

**The Impact of a Financial Education Program on Financial
Literacy among Tertiary Students in Hong Kong**

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The Impact of a Financial Education Program on Financial Literacy among Tertiary Students in Hong Kong

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This thesis results entirely from my own work and has not been offered previously
for any other degree or diploma.

Signature

Abstract

This study investigated the impact of a financial education program on the financial literacy of tertiary students in Hong Kong. The study found significant improvements in tertiary students' financial literacy, operationalised in this study as financial knowledge, attitudes, and behaviours, after participating in the financial education program. The research findings indicated that demographic factors such as age, gender, job status, and monthly income had no significant effect. However, education level showed a significant interaction effect with time, and study major was also found to influence the program's effectiveness significantly. The impact of various program outputs on financial literacy was also investigated. Lecturers, study notes, case study videos, the mobile app, the exercise, webpages, and the overall program were found to have significant effects on tertiary students' financial literacy. Qualitative analysis of in-depth interviews identified four key themes: the importance of financial literacy, ways and barriers to accessing financial education, student learning experiences through the program, and the program's impact on financial literacy. The findings confirmed the positive impact of financial education programs on financial literacy and provided insights into the role of demographic characteristics and program outputs in shaping the outcomes of these programs. These results may inform the design and refinement of financial education programs to enhance the financial literacy of tertiary students effectively.

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Chapter 1 - Introduction

1.1 Background

This research investigated the impact of a financial education program on the financial literacy of tertiary students in Hong Kong. The study used a convergent mixed-methods design, combining quantitative pre- and post-surveys with qualitative semi-structured interviews, to examine changes in tertiary students' financial knowledge, financial attitudes and financial behaviours following program participation. Data collection was conducted in Autumn 2018 across six Hong Kong tertiary institutions, and the thesis was submitted in June 2025. The quantitative analysis was based on 150 paired pre- and post-survey responses, complemented by in-depth interviews with 12 participating students. Although grounded in a 2018 dataset, this study contributes vital empirical evidence regarding the financial literacy of tertiary students and the financial education program in Hong Kong. These findings remain relevant, as students transitioning to adulthood must navigate an increasingly complex financial landscape characterised by volatile markets and emerging digital financial products.

Growing complexity in financial markets and the proliferation of digital financial products had heightened the demand for financial literacy. Many countries had begun to promote financial education to raise people's financial literacy. It had been widely championed by policymakers as a critical solution to address the growing complexity of financial choices faced by individuals (Daniel Fernandes et al., 2014). During economic recessions and financial crises, the unemployment rate and income loss usually become more serious among the youth. Equipping young people with financial life skills is one of the solutions to build resilience to economic

downturns and financial issues. Financial education helps young people better understand financial services and products and equips them with appropriate attitudes and skills to deal with financial situations. Complicated financial products and services are more widespread among young customers, such as virtual assets and leveraged exchange-traded funds. Young customers may not have sufficient financial knowledge and professional skills to handle such complicated products in the market. Therefore, financial education should be nurtured early in schools to help the youth build sound financial literacy. McCormick (2009) reviewed the state of youth financial education in the United States and observed that comprehensive strategies for educating children and youth to become effective managers of money had not yet emerged. Recognition of the need for youth financial education was, however, growing internationally. Several well-developed economies, including Australia, the United Kingdom, Japan, Singapore, and the United States identified weak financial literacy levels amongst their young populations (OECD, 2012). These developed countries have implemented financial education in the school curricula to promote financial literacy among school students.

As tertiary students transition into adulthood, they become eligible to apply for credit cards and student loans. Good financial literacy depends upon financial education to equip tertiary students with proper financial knowledge and skills to deal with financial issues. Looney and Yannelis (2015) found that community college students were at higher risk of defaulting on student loans than university students because of the higher loan ratio. Student debt and money issues both contributed to financial stress among students (Heckman et al., 2014). Wagoner and Suriano (2008) stated that the student loan burden influenced college students' future financial conditions, and financial education programs could help improve their credit management skills. Weak financial

literacy could adversely influence personal and household finances, as well as financial goals, in future life stages. Munro and Hirt (1998) suggested financial education as a means of solving college students' overspending problems. Roberts and Jones (2001) supported a similar view because their findings concluded that college students with credit card abuse often had psychological and financial issues. They concluded that credit management must be taught to college students. Delivering financial education in universities and colleges helps tertiary students develop responsible financial attitudes and behaviours, which can contribute to long-term financial well-being (Lyons et al., 2006).

The literature consistently demonstrates the association between financial education and college students' financial literacy, though key questions remain about optimal program design and measurement of effectiveness. College students with financial literacy education are better at financial skills and are more likely to use financial products to solve financial issues and satisfy personal financial goals (Campbell, 2006). Despite these benefits, prior studies have also raised concerns about the program design and outcomes. Fernandes et al. (2014) advocated for a financial education program design that incorporates interactive and hands-on approaches to address the unique needs of university learners. Grable and Joo (1998) suggested that financial literacy appears to have lasting effects beyond graduation because financially literate students were less likely to have financial difficulties after graduation. However, other than finance-major students, most college students might not receive any financial education during their studies. In pursuit of the whole-person development and financial wellness of tertiary students, many tertiary institutions have started diverse financial education programs across their campuses. Despite these widespread

efforts, a theory-based evaluation framework that assesses the programs' impact on students' financial literacy remains absent from the research literature.

1.2 Statement of the Problem

Several studies have examined financial literacy, financial knowledge, financial attitudes and behaviours, financial education, and program evaluation. O'Connell (2009) reviewed previous international literature on financial literacy and opined that measuring the impact of financial education programs was difficult. Most of the studies on financial literacy are related to financial knowledge, attitudes, and behaviours. Few studies have examined financial education programs. This research aimed to address the gap by studying the financial literacy of tertiary students following the financial education program. For the purposes of this study, a financial literacy measurement approach was adapted to examine the financial literacy levels of the participants in terms of financial attitudes, knowledge, and behaviours.

O'Connell (2009) pointed out that many financial education programs were evaluated only by the satisfaction rate and usage. These measurements are popular benchmarks for program evaluation. However, they cannot reflect the actual impact of programs. Prior studies have conducted limited research on the evaluation of financial education programs and their impacts on financial literacy. This research aimed to bridge the gap. This research used a mixed method design to conduct quantitative and qualitative analyses, and thus contributed to the literature on evaluating financial education programs.

While many prior studies have examined financial education in school students, there was a noticeable gap when it comes to studying the effects of financial education, specifically targeting tertiary students. Pinto et al. (2005) examined the effects of socialisation agents on college students' credit use. They found that 87% of college students depended on their parents for financial advice, and the parents were a significant source of financial information. This showed that financial literacy learnt from the family had an impact on students' finances. However, there is limited research on financial education in tertiary education. This study filled the research gap by examining whether financial education programs were capable of improving financial literacy among tertiary students.

There are gaps in the literature examining financial education programs and their effects on financial literacy, particularly within the context of Hong Kong . In the United States, tertiary institutions must provide mandatory counselling and financial education sessions to student loan borrowers (Klepfer et al., 2015). However, in Hong Kong, tertiary students who receive student loans are not required to participate in compulsory counselling. According to the Government of Hong Kong, the default rate of student loan repayment climbed to a record high of 10% in 2014. This reflected a severe financial issue among tertiary students and an urgent demand to improve their financial literacy. Compared to other international financial centres, Hong Kong began the national strategy for financial literacy later than the United States, the United Kingdom, and Singapore, and financial education is not mandated in the educational system. The limited number of studies on financial literacy education among tertiary students in Hong Kong contributed to the research gap. To address this research gap, this research aimed to inform policy decisions, program design, and resource allocation to maximise the impact of financial education programs. This

research also aimed to inform the development of targeted financial education programs in Hong Kong.

1.3 Research Purposes

This study aimed to achieve the following research purposes:

1. To examine the effects of the financial education program on the financial literacy of tertiary students in the context of financial knowledge, attitudes, and behaviours.
2. To investigate the relationship between demographic characteristics and financial literacy of tertiary students.
3. To understand the effects of program outputs on learning financial literacy of tertiary students.
4. To design a theory-based logic model to guide the evaluation of the financial education program.
5. To integrate the research findings and provide recommendations for implementing financial education programs in tertiary institutions.

1.4 Research Questions and Research Hypotheses

This research investigated how and to what extent the financial education program influenced the financial literacy of tertiary students. The research questions were developed as follows:

1. How and to what extent did participation in the financial education program impact the financial literacy of tertiary students?

2. Did the financial literacy of tertiary students differ by their demographic characteristics following the financial education program?
3. Were there any relationships between tertiary students' perceptions of program outputs and their financial literacy?
4. How did tertiary students perceive the financial education program and its impact on financial literacy?

Research hypotheses were formed to answer the research questions above.

For research question 1, there were four alternative hypotheses.

H1a: There is a significant improvement in the financial knowledge of tertiary students after the financial education program.

H1b: There is a significant improvement in the financial attitudes of tertiary students after the financial education program.

H1c: There is a significant improvement in the financial behaviours of tertiary students after the financial education program.

H1d: There is a significant improvement in the financial literacy of tertiary students after the financial education program.

For research question 2, there were six alternative hypotheses.

H2a: There is a significant difference in the financial literacy of tertiary students by gender following the financial education program.

H2b: There is a significant difference in the financial literacy of tertiary students by age group following the financial education program.

H2c: There is a significant difference in the financial literacy of tertiary students by job status following the financial education program.

H2d: There is a significant difference in the financial literacy of tertiary students by monthly income level following the financial education program.

H2e: There is a significant difference in the financial literacy of tertiary students by education level following the financial education program.

H2f: There is a significant difference in the financial literacy of tertiary students by study major following the financial education program.

For research question 3, there were seven alternative hypotheses.

H3a: There is a significant effect of the lecturers on the financial literacy of tertiary students following the financial education program.

H3b: There is a significant effect of the study notes on the financial literacy of tertiary students following the financial education program.

H3c: There is a significant effect of the case study videos on the financial literacy of tertiary students following the financial education program.

H3d: There is a significant effect of the mobile app on the financial literacy of tertiary students following the financial education program.

H3e: There is a significant effect of the exercise on the financial literacy of tertiary students following the financial education program.

H3f: There is a significant effect of the webpages on the financial literacy of tertiary students following the financial education program.

H3g: There is a significant effect of the overall program on the financial literacy of tertiary students following the financial education program.

For research question 4, no hypothesis was formed to be tested because it was based on qualitative analysis to complement the quantitative analysis.

1.5 Significance of the Study

This research was significant because it explored the research gap and contributed new knowledge to the existing literature on financial literacy, financial education, and program evaluation. Colleges and universities that deliver financial education programs typically evaluate the program by using satisfaction levels and post-program surveys. OECD (2010a, 2010b, 2013) proposed using a logic model to evaluate financial education programs. More organisations and institutions established the logic model to build a structured program evaluation, and certain previous studies applied pre- and post-surveys to evaluate how programs influenced the participants. Only a few studies explored theory-based program evaluation using a logic model to examine the impact of financial education programs on financial knowledge, attitudes, and behaviours. Therefore, this study was intended to inform the development of a theory-based program evaluation model to measure the effects of financial education programs. Financial educators and program organisers could apply the theory-based program evaluation model to improve future program measurement. This research also identified the program outputs which had significant effects on students'

financial literacy. The findings could help financial educators and teachers to plan and develop more effective teaching strategies and resources.

