsif dan cenderung untuk membeli sesuatu barang walaupun saya tidak memiliki wang yang mencukupi untuk membelinya.*	[1]	[2]	[3]	[4]	Low SC
14.	**I am prepared to spend now and let the future take care of itself.** *Saya bersedia untuk berbelanja sekarang dan tidak terlalu memikirkan masa depan.*	[1]	[2]	[3]	[4]	Low SC

15.	**I live more for the day of today than for the day of tomorrow.** *Kehidupan saya pada hari ini melebihi kehidupan hari-hari yang akan datang.*	[1]	[2]	[3]	[4]	Low SC
16.	**My convenience plays an important role in the decision-making.** *Kemudahan yang ada pada saya memainkan peranan penting dalam membuat keputusan.*	[1]	[2]	[3]	[4]	Low SC
17.	**I only focus on short-term.** *Saya hanya fokus pada jangka-masa pendek.*	[1]	[2]	[3]	[4]	Low SC

THANK YOU FOR YOUR COOPERATION
TERIMA KASIH DIATAS KERJASAMA ANDA

RESEARCH PARTICIPANTS NEEDED

- ✓ Criteria: **current full-time / part-time students of Universiti Malaysia Sabah (UMS)**
- ✓ We are looking for volunteers to take part in an experimental study assessing the **effectiveness of financial education on financial literacy and decision-making behavior**
- ✓ You will be asked to complete two surveys which is likely to take around 15 minutes each to complete, and will be randomly selected to receive financial education programs
- ✓ Each participant will receive a **lunch voucher** for participation in the study, and will be eligible to enter a **RM300 cash prize drawing**
- ✓ All information provided will be treated confidentially

If you are interested to participate or would like to learn more about this study, please contact the principle researcher, Mr. Amer Azlan Abdul Jamal at: [redacted] **Whatsapp)** or email at [redacted]

** This study has been reviewed and approved by the Humanities & Social Sciences Ethical Review Committee, University of Birmingham*

UMS
UNIVERSITI MALAYSIA SABAH

UNIVERSITY OF BIRMINGHAM