This research contributed to providing new knowledge to similar studies on tertiary students. Previous studies have been conducted in OECD member regions, and similar research on Hong Kong tertiary students remains limited. This research contributed new insights to financial literacy and financial education programs at the tertiary level. Tertiary students from different tertiary institutions were examined in Hong Kong. This research added the new findings on Hong Kong tertiary students to the body of knowledge. This would broaden the research subjects and sites to fill the gap in the existing literature.

1.6 Chapter Summary

This chapter provided an overview of the research study and reviewed key studies on financial literacy and financial education. The problem statement explained that while many universities and colleges offered financial education programs, there was limited research on program impacts on tertiary students' financial knowledge, attitudes, and behaviours. This chapter then outlined the research purposes, which were to examine the impact of the financial education program on tertiary students' financial literacy, the relationships between demographic factors and financial literacy, the effects of program outputs, and the outcomes of the financial education program. Corresponding research questions were presented, along with hypotheses for the quantitative questions. The significance of the study was discussed, emphasising how it addressed those gaps in understanding the impact of financial education programs and contributed to the literature on

the financial literacy of tertiary students. Potential benefits to financial educators and policymakers were also discussed. This chapter laid the foundation for the literature review and subsequent methodology for the empirical investigation of the impact of the financial education program on tertiary students' financial literacy.

Chapter 2 - Literature Review

2.1 Research on Financial Literacy

This chapter reviews the literature relevant to the design and interpretation of this study, focusing on: (1) operational definitions and the measurement of financial literacy, (2) financial literacy among students and youth populations, (3) demographic factors associated with financial literacy, and (4) financial education and program evaluation, with a particular emphasis on school-based programs and the Hong Kong context. The review prioritised empirical studies, theoretical models, and policy frameworks published between the 1990s and the 2020s that directly informed the measurement dimensions and logic model used in this research, while drawing selectively on earlier foundational studies. This review also identified research gaps in the existing literature. The key conclusion drawn from this review was that financial literacy is operationalised as a multidimensional construct encompassing financial knowledge, financial attitudes, and financial behaviours, and that financial education programs have demonstrated mixed effects on financial literacy.

The literature on financial literacy reveals a complex and evolving field. Some definitions have emphasised financial knowledge and the ability to apply it, whereas later operational frameworks have treated financial literacy as a multidimensional operational construct. Prior literature highlighted the lack of a single agreed definition (Huston, 2010); the OECD's work subsequently provided a widely used operational approach for measurement. Lusardi (2008) described financial literacy as knowledge of economic concepts that enabled informed decisions on savings,

mortgages, financial planning, and retirement. Hung et al. (2009) proposed a broader composite definition: financial literacy as knowledge of basic economic and financial concepts, as well as the ability to use that knowledge and other financial skills to manage financial resources effectively for a lifetime of financial well-being. However, they argued that financial literacy should be distinguished from financial attitudes, which derived in part from personal preferences. By contrast, the OECD (2011a, 2011b) provided a multidimensional operational approach in which financial literacy was measured through financial knowledge, financial attitudes and financial behaviours. Hung et al. (2009) treated financial attitude as distinct from financial literacy, whereas the OECD adopted a broader operational approach for measurement. This divergence reflected differing conceptualisations in the evolving literature.

Prior studies emphasised financial literacy as the ability, skill, and knowledge to exercise well-informed judgments, as well as to make effective financial decisions (Hogarth, 2002; Noctor et al., 1992; Schagen, 1997). It was the way individuals managed their savings, insurance, and investments. JumpStart Coalition (2007) also provided a similar definition of financial literacy: *“the ability to use knowledge and skills to effectively manage personal financial resources for a lifetime”*. Moore (2003) went further to encompass practical experience and active integration of financial knowledge. Diverging from this perspective, Xiao et al. (2011a) framed financial literacy within the context of financial education, and illustrated how acquired knowledge shaped financial behaviours.

The literature also consistently identified significant consequences associated with low financial literacy. Mandell (2007) drew on five JumpStart Coalition surveys of high school seniors in the

United States between 1997 and 2006. These surveys showed that high school seniors in the United States persistently demonstrated low levels of financial literacy and a limited ability to make age-appropriate financial decisions in their own self-interests (Mandell, 2007). As the youth grew into adulthood, weak financial literacy left them more vulnerable to adverse financial outcomes, debt problems and financial shocks. In many countries, the rising concern about low financial literacy levels led to an increasing awareness of national strategies for financial education development (Grifoni & Messy, 2012).

The OECD (2012) conducted an overview of the international development in national strategies for financial education, and many well-developed economies (for example, the United States, Australia, the United Kingdom, New Zealand, and Singapore) had established their national strategies. The national strategy provided directions on designing, implementing, and evaluating financial education programs. Most countries and regions conducted financial literacy surveys across their populations to collect substantial evidence and identify vulnerable groups to set up their national strategies (OECD, 2015). As the OECD's (2011a, 2011b) multidimensional approach to operationalising financial literacy provided a more comprehensive basis for conceptualising and measuring financial literacy in this study, this approach was therefore adopted in this study. The measurement of financial literacy is discussed further in Section 2.7.

2.2 Financial Literacy in Hong Kong

The first Hong Kong's national strategy for financial literacy was established in 2015 by the Securities and Futures Commission's (SFC) Investor Education Centre (IEC). The SFC is a financial regulator in Hong Kong. In 2019, the SFC renamed its subsidiary, the IEC, as the Investor

and Financial Education Council. Following the decision of the Hong Kong Government to improve the financial literacy and capability of Hong Kong people, the SFC developed the first large-scale financial literacy survey to understand financial knowledge, financial attitudes, financial behaviours, and financial capabilities. The SFC (2013) used face-to-face interviews and a two-stage sampling approach to collect 2,062 valid samples. The first stage comprised 2,000 people aged 18-64 of different genders, residential regions, and household incomes. The second stage involved the booster interviews to obtain an additional 62 booster samples for sub-group analysis.

The SFC (2013) reported that Hong Kong people had the lowest score on financial planning because the development of financial planning practices and mandatory provident funds in Hong Kong still lagged behind that in other well-developed countries. The research also showed that young people had better financial knowledge than other age groups. However, the young people were less financially capable than the others because their engagement in financial planning was low, and their awareness of financial position was poor. The young people demonstrated weak budget control and limited awareness of their living expenses, but they were more likely to set spending limits on credit cards. They also had a significantly lower understanding of investment diversification. The study indicated that young people relied on the internet and peer recommendations as primary sources of information on financial products (SFC, 2013).

Chau et al. (2004) studied the financial management practices of tertiary students in Hong Kong and conducted questionnaires to 802 respondents. Tertiary students showed limited understanding of financial management knowledge, especially regarding credit cards and student loans. The

financial issues of student loans among tertiary students were also reflected in another study conducted by the Hong Kong Federation of Youth Groups (HKFYG) in 2013. The research investigated the financial pressure of tertiary students with student loans. This study received 727 valid questionnaires from 45 tertiary institutions in Hong Kong. The HKFYG (2013) showed that only one-third of the surveyed youth attended publicly funded tertiary institutions in Hong Kong. Tertiary students in private institutions relied heavily on student loans for tuition fees. However, only 15.7% of respondents demonstrated sufficient financial capacity to make their loan repayments independently, while the majority cited that their family members were unable to cover either a portion or the entire amount of their tuition fees and living expenses. 65.5% of tertiary students took part-time jobs to support their daily expenses. The tertiary students who borrowed student loans felt high financial pressure, and the average financial stress score was 7.31 out of 10 (HKFYG, 2013).

In the Hong Kong literature, the term financial capability was frequently used alongside financial literacy. This was evident in the SFC and HKFYG studies, which examined financial literacy and financial capability together. Subsequent OECD and Hong Kong survey research adopted the OECD's approach to measuring financial literacy, operationalised through knowledge, attitude and behaviour, in examining the Hong Kong evidence. In 2016, the OECD included Hong Kong for the first time in the international financial literacy measurement, which surveyed 51,650 adults from 30 countries and economies. The OECD (2016) combined the scores of financial knowledge, attitudes, and behaviours to provide an indicative score of overall financial literacy. A global mean of overall financial literacy was reported at 13.2 (Maximum score: 21) for all participating countries. France, Finland, and Norway were the top three countries with the highest overall scores

in financial literacy. Hong Kong had strengths in financial knowledge but was weak in financial behaviours. Hong Kong achieved a relatively high overall score of 14.4 and ranked fifth among the OECD economies (OECD, 2016). Like the previous studies, the IEC (2016) reported that the young people in Hong Kong were more vulnerable to debt problems with credit products, and their satisfaction level with their financial position was low. They did not engage in daily money management and were less likely to do financial planning. The IEC (2016) also found that Hong Kong students showed weaker financial knowledge levels and were relatively focused on short-term goals, mainly because they were less financially capable and did not have adequate savings.

2.3 Demographic Variables Related to Financial Literacy

Previous studies employed various surveys to explore the relationship between demographic variables and financial literacy. Certain groups were identified as particularly vulnerable due to lower financial literacy. People demonstrating lower financial capability across multiple dimensions tend to be younger, have below-average incomes, and possess fewer financial products (Atkinson et al., 2006). The ANZ Social Research Centre (2008) conducted a financial literacy survey in Australia, revealing significant correlations between financial literacy and four variables: gender, educational attainment, age, and socioeconomic status. Young people aged 18 to 24, people with no post-secondary education, and those living in lower socio-economic areas were less financially literate. The subsequent survey of the ANZ Social Research Centre (2011) showed the same demographic characteristics for the low financial literacy groups. Both age and educational attainment consistently emerged as significant predictors of financial literacy across multiple studies (ANZ Social Research Centre, 2008; ANZ Social Research Centre, 2011; Colmar Brunton, 2006; Hogarth, 2002).

Socioeconomic variables, particularly income and employment status, formed another cluster of powerful predictors in prior research. Van Rooij et al. (2011) found that age, income level and education had effects on financial literacy. Potrich et al. (2015) further concluded that financial literacy was associated with income, employment, and education level. Koto (2023) extended the analysis to university students and found that age, gender, and parental income significantly affected financial literacy. Prior research showed that low education, unemployment, low income, and younger age were primarily common demographic factors associated with low financial

literacy. Identifying vulnerable groups helps to develop financial education effectively for the targeted people.

2.4 Financial Literacy of Tertiary Students

Tertiary students are in the initial life stage when they can access various financial transactions. They are qualified to earn an income for the first time and engage in financial activities such as investing, borrowing student loans, and using credit cards. Parental influence was identified as one of the critical interventions for building their financial literacy (Cude et al., 2006). Shim et al. (2010) subsequently found that college students who perceived they could talk about financial topics with others showed lower financial stress. With more financial independence, there was a risk that tertiary students would not be able to manage their finances, with particular concern about their spending control. Credit cards were one of the significant debt problems among college students across several studies. Lyons (2004) identified financially at-risk college students and indicated that credit issues were a significant factor. Poor financial skills affect students' finances and personal well-being. College administrators and financial aid officers should better target students' financial issues to address these problems. Hira (2012) suggested that financial education helped people nurture responsible borrowing and sustainable financial behaviour.

2.5 Financial Education

Financial education was defined by the OECD (2005) as "the process by which financial consumers/investors improve their understanding of financial products, concepts and risks and, through information, instruction and/or objective advice, develop the skills and confidence to

become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being". Although policymakers and educators broadly agreed on the importance of developing financial education, research documented mixed evidence regarding the effectiveness of different program approaches, particularly in relation to their implementation within school systems. This section therefore reviews both the policy development of financial education and the evidence on how different delivery approaches have been implemented and evaluated.

Highsmith (1989) indicated that the United States started financial education programs as far back as 1957. Twenty-nine states had legal mandates to require schools to deliver consumer education to secondary school students. Personal finance was one of the four main areas in consumer education, and the programs covered topics on saving, money management, household budgeting and credit use (Scott, 1990). Prior studies further evaluated the effectiveness of financial education, highlighting both benefits and limitations. Seminars are a popular form of financial education. Clark and d'Ambrosio's (2003) analysis revealed that the intervention generated an observable short-term behavioural shift in retirement among the participants. They also showed the intention to change their saving behaviour after the seminar. However, the long-term effect was insignificant as they did not maintain the said behaviour in the next three months. FINRA Investor Education Foundation (2009) similarly documented a persistent gap between real-world behaviour and self-reported knowledge. This showed the challenge of translating knowledge gains into behavioural changes.

A significant advancement in financial education was the development of national strategies advocated by the OECD. The OECD (2005) recommended key principles and good practices for financial education to its member countries, advocating for national approaches to financial education. The European Commission (2007) issued a Communication on Financial Education, which set out key principles to guide financial educators and announced practical initiatives to support financial education across the European Union, aiming to assist stakeholders in the development of financial education schemes. Grifoni and Messy (2012) noted that the potential consequences of low financial literacy levels had led to an increasing awareness of financial education in different countries. The national strategy for financial literacy provided a road map for financial education, goals and guidance for financial education programs.

The OECD (2015) reviewed the international development and revealed that the national strategies for financial education were usually initiated by government bodies and/or financial regulators. Table 2.1 summarises the organisations and the year the major economies initiated their national strategies. These coordinated approaches had been progressively adopted by major economies over the years.

Table 2.1 National strategies for financial education

Major economies	National Strategy Initiator	Year
United Kingdom	Financial Services Authority	2003
Singapore	Financial Education Steering Committee	2003
United States	Department of the Treasury	2006
New Zealand	Commission for Financial Literacy and Retirement Income	2008
Australia	Australian Securities and Investments Commission	2011
Hong Kong	Investor Education Centre	2015

As evidenced by the national strategies for financial education adopted across major economies from 2003 onwards (Table 2.1), financial education had typically been framed as a structured and coordinated process supported by government departments, public bodies and/or financial regulators, with the aim of improving individuals' financial literacy and enabling them to make informed financial decisions. Given this conceptual breadth and the policy convergence identified above, this study adopted the OECD's (2005) definition of financial education as the working definition. The OECD's (2005) definition captured both the educational process and intended outcomes. Moreover, the financial education program examined in this study was developed with reference to Hong Kong's National Strategy for Financial Education 2015. It therefore provided a clear definitional basis for the financial education program examined in this study and informed the program design and development in Chapter 3.

2.6 Financial Education Programs

2.6.1 School-based programs

Financial education in schools requires various stakeholders, including the government, financial regulators, central banks, education institutions, parents, teachers, and students (OECD, 2015). The research evidence showed that schools and parents were two primary sources from which the youth learnt financial literacy (Chowa et al., 2012). In schools that had developed financial literacy curricula, financial education was usually embedded in school-based programs to educate students. Previous research results for school-based programs appeared to have met limited success. Inconclusive findings on the effectiveness of financial education programs were shown (Hathaway & Khatiwada, 2008; Mandell, 2008). Hogarth (2002) found that students who received school-based financial education programs showed higher financial knowledge, which in turn resulted in informed financial decisions. However, Mandell (2006) reported that financial literacy levels in the United States had not improved despite growing investment in financial education programs, and that students who had taken a personal finance course alone performed no better than those who had not taken a personal finance course. It was also found that schools using a standardised format to design financial education programs were ineffective because Hathaway and Khatiwada (2008) argued that the “one-size-fits-all” approach could not accommodate the varying circumstances of students.

Boyce and Danes (1998) evaluated the effect of the High School Financial Planning Program on 4,107 students nationally. Students showed significant gains in financial knowledge, behaviour,

and self-efficacy after completing the financial education program. Hathaway and Khatiwada (2008) reviewed various school-based financial education programs and suggested that financial education programs were significantly effective if they were targeted at a specific segment or financial activity (e.g., credit card and mortgage). O’Connell (2009) added that different people had varying responses to different program content or formats. Tailored program topics, content and formats for target groups enhanced the effectiveness of financial education programs. These findings suggested that while school-based financial education was not automatically effective, the contradictions in the literature could often be explained by variations in program design. Specifically, interventions were more likely to succeed when they were highly targeted, relevant to students' life stages, and appropriately delivered. Despite these implementation challenges, the OECD (2016, p.7) reported that overall financial literacy levels remained low across the 30 participating countries and economies, highlighting the importance of introducing financial education early within school settings. As new financial products and services continually emerge in financial markets, early financial education in schools was recognised as providing students with a stronger foundation.

2.6.2 Financial Education Curricula

Financial education approaches varied significantly by country; schools in France, Singapore, and Malaysia offered financial education on a voluntary basis (OECD, 2012). In contrast, in Australia, Canada and the United States, financial education was made compulsory, and schools were required by legislation to deliver financial education to specific groups of students. Mexican public and private education systems both contained financial education, but the curricula were varied (Álvarez et al., 2021). To ensure financial education curricula maintained their relevance and

effectiveness across diverse student populations, students' socio-economic contexts needed to be considered. Pedagogical approaches should be appropriately tailored to students' differing backgrounds and designed to be interactive and relevant (Mandell, 2007).

Mundy (2008) compared financial education programs in the OECD's selected member and non-member countries. The findings indicated that financial education programs were usually embedded in curricula across various subjects and were developed by public-private partnerships. The OECD (2012) recommended integrating financial education programs into school curricula because it was an effective approach to achieve widespread generational financial competency. However, Tennyson and Nguyen (2001) argued that personal finance curriculum mandates did not have a significant association with the financial literacy scores of high school students. Even students who studied non-standard mandated personal finance curricula did not perform better than those without financial education. Spielhofer et al. (2009) evaluated a school-based financial education program and reported a significant program outcome on financial knowledge. While the financial education program was the same, the level of success exhibited notable variability between schools. While some schools were able to effectively implement the financial education curriculum, others unfortunately struggled with the realisation of intended outcomes. Spielhofer et al. (2009) explained that there were three major barriers to successful financial education in schools. First, it was difficult to recruit suitable teachers to deliver the program. Second, schools did not have sufficient time to implement the program, and third, other subjects had enormous demands. These mixed findings suggested that curriculum mandates alone were insufficient, and that implementation quality, teacher capacity, and contextual adaptation influenced whether financial education curricula produced measurable gains.

Several researchers reported that there was consistent evidence that financial education brought promising benefits for financial knowledge, attitudes, and behaviours (Hilgert et al., 2002; Hogarth, 2006; Lyons, 2004). McCormick (2009) reviewed the youth financial education literature and highlighted several features of promising practice, including earlier provision of financial education, learner motivation, and the relevance of program design. The study of Kaiser and Menkhoff (2017) similarly found that financial education programs with relevant topics yielded improvements in participants' financial understanding in target areas. Potrich et al. (2015) proposed that financial education programs should focus on practices, strengthening financial literacy rather than teaching financial knowledge and concepts. For instance, participants were encouraged to track expenses regularly to spend within the budget and reduce their dependence on credit card spending. Moreover, after students gained basic investing skills and risk knowledge about investment products, they were less likely to perform any risky investing transactions.

2.6.3 Financial Education Programs in Hong Kong

This section focuses specifically on the provision and delivery formats of financial education initiatives in Hong Kong, building on the broader policy and survey background discussed in Sections 2.2 and 2.5. The Monetary Authority of Singapore pioneered a nationwide assessment of financial literacy in 2005, and students' overall financial literacy scores were poorer than the population average. Thus, Singapore implemented financial education programs in their school system to address the issue. The development of such programs in Hong Kong lagged somewhat in comparison. Hong Kong undertook its first extensive population-based assessment of financial literacy in 2012 (SFC, 2013). The OECD (2014, pp. 25, 28) reported in the large-scale Programme for International Student Assessment (PISA) 2012 study on youth financial literacy that 18 countries and economies participated in the financial literacy assessment, and that more countries had started introducing financial education into schools, often as part of a national strategy for financial education across the whole population.

By 2015, Hong Kong was still at an initial stage of implementing financial education programs in schools (IEC, 2015). The IEC (2015) delivered stocktaking research to identify the financial education initiatives in Hong Kong. Two hundred and thirty-two organisations offered a total of 661 financial education initiatives; banks (20%) and non-governmental organisations (20%) were the major organisers, while 13% of which were organised by tertiary institutions. In contrast to Hong Kong, MoneySENSE was Singapore's national financial education program. It collaborates with the university to deliver financial education to the public (Monetary Authority of Singapore,

2005). The program includes lectures and workshops designed to equip students with money management skills and knowledge.

In Hong Kong, financial education initiatives were delivered in a diverse range of formats; websites (29%), talks (28%) and programs (9%) were the top three delivery formats (IEC, 2015). 69% of financial education initiatives targeted a mass audience, with 10% targeting tertiary students. The stocktaking research was conducted again in 2018 to explore the development of financial education initiatives (IEC, 2018). The comparison revealed an expanded breadth of financial education initiatives. More initiatives were developed for primary school, secondary school, and tertiary students when there was a growth in the number of universities that organised financial education initiatives. Financial education programs accounted for 12% of initiatives, which denoted a significant increase in the 2015 stocktaking research. More practitioners incorporated program evaluation into the initiatives and published quantitative and qualitative evaluations to report the program's effectiveness and impact (IEC, 2018).

2.7 Conceptualising and Measuring Financial Literacy

Researchers have developed various models to conceptualise and measure financial literacy. Many studies have attempted to measure financial literacy using objective tests of financial knowledge, and questionnaires have been developed with multiple-choice questions covering topics such as interest rates, inflation, and investment risk (Chen & Volpe, 1998; Volpe et al., 1996). The financial market has many complicated financial terms, such as asset allocation, return on investment, and risk diversification. Financially illiterate individuals have difficulty in understanding these terms and making informed decisions. Accordingly, knowledge has been

positioned as an essential component of financial literacy by prior studies. Huston (2010) argued that financial literacy involves the financial knowledge and application for making informed financial decisions. Financially literate people can apply financial knowledge and numeracy skills to deal with financial issues (Atkinson & Messy, 2012). Some researchers utilised self-assessment of perceived financial knowledge. Lusardi and Mitchell (2007) used a self-assessed question asking respondents to rate their overall financial knowledge. Although it was easier to implement, perceived knowledge measures often differed from objectively measured knowledge (Parker et al., 2012). However, Lusardi and Mitchell are also credited with developing the widely influential “Big Three” questions. The “Big Three” questions assess respondents' understanding of compound interest, inflation, and risk diversification (Lusardi and Mitchell, 2008). The “Big Three” questions have been adopted in national surveys across more than 20 countries and are now one of the most widely used brief objective instruments for measuring financial knowledge in the literature (Lusardi and Mitchell, 2014).

While knowledge-based measurements provide a practical basis for evaluation, there is debate about whether financial knowledge questions adequately capture the full scope of financial literacy. Subsequent research has developed multidimensional scales incorporating measures of financial skills and attitudes in addition to financial knowledge (Taft et al., 2013; Xiao et al., 2011b). In addition to financial knowledge, financial attitudes and behaviours were essential for improving financial positions (Hira, 2012). Jodi et al. (1998) defined financial attitude as a person's psychological tendency to evaluate the acceptance of a financial management practice. In contrast to the psychological definition, Shockey (2002) defined financial attitudes as a combination of

concepts, information, and emotions that lead to a willingness to react favourably. Financial attitudes were positively related to financial behaviours (Shim et al., 2010).

The conventional wisdom was that financial knowledge was a pre-condition for positive financial behaviours, as evidenced in the literature review of Hathaway and Khatiwada (2008). However, their research did not find an empirical relationship between financial behaviour and knowledge. They argued that financial behaviours might be correlated with other factors, but not with knowledge and attitudes. Other studies reinforced the idea that financial behaviours correlated with the factors of financial literacy and financial wellness. The ANZ Social Research Centre (2008) reported that people with higher financial literacy were more likely to use various sources of financial advice, manage their risk, and compare financial products and services. Atkinson and Messy (2012) stated that financial behavioural problems, such as overspending and over-borrowing, had a negative impact on financial wellness, and both could lead to debt and credit issues. Nevertheless, Hilgert et al. (2002) delineated financial behaviours into four distinct money categories: savings, cash flow management, credit management, and investment. Their consumer surveys showed that financial knowledge was significantly related to financial behaviours, while the direction of causality might be bidirectional. These divergent findings suggest that the knowledge–behaviour relationship was not uniform across studies and was likely mediated by contextual factors such as measurement approach, population characteristics, and the specific financial domain examined.

Definitions of financial literacy have evolved to reflect its multidimensional and process-oriented character. Noctor et al. (1992) defined financial literacy as the capability to make well-informed

and effective choices regarding money management. This definition has been widely used in the context of financial education in schools. Mason and Wilson (2000) conceptualised financial literacy as a process that led to a range of desired outcomes (Atkinson, 2005, p.10). They defined financial literacy as an individual's ability to obtain, understand and evaluate the relevant information necessary to make decisions with an awareness of the likely financial consequences (Mason and Wilson, 2000, p. 31). The Basic Skills Agency published the Adult Financial Capability Framework for adults in the United Kingdom (Basic Skills Agency, 2004) and the framework identified three interlinked sections to form financial capability: (a) financial knowledge and understanding, (b) financial skills and competence, and (c) financial responsibility. The Adult Financial Capability Framework reflected a broader conception of financial competence than financial literacy alone. Financial literacy and financial capability have often been treated as closely related concepts, although financial capability has usually placed greater emphasis on practical enactment in real-life contexts. In this study, the term financial literacy was retained as the primary term, because it aligned with the OECD's (2011a, 2011b) approach adapted for measurement, in which financial literacy was assessed through financial knowledge, financial attitude and financial behaviour. Literature employing the language of financial capability was treated as conceptually relevant and complementary as financial capability frameworks placed more emphasis on practical application and enactment in everyday contexts, particularly evident in the United Kingdom and Hong Kong policy literature.

Given this definitional background, conceptualising and measuring financial literacy is challenging, and various approaches have been used. An influential framework was developed in 2008 by the United States President's Advisory Council on Financial Literacy (PACFL). PACFL

(2008) referred to financial literacy as the ability to effectively manage financial resources using knowledge and skills to achieve long-term financial well-being. The PACFL's (2008) financial literacy model highlighted the range of knowledge and skills vital for financial well-being. It provided a starting point for measurement across financial literacy domains. Shim et al. (2010) studied college students with a financial socialisation model to understand how they learn financial knowledge, attitudes, and behaviours. While models vary, the financial literacy measurement tends to include a mix of financial knowledge, attitudes, skills, behaviours, and experiences. However, the emphasis was often on assessing financial knowledge (Huston, 2010). The OECD (2011a, 2011b) proposed an approach to measure financial literacy that treats financial literacy as comprising financial knowledge, financial attitudes, and financial behaviours. The OECD's (2011a, 2011b) approach to measuring financial literacy was widely used in the national surveys, and it was also recommended by Atkinson and Messy (2012) and Agarwalla et al. (2013). Figure 2.2 presents the concepts of the OECD's (2011a, 2011b) approach to measuring financial literacy. Financial literacy was operationalised in this study as a higher-order construct, comprising three first-order dimensions: financial knowledge, financial attitude, and financial behaviour.

Figure 2.2 The OECD's (2011a, 2011b) approach to measuring financial literacy

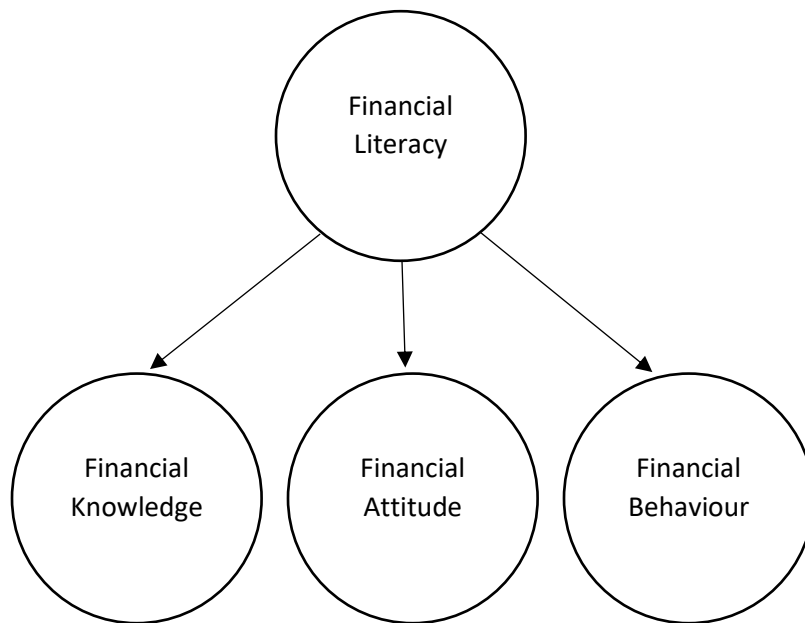


Table 2.3 summarises the dimensions that measure financial literacy and the relationships among the dimensions. Prior research consistently highlighted three dimensions for financial literacy measurement: financial knowledge, financial attitude, and financial behaviour. Empirical research confirmed that these dimensions were not isolated; improvements or deficiencies in one area often influenced the others. Hung et al. (2009) and Huston (2010) both stressed the predictive power of financial knowledge for positive financial behaviours or applications. Lusardi and Mitchell's (2008, 2011) “Big Three” questions measuring compound interest, inflation, and risk diversification represented the most widely employed objective measure of financial knowledge. OECD (2011a, 2011b), Atkinson and Messy (2012), Agarwalla et al. (2013), Potrich et al. (2015), and Felipe et al. (2017) all explicitly included financial attitude and behaviour alongside knowledge, though the nature and strength of the relationships among these dimensions might vary across studies. Most research found that higher financial knowledge was associated with more responsible financial

behaviour, and positive attitudes further reinforced such behaviours. However, some studies also noted inconsistencies, such as Felipe et al. (2017), who found neither a direct correlation between financial knowledge and attitude nor evidence that attitude could independently drive behaviour.

Drawing on the evidence reviewed, this study adopted the OECD’s (2011a, 2011b) financial literacy measurement approach as the conceptual framework for financial literacy because it provided a multidimensional and integrative approach for measuring financial literacy and had been validated in large-scale international surveys across the well-developed countries and economies. Financial literacy comprises three dimensions (financial knowledge, financial attitude, and financial behaviour) that are dynamically interconnected. This adopted approach helped to inform the conceptual framework presented in Section 3.2.

Table 2.3 Dimensions of Financial Literacy Measurement

Studies	Dimensions	Relationships Among Dimensions
Hung et al. (2009)	Financial knowledge, financial behaviour	<ul style="list-style-type: none"> • Financial knowledge is a strong predictive indicator for financial planning behaviour. • Financial knowledge supports financial skills and behaviour, but financial attitudes should be treated as conceptually distinct.
Huston (2010)	Financial knowledge, financial application	<ul style="list-style-type: none"> • Financial knowledge leads to financial application. • People must have the ability to apply or use the financial knowledge.
OECD (2011a, 2011b)	Financial knowledge, financial attitude, financial behaviour	<ul style="list-style-type: none"> • Financial attitude and financial behaviour are inconsistent. • Financial knowledge and behaviour are strongly and positively connected. • Higher financial knowledge demonstrates more positive financial behaviours.

		<ul style="list-style-type: none"> • Positive financial attitude towards a longer-term exhibits better financial behaviour
Atkinson and Messy (2012)	Financial knowledge, financial attitude, financial behaviour	<ul style="list-style-type: none"> • Higher financial knowledge leads to better financial behaviour. • Positive financial attitude exhibits positive financial behaviour.
Agarwalla et al. (2013)	Financial knowledge, financial attitude, financial behaviour	<ul style="list-style-type: none"> • Financial knowledge and financial behaviour have a significant positive correlation; better financial knowledge promotes responsible financial behaviour. • Financial behaviour and financial attitude show a significant negative correlation.
Lusardi & Mitchell (2008, 2011)	Financial knowledge	<ul style="list-style-type: none"> • Financial knowledge (objective measurement via “Big Three” questions) is a strong predictor of retirement planning behaviour.
Lusardi et al. (2013)	Financial knowledge	<ul style="list-style-type: none"> • There is a causal pathway from financial knowledge to financial behaviour; financial literacy is a key determinant in guiding financial decision making.
Potrich et al. (2015)	Financial knowledge, financial attitude, financial behaviour	<ul style="list-style-type: none"> • Learning financial knowledge positively shapes a responsible financial attitude and financial behaviour.
Felipe et al. (2017)	Financial knowledge, financial attitude, financial behaviour	<ul style="list-style-type: none"> • Financial attitude directly influences financial behaviour. • Financial knowledge does not influence financial behaviour. • No correlation between financial knowledge and attitude.

2.8 Theories Associated with Financial Literacy Research

Prior literature showed that different theoretical frameworks had been used to examine various cognitive, behavioural, and social factors influencing financial literacy. This section discussed several prominent theories that had guided financial literacy research, including behavioural finance theories, the theory of planned behaviour, and the family resource management model. Behavioural finance theories focused on the psychological and behavioural factors that affected financial decisions. The theory of planned behaviour provided insights into how attitudes, social norms, and perceived control influenced the role of intentions in financial behaviours. The family resource management model offered a comprehensive understanding of how resources, demands and management processes affected financial literacy. Program evaluation was another crucial aspect of financial literacy research, addressing the effectiveness of financial education programs. The logic model used in program evaluation offered a structured approach to assessing the outcomes of financial education programs, highlighting the collaborative efforts of inputs, activities, outputs, outcomes, and impacts.

2.8.1 Behavioural Finance Theories

Behavioural finance was closely related to financial literacy because it discussed how people made financial decisions and explored the impact of emotional and behavioural biases. Behavioural finance theories argued that psychological and behavioural factors influenced financial decisions. Kahneman and Tversky (1979) developed the prospect theory, a prominent behavioural finance theory. The prospect theory described how people made choices under conditions of uncertainty

and how they evaluated potential losses and gains. When applied to financial literacy studies, prospect theory illuminated various aspects of how individuals processed financial information and made financial decisions. Shefrin and Statman (1985) used this theory to study how individuals might avoid certain financial decisions, such as selling a price-dropping stock to realise the investment loss. They suggested that financial education initiatives could address the loss aversion issue by teaching people about long-term investment and risk diversification. Meza et al. (2008) argued that low financial literacy had more to do with psychology than with knowledge. Elliott et al. (2010) suggested that financial education should draw lessons from the psychological field to drive financial behavioural changes among people.

2.8.2 Theory of Planned Behaviour

The theory of planned behaviour was a model proposed to forecast and explain human behaviour in specific contexts (Ajzen, 1991). Ajzen (1991) indicated that perceived behavioural control, attitude, and subjective norm contributed to the intentions and that intention was the most crucial determinant of behaviour. The theory had been extensively used in prior studies to research people's intentions and behaviours, including research on financial literacy and financial behaviours. East (1993) used the theory of planned behaviour to study significant predictors of investment intentions and behaviours. Jacobs-Lawson and Hershey (2005) conducted a similar study using the theory of planned behaviour to predict retirement savings intentions.

The theory of planned behaviour has also been used to understand the behaviours of credit card users and college students. Shim et al. (2009) applied the theory of planned behaviour to investigate college students' saving behaviour. They found that subjective norms, attitudes, and

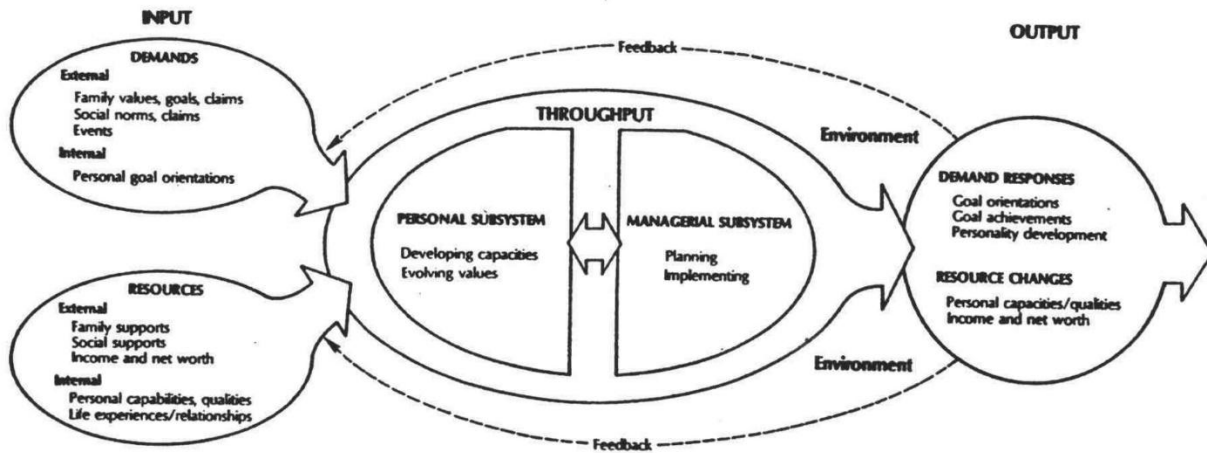
perceived behavioural control significantly predicted saving intention. Shim et al. (2009) concluded that the theory of planned behaviour offered a helpful framework for understanding determinants of saving behaviour. Another study by Xiao et al. (2011b) also used the theory of planned behaviour as a framework to examine factors influencing consumer intention to use credit cards. In the theory of planned behaviour, it considered internal cognitive factors as well as social influences that shaped intentions and behaviours. However, Sheeran (2002) opined that those intentions did not always lead to actual behaviour, and there were gaps between behavioural intentions and actions. This constraint was a limitation of the theory of planned behaviour.

2.8.3 Family Resource Management Model

The family resource management model, proposed by Deacon and Firebaugh (1988), offered a comprehensive framework to understand how people utilise resources to meet demands and achieve financial goals. The family resource management model emphasised the active role families played in managing resources amidst changing demands and goals. Deacon and Firebaugh (1988) described management as a basic tool for achieving desired goals by effectively using resources to advantage. Effective managerial processes helped families and individuals handle various life events using resources to meet demands and goals. As shown in Figure 2.4, the family resource management model consisted of four key components in the personal system of resource management: input, throughput, output, and feedback loop (Deacon & Firebaugh, 1988). Inputs referred to the resources available to a family, including values, attitudes, knowledge, time, energy, money, skills, and material items. Throughput involved the planning and implementation processes to allocate resources to meet demands. Output constituted the results of resource allocation, such as whether demands were met, goals were achieved, and quality of life was

improved. Finally, the feedback loop allowed families to evaluate outputs and adjust inputs and throughputs accordingly (Deacon & Firebaugh, 1988).

Figure 2.4 Deacon and Firebaugh's (1988) family resource management model



Source: Deacon and Firebaugh (1988) Family Resource Management (2nd Ed.). Boston: Allyn and Bacon, Inc., P. 22.

Deacon and Firebaugh (1988) stated that the managerial system worked with the personal subsystem within families. The personal subsystem encompassed the values, attitudes, knowledge, and capacities, which provided input and support to the managerial subsystem. In turn, the managerial subsystem included the planning, decision-making, and implementing processes that allowed families to allocate resources effectively. The Throughput helped manage resources to achieve goals in the Output. Through putting plans into action, the managerial system generated experiences which fed back into the personal system, fostering learning and growth at the individual level. Output satisfaction resulted when demands were adequately met through

management processes. Dissatisfaction arose when outputs deviated significantly from anticipated goals. Feedback loops allowed families to monitor input-output relationships and make adjustments. Deacon and Firebaugh (1988) pointed out that negative feedback promoted a system's stability by influencing the reduction in deviation, and positive feedback represented growth or change in possibilities. This model coordinated actions to convert inputs into outputs that fulfilled demands. In doing so, it also shaped learning processes, which modified personal capabilities and qualities. The interplay between managerial and personal systems allowed individuals to manage resources in dynamically responsive ways.

Prior family financial management studies (Fitzsimmons & Leach, 1994; Gutter et al., 2010; Joo, 2008; Titus et al., 1989) had been grounded in the family resource management model proposed by Deacon and Firebaugh (1988). The family resource management model provided a relevant framework for studying financial literacy. Previous studies had applied the family resource management model to examine financial literacy in areas such as behaviours, attitudes, and well-being. McGee (2017) utilised the family resource management model to assess a value-based financial literacy program and concluded that various input factors, including demographics, saving motives, and current financial assets, influenced retirement saving behaviours (throughput) and retirement income satisfaction (output).

Jorgensen and Savla (2010) combined the family resource management model and social learning theories to explore the parental influence on young adults' financial literacy. Their study demonstrated how parents' financial knowledge, attitudes, and behaviours influenced their children's financial literacy. According to Jorgensen and Savla (2010), parents' financial inputs

(e.g., knowledge, values, experiences) influenced their financial socialisation processes and practices with children (throughput), which in turn affected children's financial literacy (output). The feedback loop represented how children's financial behaviours and effectiveness further shaped parents' approaches. Researchers applied the family resource management model to study how inputs, such as family characteristics and resources, influenced financial throughputs, such as decision-making, and outputs, such as financial well-being (Deacon & Firebaugh, 1988; Greninger et al., 1996). The model recognised that families differed in financial resources, demands, and management processes, leading to varied financial literacy development. Gudmunson and Danes (2011) highlighted that the family unit and parent-child relationships were central to financial socialisation. The family resource management model appropriately captured financial socialisation as a family-level process shaped by parents' knowledge and practices. The model had proven helpful in identifying parental inputs that fostered children's financial literacy. Some researchers used the model as the conceptual framework for financial literacy studies. Subarna Bir (2016) found that recently graduated employees with more positive financial attitudes had better financial management practices. Xiao et al. (2014) found that financial attitudes and knowledge significantly influenced financial management behaviour, emphasising the importance of these variables in understanding family financial management.

However, some limitations to the family resource management model were noted. Godwin (1994) argued that the model might not encompass all the essential variables to explain a family's financial decision-making. He mentioned the absence of variables, "attitudes towards management" or "perceptions of the expected cash flow". Incorporating theories, such as the social learning theory, helped address these limitations, offering a broader perspective on financial literacy development

(Danes, 1994; Gutter et al., 2010). Integrating multiple theories provided a more comprehensive understanding of how diverse factors interact to shape financial knowledge and behaviours.

The family resource management model offered a practical, theoretical framework for researching financial literacy. The model captured the external and internal resources and demands (e.g., financial education) that finally shaped people's financial literacy. Deacon and Firebaugh (1988) identified education as one of the components of information within the model. Families and individuals have differential access to resources and inputs that shape throughputs and outputs. As such, the model provided tools to identify factors that promoted or inhibited financial literacy, as well as the socioeconomic factors, family dynamics, and individual attributes that shaped financial literacy. Although the Deacon and Firebaugh (1988) model took a comprehensive approach by encompassing the relationships among all key components: inputs, throughputs, and outputs, some researchers had only examined relationships found in one or two portions of the model. For example, some research focused on the relationships between inputs and outputs, while some studies were limited to the linkages between the personal and managerial subsystems within the throughput component (Junk et al., 1993; McKenna & Nickols, 2009). Previous studies have taken different approaches to applying the family resource management model. The conceptual framework derived from the family resource management model was further discussed in Chapter three.

2.8.4 Program Evaluation

Although many financial education programs have been developed, little or no research had been conducted to assess their effectiveness (O'Connell, 2007). Previous studies reported that financial education led to higher participation rates in personal savings and improvements in financial behaviour (Bernheim et al., 2001; Lusardi, 2010). However, it was challenging to prove that these impacts were influenced by financial education programs alone. The OECD (2016) underscored the pressing demand for a clear consensus on measuring financial literacy, which had been widely recognised across the OECD countries. The United Kingdom, United States, Australia, and New Zealand acknowledged the value of effective program evaluation and actively sought solutions to measure financial literacy.

In the United Kingdom, Smith (2004) administered questionnaires to evaluate the "Learning Money Matters" program and concluded that it was difficult to assess the effectiveness of students' learning in personal finance through the financial education program. The Australian Securities and Investments Commission (2011) also recognised the difficulties of financial education program evaluation because the evaluation research in this field was still evolving, and many factors might influence behavioural changes. In New Zealand, the Commission for Financial Literacy and Retirement Income (2012) found that many financial education programs did not have program evaluations. Time and cost were challenging issues for establishing a systematic evaluation of financial education programs. As it was essential to have an effective program evaluation, New Zealand added program evaluation as a key component in its national strategy for financial literacy. Their national strategy for financial literacy provided directions on the

evaluation of financial education programs because program organisers required a widely recognised evaluation model which could measure the impact and report the results.

To assess the success of financial education initiatives, the user engagement and satisfaction scores were commonly employed as key metrics. Although these metrics might not capture all aspects of financial education initiatives, they were still essential benchmarks for the program evaluation. Lyons et al. (2006) identified two kinds of impact measurement for financial education programs: subjective measures and objective measures. The objective measures included savings rates, debt levels, delinquency and bankruptcy rates, credit scores, investments, account enrolments, homeownership rates, and retirement plan participation. Subjective measures involved satisfaction levels, self-confidence, attitudes and intended changes in financial behaviour.

2.8.5 Logic Model

Program evaluation was an essential element for the success of financial education (Collins & O'Rourke, 2010; Fox & Bartholomae, 2008; NEFE, 2010). Through program evaluation, educators could assess the merit of a program, suggest improvements, and analyse participant impacts (Bamberger et al., 2006). DeVaney (2008) recommended a five-step model for program evaluation, including pre-implementation, program clarification, accountability, progress towards objectives, and program impact. Fox et al. (2012) highlighted the need for comprehensive evaluation studies of financial education programs in universities and proposed a framework for evaluation. Burk et al. (2014) evaluated a Retirement and Savings Seminar using a logic model and found that participants had increased financial knowledge, confidence, and positive financial behaviour changes compared with non-participants. These papers provided insights into the evaluation of financial education programs using logic models.

Logic models were practical tools for planning and implementing a thorough program evaluation (University of Wisconsin Extension, 2002). A logic model was a conceptual framework of how an educational program was expected to produce the intended outcomes (Bamberger et al., 2006). It depicted the problem and goal statement along with assumptions and factors that influenced outcomes (University of Wisconsin Extension, 2002). Evaluation should be integrated into every phase of program design and implementation for it to be effective (Bamberger et al., 2006; Fox & Bartholomae, 2008). The OECD (2010a, 2010b) developed guidelines that outlined the major components of the logic model:

- a. Inputs: *“clearly describe the investment you make, such as material, human and funding resources used by the program.”*
- b. Activities: *“undertook what work or actions through which inputs were utilised to produce program outputs.”*
- c. Outputs: *“produced what services, goods, training, and products to the target participants.”*
- d. Outcomes: *“short-term and intermediate-term changes resulting from the program outputs.”*
- e. Impacts: *“long-term changes resulting from the intermediate outcomes over a longer period.”*
- f. Assumptions: *“premises of the program and the beliefs we held about participants.”*
- g. External factors: *“variables that might affect the program’s ability to achieve the outcomes.”*

(OECD, 2010, P.4)

Logic models were widely recognised as effective tools for program evaluation. They presented a systematic and visual representation of the interrelationships among the program's resources, outputs, activities, outcomes, and impacts (W.K. Kellogg Foundation, 2004). Stinson and Wilkinson (2004) stated that logic models provided a structured framework to connect resources, activities, and expected outcomes. In financial education, particularly in contexts such as investor education seminars, logic models facilitated a clear understanding of the program's goals, the resources demanded, and the intended impact on participants. Lown and Nelson (2012) agreed that logic models enabled educators and evaluators to clearly define the objectives, identify the necessary resources, and measure the outcomes against the expected results. This systematic

approach was vital for determining the effectiveness of financial literacy programs. There was no further research beyond these studies specifically developed for measuring the financial literacy of tertiary students and the impact of financial education programs. This represented a research gap, as tertiary education offered considerable scope for implementing various kinds of education programs for students to receive financial education. This research aimed to address this gap and provided a model for policymakers to evaluate the financial literacy of tertiary students and the impact of financial education programs.

2.9 Chapter Summary

This chapter explored prior research on financial literacy and financial education programs. It found that financial literacy was a complex concept defined in many ways across the literature. Research showed that financial literacy was associated with demographic factors, such as age, income, education level, and employment status. International surveys reflected lower financial literacy among young people. Studies on tertiary students showed poor financial knowledge, especially regarding credit cards and student loans. Financial education programs in schools reported mixed results in improving financial literacy. Prior research indicated that various models had been developed to measure financial literacy. Typical dimensions of financial literacy included financial knowledge, attitudes, skills, and behaviours. Program evaluation remained a crucial challenge in demonstrating the effectiveness of financial education programs. In sum, the chapter identified research gaps on financial literacy of tertiary students and financial education program evaluation. The chapter also reviewed relevant theories, such as behavioural finance, the theory of planned behaviour, the family resource management model, and the OECD's financial literacy measurement approach. The logic model was introduced as a structured approach to evaluating the outcomes of financial education, offering a systematic representation of the relationships among various components. These findings informed the study's design, conceptual framework and program evaluation model.

Chapter 3 - Methodology

3.1 The Research Design

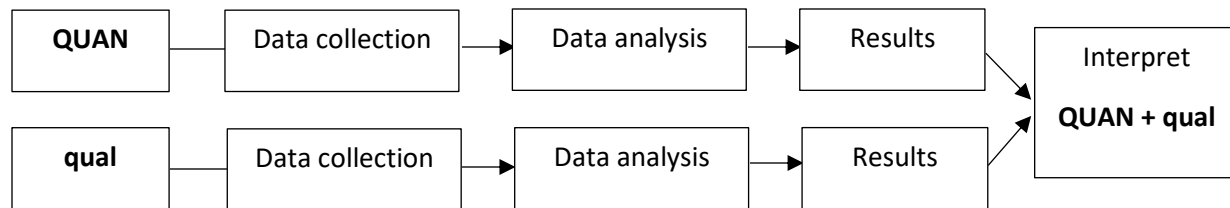
A research design was an overall plan for obtaining answers to the research questions and handling some difficulties encountered during the research process (Polit & Beck, 2004). Creswell and Plano Clark (2007) stated that research designs encompassed the methodologies for gathering, analysing, interpreting, and presenting data within research investigations. There were three conventional research designs: qualitative, quantitative, and mixed methods (Creswell & Poth, 2017). A mixed methods design was used in this research, through which quantitative and qualitative data were collected to investigate the research questions. As a single data source might be insufficient to analyse the research questions, integrating qualitative and quantitative data offered a better understanding of the studied concepts (Runeson & Höst, 2009). Creswell (2012) identified six major types of mixed-methods research designs:

- a. Convergent parallel mixed methods design
- b. Explanatory sequential mixed methods design (quantitative - qualitative)
- c. Exploratory sequential mixed methods design (quantitative - qualitative)
- d. Embedded mixed methods design
- e. Transformative mixed methods design
- f. Multiphase mixed methods design

Rauber and Rüniger (2007) highlighted the potential of the convergent parallel mixed methods design for improved efficiency and richer information. This study applied the convergent parallel

mixed methods design as its design was optimal and efficient in answering the research questions. The quantitative and qualitative data collection were conducted in parallel. The quantitative and qualitative data underwent separate analyses, followed by integrating both sets of results for comparison and interpretation. The relevant quantitative, qualitative, or mixed research questions were answered. Morse (1991) suggested that a primarily qualitative design could include some quantitative data to enrich the description of the sample participants. In this study, the quantitative data collection played a dominant role, involving more students and taking a broader view of results. Qualitative data collection played a less dominant role, and it was conducted for a smaller group. The qualitative findings supplemented the quantitative approach and provided a deeper understanding of the research problems. Figure 3.1 shows the convergent parallel mixed methods design in this study. The quantitative data collection involved pre- and post-surveys, which were used to measure the financial literacy of program participants. Pre- and post-surveys were performed before and after the financial education program. The qualitative data collection used semi-structured in-depth interviews to better understand the participants' feedback and experiences in the program. The researcher collected quantitative and qualitative data, which helped with the data analysis for better insight into the research questions. In Figure 3.1, the symbol “QUAN” refers to quantitative, whereas “qual” stands for qualitative, and “+” means both approaches are concurrent. The capital letter represents higher priority, while the lowercase letter represents lower priority (Johnson & Onwuegbuzie, 2004). The quantitative analysis had a greater weighting than the qualitative analysis in this study. The qualitative research was used to support the findings of the quantitative data.

Figure 3.1 Convergent parallel mixed methods design



Research Questions

As discussed in Chapter 1, this research was planned to address the gap in the literature on the effects of financial education programs in tertiary institutions, particularly among tertiary students in Hong Kong. The research questions were presented in Section 1.4 and the corresponding research hypotheses were developed to address these research questions. The following sections would outline the research methodology adopted in this study.

3.2 Conceptual Framework

A conceptual framework was developed to investigate the effects of a financial education program on tertiary students' financial knowledge, financial attitudes and financial behaviours and to explain how the program affected tertiary students' financial literacy levels. This study developed the conceptual framework drawing on Deacon and Firebaugh's (1988) Family Resource Management System Theory and the OECD's (2011a, 2011b) approach to measuring financial literacy.

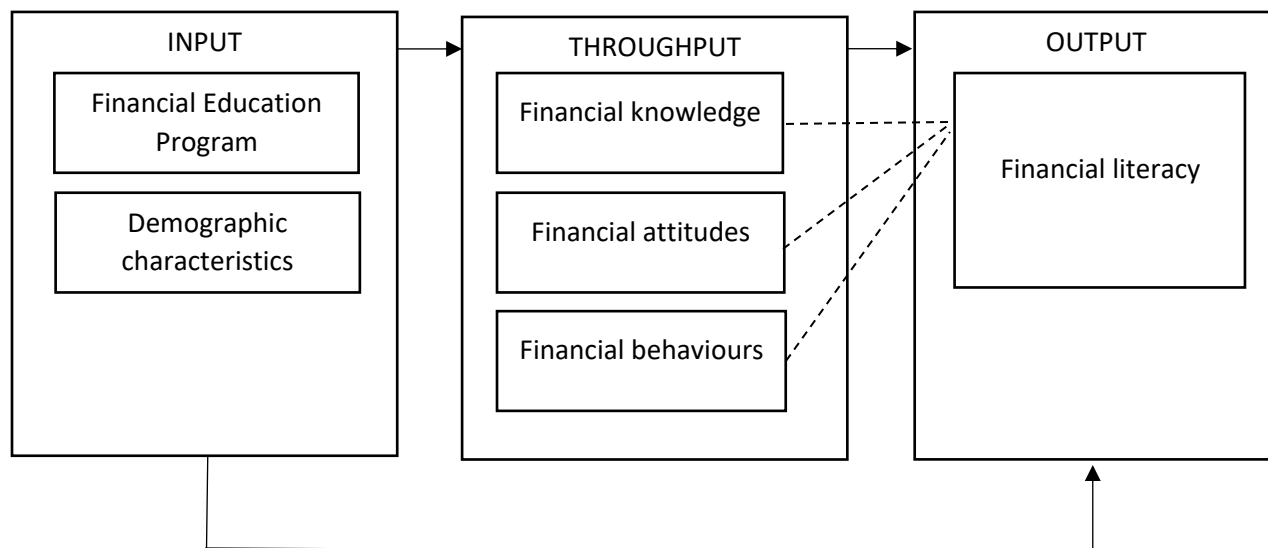
The Family Resource Management System Theory had three major components: inputs, throughputs, and outputs. Deacon and Firebaugh (1988) indicated that the model showed the processes that helped individuals and families use the resources to meet demands and goals. Figure 3.2 shows the outline of the conceptual framework in the study. As the proposed conceptual framework was derived from the Family Resource Management System Theory (Deacon & Firebaugh, 1988), there were three components. The first part was “Input”, which involved the internal and external resources. The financial education program was an external resource for the individuals (tertiary students), and demographic characteristics were internal resources of the individuals. The demand of individuals was to improve financial literacy with the use of financial education programs. Individuals with various demographic backgrounds, as the internal input, were given the external input. In Figure 3.2, the arrows indicate how “Input” went through the “Throughput” and achieved the desired “Output”. Financial knowledge, attitudes, and behaviours formed part of the “Throughput”. The personal and managerial subsystems in the “Throughput” generated the “Output” in the form of financial literacy.

To evaluate the effects of the financial education program on the financial literacy of tertiary students, the OECD’s (2011a, 2011b) financial literacy measurement approach was adapted. As mentioned in Chapter 2, the OECD’s (2011a, 2011b) financial literacy measurement approach aimed to assess financial literacy and determine the levels of financial literacy across 14 different countries. The three dimensions of financial literacy were widely used in previous studies (Agarwalla et al., 2013; Atkinson & Messy, 2012; Filipiak & Walle, 2015; Firli, 2017; Klapper et al., 2012; Lusardi & Mitchell, 2011; Potrich et al., 2015; Rai et al., 2019). The integration of these models in the current study allowed for a comprehensive investigation of how educational

interventions could drive measurable improvements in financial literacy, through changes in knowledge, attitudes, and behaviours. In Figure 3.2, the dashed lines position financial literacy as a higher-order construct measured through its three first-order dimensions: financial knowledge, financial attitude, and financial behaviour.

This input-throughput-output model has been used in previous studies to study financial management practices and financial well-being (Fitzsimmons & Leach, 1994; Goldsmith, 2005; McGregor & Goldsmith, 1998; Mugenda et al., 1990), and some studies have concentrated on financial stress (Mokhtar et al., 2015; Sabri & Falahati, 2003). This study contributed to the existing literature by using the model to understand the effects of the financial education program on tertiary students and to investigate missing variables, such as financial literacy and financial education, from past studies. In this study, the conceptual framework informed the effects of the financial education program and individual demographic characteristics (Inputs) towards financial knowledge, financial attitudes, and financial behaviours (Throughputs), then towards financial literacy (Output).

Figure 3.2 Conceptual framework based on the Family Resource Management System Theory (Deacon & Firebaugh, 1988) and the OECD’s Financial Literacy Measurement Approach (OECD, 2011a, 2011b)



3.3 Financial Education Program Logic Model

As discussed in the literature review section, several studies have examined financial education program evaluation with the logic model (Fox & Bartholomae, 2008; Fox et al., 2005; Lusardi, 2008). The OECD (2010a, 2010b, 2013) proposed the use of a logic model, which expressed a theory of change for the evaluation of financial education programs. The use of logic models began in the work of Suchman (1967) and Weiss (1972), who applied them as conceptual frameworks for how a program was intended to produce its outcomes (Bamberger et al., 2006). As the logic model was helpful for practical financial education program evaluation, the NEFE (2010) designed a financial education evaluation manual that promoted the use of logic models to assess the outcomes of financial education programs. This study adapted the OECD’s (2010a, 2010b, 2013)

logic model to propose the “Financial Education Program Logic Model” in Figure 3.3. The theory of change was that “tertiary students who completed the financial education program should show positive effects in their financial knowledge, financial attitudes, and financial behaviours, thereby improving their financial literacy.” The logic model was developed and applied in the conceptual framework to evaluate the financial education program. The logic model showed the logical relationships among the program inputs, program activities, program outputs, and program outcomes in the financial education program. The logic model helped guide the program evaluation, explained the implementation of the financial education program, and identified and measured essential variables to answer the research questions.

The logic model comprised six components: situation, inputs, outputs, outcomes, assumptions, and external factors (University of Wisconsin Extension, 2002). Starting from the top of the logic model, as shown in Figure 3.3, the situation statement describes the issue the program aimed to solve. Assumptions and external factors affecting the financial education program were proposed at the bottom of the logic model. The logic model was a useful construct to describe all the elements of a financial education program. Various program inputs, program activities, program outputs, and program outcomes were identified and connected to show the logical framework. The linkage between the logic model and the conceptual framework is illustrated in Figure 3.3. The input domain of the conceptual framework was related to the program inputs, program activities, and program outputs in the logic model. The throughput domain of the conceptual framework was associated with the short-term outcomes of the logic model. The output domain of the conceptual framework was related to the intermediate outcome of the logic model. The logic model depicted the flow of the financial education program, from program inputs (e.g., resources, manpower, and

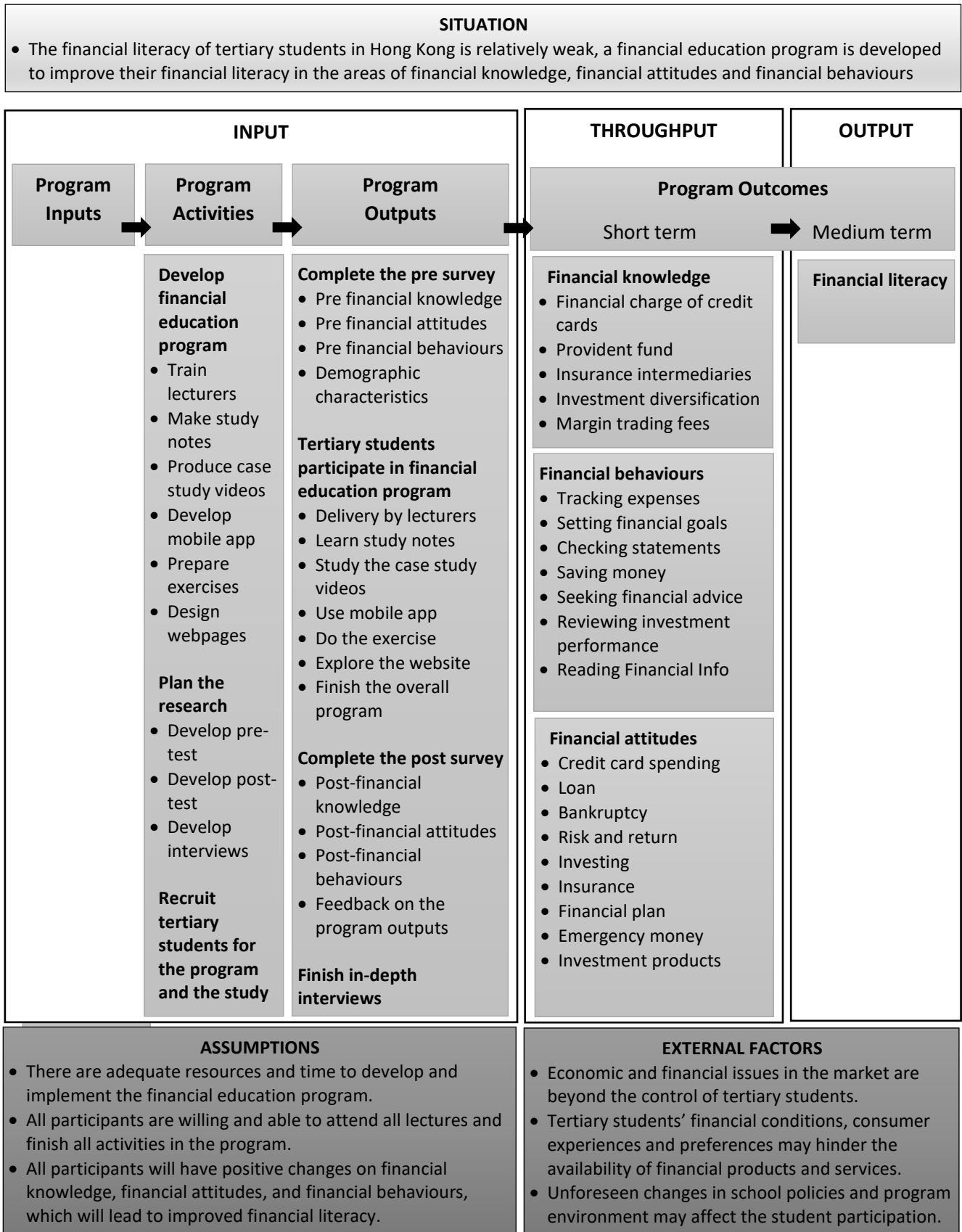
materials) to program activities (e.g., program development and research plan) and program outputs (e.g., study notes, case study videos, and exercise). The program participants were expected to have short-term outcomes (better financial knowledge, financial attitudes, and financial behaviour), which resulted in intermediate-term outcomes (improved financial literacy). As a longitudinal study was required to measure the long-term outcomes in the logic model, the long-term outcomes were not evaluated in this study because the researcher was limited by the time horizon of the organisers and students.

As the logic model guided the program evaluation, the program inputs were converted into program outputs, and key variables of program outputs were identified for measurement. The lecturers, study notes, case study videos, webpages, and overall program were the independent variables for program outputs. Program outputs were expected to generate positive effects on short-term outcomes. Financial knowledge, financial attitudes, and financial behaviours were dependent variables for the short-term outcomes. The changes in dependent variables were measured to evaluate the effects of the financial education program. The enhanced short-term outcomes were intended to help students achieve a better intermediate-term outcome (financial literacy). The short-term outcome variables were used to determine the level of financial literacy before and after the program.

The theory-based logic model in this study would help the program organisers, student affairs officers, and financial educators to design their program evaluations in the future, as the logic model could be replicated in similar financial education programs. They would be interested in

more research findings for future decisions because evaluation evidence could provide a good reference for the development of financial education programs. Previous studies on financial education program evaluation focused on using the Transtheoretical Model of Behaviour Change theory and the logic model (Burk, 2011; Burk et al., 2014; Jean & Samantha, 2012; Schmidt et al., 2006). Rajna (2019) merged the theory of the Transtheoretical Model of Behaviour Change and the Theory of Planned Behaviour into a logic model, which bridged the gap between the theory and practice for the financial intervention program evaluation. University of Wisconsin Extension (2002) stated that many evaluators developed and used logic model concepts in a variety of theoretical and practical applications. The integration of the logic model with the Financial Resource Management Theory and the OECD's financial literacy measurement approach (OECD, 2011a, 2011b) contributed to the body of knowledge.

Figure 3.3 Financial Education Program Logic Model



3.4 Sampling

This research studied tertiary students in Hong Kong, and the sampling was done to select study sites. In 2018, there were thirty tertiary institutions in Hong Kong, including eleven universities and nineteen institutions. In total, 249,900 tertiary students studied in these thirty tertiary institutions. Table 3.4a shows the breakdown of tertiary students by level of study, and tertiary students are classified into three major groups: 130,400 bachelor's degree students, 66,800 sub-degree students, and 52,700 postgraduate students. To select samples from the pool of tertiary institutions, convenience sampling was conducted with three selection criteria. The first was the experience with financial education programs because Cimigo (2015) indicated that only 10% of financial education initiatives targeted tertiary students, and 13% are organised in tertiary institutions. Those tertiary institutions with experience in financial education programs were identified by examining their websites, past student activities, and online records. A list of potential tertiary institutions with regular financial education programs was compiled. The shortlisted tertiary institutions usually collaborate with external parties (e.g., non-governmental organisations, government authorities, public bodies, and corporations) to carry out financial education programs. Their lecturers and officers were approached for their willingness to participate in the study and the financial education program.

The second and third criteria were the student enrolment size of tertiary institutions and the diversity in student types. This is because, in Hong Kong's tertiary education sector, colleges are the primary providers of sub-degrees and top-up degrees, while universities are the accredited bodies that award diversified qualifications from bachelor's to doctoral degrees. Finally, six tertiary institutions were chosen for the study, including three universities and three colleges: The University of Hong Kong (HKU); Hong Kong Baptist University (HKBU); The Education University of Hong Kong (EDUHK); The School of Professional Education and Executive Development (SPEED); Hong Kong Community College (HKCC); Hong Kong Institute of Vocational Education (HKIVE).

Table 3.4a Hong Kong tertiary student enrolment by level of study in 2018

Level of study	Student enrolments
Sub-degrees (associate degree, higher diploma, diploma, etc.)	66,800
Bachelor's degrees (Top-up degree, honours bachelor's degree)	130,400
Postgraduate degrees (Postgraduate diploma, master's, doctoral degrees, etc.)	52,700
Total	249,900

The selected six tertiary institutions offered diversity by having different student types. Table 3.4b shows the student enrolment figures, types of degrees offered, and records of financial education programs in these six tertiary institutions. Each tertiary institution had a high student enrolment; their total number of students is 69,542, which accounts for 28% of tertiary students in Hong Kong. These six tertiary institutions covered diverse types of tertiary students. HKIVE and HKCC were chosen as they both had a large number of sub-degree students. For the segment of degree students, top-up degrees and honours bachelor's degrees were two major types in Hong Kong. SPEED was selected because it is the largest top-up degree provider. Top-up degrees were the major articulation pathway for sub-degree graduates in Hong Kong. As universities covered tertiary students from bachelor's to doctoral degrees, HKU, HKBU, and EDUHK were chosen as these three universities all have high student enrolments and diversity in student types. All six tertiary institutions had solid experience delivering financial education programs to their students. Their lecturers and officers were approached to conduct the financial education program, and the researcher gained their consent to conduct the study.

Table 3.4b Details of six tertiary institutions chosen

Name	The University of Hong Kong (HKU)	Hong Kong Baptist University (HKBU)	The Education University of Hong Kong (EDUHK)	The School of Professional Education and Executive Development (SPEED)	Hong Kong Community College (HKCC)	Hong Kong Institute of Vocational Education (HKIVE)
Type	Public University	Public University	Public University	Community College	Community College	Public College
Funding source	University Grants Committee	University Grants Committee	University Grants Committee	Self-financed	Self-financed	Publicly funded and self-financed
Students no.	19,161	7,079	6,450	2,522	9,419	24,911
Type of degrees awarded	From a bachelor's degree to a doctoral degree	From a bachelor's degree to a doctoral degree	From a bachelor's degree to a doctoral degree	Bachelor's degree and top-up degree	Sub-degrees (associate degree and higher diploma)	Sub-degrees (Diploma and higher diploma)
Academic disciplines or faculties	-Architecture -Arts -Business and economics -Dentistry -Education -Engineering -Law -Medicine -Science -Social sciences	-Arts -Business -Chinese medicine -Communication and film -Science -Social sciences -Visual arts -Continuing education	-Education and human development -Humanities -Liberal arts and social sciences	-Accounting and finance -Business and management -Marketing -Applied sciences and technology -Social sciences -Hospitality and tourism management	-Business and hospitality management -Languages & communication -Science, engineering, and health studies -Social sciences, humanities, and design	-Business -Childcare, elderly, and community -Design -Engineering -Information technology -Health and life science
Experience with Financial Education Programs	Yes, arranged by the Centre of Development and Resources for Students	Yes, arranged by the Department of Finance and Decision Sciences	Yes, arranged by the Department of Social Sciences	Yes, arranged by the Discipline of Accounting and Finance	Yes, arranged by the Division of Business and Hospitality Management	Yes, arranged by the Department of Business Administration

With the convenience sampling method, the sampling frame was narrowed to six tertiary institutions in Hong Kong. The financial education program was delivered at six tertiary institutions in Autumn 2018. Each tertiary institution had one class of the financial education program, so there were six classes in total. The financial education program contained two lectures. The recruitment was completed by early October 2018 because six tertiary institutions had different program timelines. The financial education program was open to all students for enrolment, and enrolment was on a first-come, first-served basis. The total number of students in six classes was 180. As participation in the financial education program was not compulsory, some students might not attend one or both lectures. Finally, 158 out of 180 students completed the program, and the completion rate was 87.8%. As the quantitative data involved two surveys, the pre-survey was conducted before the first lecture and the post-survey was completed after the second lecture. The surveys were distributed to all attendees in the classes, and they were invited to complete the surveys on a voluntary basis. In the end, 150 out of 158 students finished pre- and post-surveys. The response rate was 94.9%. The total number of paired responses was 150 for the quantitative data, and Figure 3.4c shows the distribution of experimental groups.

After the completion of the post-survey, a judgment sampling was conducted in each class to select two students for in-depth interviews. The researcher relied on his knowledge and experience to make a reasonable judgment for the sample selection. The participants who completed the whole program and all the learning activities were intentionally invited by the researcher. This non-probability sampling strategy was preferred because of the availability of students and the limitations of tertiary institutions. The researcher had no opportunities or rights to contact the students in the future, so inviting enough samples and confirming the interviews at the end of the

classes was important. Finally, 12 samples were selected across six tertiary institutions for the in-depth interview, as shown in Table 3.4c. The researcher collected qualitative data to conduct the analysis. The purpose was to get evidence to answer the research questions and complement the findings of quantitative data analysis.

Table 3.4c Sample distribution of experimental groups

Sample size	No. of samples completed pre- and post-surveys	No. of samples completed interviews
HKU	24	2
HKBU	21	2
EDUHK	28	2
SPEED	18	2
HKCC	35	2
HKIVE	24	2
Total	150	12

Table 3.4d presents the demographic characteristics of the final paired sample of 150 participants who completed both the pre- and post-surveys. 45% were male and 55% were female and the majority of participants (98%) were aged 18 or above. Regarding job status, 43% reported no employment, 55% held part-time jobs, and 3% were employed full-time. The majority of participants (57%) reported a monthly income of HK\$3,000 or below, 25% earned between HK\$3,001 and HK\$6,000, and 17% earned HK\$6,001 or above. With respect to education level, the two largest groups were Higher Diploma Year 2 (40%) and Bachelor Year 3 (26%) students,

together accounting for 66% of the sample. The distribution across education levels and study majors reflected the diversity of the six participating institutions in Hong Kong. The most common study major was Business (non-finance) (30%), followed by Social Science (13%) and Finance-related subjects (12%).

Table 3.4d Descriptive statistics of sample demographics (n = 150)

Demographic Variable	Category	Frequency	Percentage
Gender	Male	68	45%
	Female	82	55%
Age	Below 18	3	2%
	18 or above	147	98%
Job Status	No job	64	43%
	Part-time job	82	55%
	Full-time job	4	3%
Monthly Income	HK\$3,000 or below	86	57%
	HK\$3,001–6,000	38	25%
	HK\$6,001 or above	26	17%
Education Level	Higher Diploma Year 1	3	2%
	Higher Diploma Year 2	60	40%
	Bachelor Year 1	10	7%
	Bachelor Year 2	13	9%
	Bachelor Year 3	39	26%
	Bachelor Year 4	25	17%

Study Major	Finance-related	18	12%
	Business (non-finance)	45	30%
	Education	16	11%
	Arts	11	7%
	Social Science	19	13%
	Science	7	5%
	Engineering	8	5%
	Health-related	12	8%
	Others	14	9%

Note: Percentages are rounded to the nearest whole number.

3.5 Research Instrument

3.5.1 Experimental Design

This study employed the one-group pre-test and post-test design, as shown in Figure 3.5a. The absence of a control group represents a common methodological constraint in real-world educational program evaluation. In practice, the random assignment of tertiary students to treatment and control conditions is rarely feasible due to institutional resource limitations and scheduling constraints. The one-group pre-test and post-test design is a kind of pre-experimental design with no control group. This method was chosen because it was the simplest type of experimental research design and was convenient to implement. Ary et al. (2010, p. 303) pointed out that the one-group pre-test and post-test design consisted of three steps: (a) administering a preliminary assessment to measure the outcome variable, (b) applying the experimental intervention X to the participants, and (c) administering a post-test, again measuring the dependent variable.

Figure 3.5a One-Group Pre-Test – Post-Test experimental design

Pre-test	Treatment	Post-test
O ₁	X	O ₂
Dependent variables	Independent variables	Dependent variables

In this study, the design had two measurements. The group of subjects was first measured at the pre-test, then the treatment of the financial education program was administered, and the group was measured again in the post-test. The changes were examined by comparing the pre-test and post-test scores, and the differences were presumed to be due to the treatment effects of the program. The procedures of the one-group pre-test and post-test design were illustrated as follows:

1. Conducting the pre-test (O_1) to measure the program participants' financial knowledge, financial attitudes, and financial behaviours before giving the treatment.
2. Applying the treatment of the financial education program (X) to strengthen the financial knowledge, financial attitudes, and financial behaviours of program participants.
3. Conducting the post-test (O_2) to measure the program participants' financial knowledge, financial attitudes, and financial behaviours after giving the treatment.

The researcher compared and analysed the pre-test and post-test scores to determine if there were significant differences in the dependent variables following the financial education program.

3.5.2 Survey Instrument Design

This study drew upon the OECD/INFE (2013) financial literacy measurement toolkit as a methodological framework to develop the survey instrument, adapting its questions for the Hong Kong tertiary student context. This study employed pre- and post-surveys to assess students' financial literacy before and after the program. This practice was similar to the study of Borden et al. (2008), which measured the changes in financial literacy of seminar participants based on a pre- and post-test assessment model. In the United States, JumpStart Coalition has conducted biennial surveys with over fifty questions to assess young people's financial literacy since 1997, and

Mandell (2008) also reported financial literacy results for college students as well as high school seniors. Based on Kempson's (2009) framework for developing financial literacy baseline surveys, the OECD (2011b) conducted an international financial literacy pilot survey project across 13 countries in 2010, such as Germany, Ireland, Malaysia, Norway, South Africa, and the United Kingdom. T

he OECD (2012) conducted a stocktake exercise of financial literacy surveys from 16 countries and published a financial literacy questionnaire and supplement survey questions, which were used to develop financial literacy scores. Another financial literacy assessment framework, developed for the OECD's PISA 2012 assessment (OECD, 2014, p.34), consisted of four main content areas: money and transactions, planning and managing finances, risk and reward, and financial landscape. The OECD/INFE (2013) published the Financial Literacy Measurement Toolkit, which provided financial literacy questions and methodological guidance to help public authorities, policymakers, and other organisations with financial literacy measurement.

The OECD/INFE (2013) toolkit comprised a number of core and supplementary questions. The question bank included questions drawn from various national surveys to reflect good practice and to measure various aspects of financial literacy. The core and supplementary questions captured the responses about financial knowledge, financial attitudes, and financial behaviours. The questions covered five domains of financial literacy, including making ends meet, financial control, choosing appropriate financial products, financial planning, and financial knowledge and understanding. The OECD/INFE (2013) toolkit provided the following descriptions of these domains:

- a. Financial control: *“It is an aspect of money management. It includes budgeting and record keeping as well as more general awareness of one’s financial position”* (OECD/INFE, 2013, p. 48)
- b. Choosing appropriate financial products: *“The manner in which individuals select financial products is a significant indication of their financial literacy”* (OECD/INFE, 2013, p. 60)
- c. Making ends meet: *“Making ends meet, like financial control, is an aspect of money management and being able to live within one’s means is considered to be an important aspect of financial literacy”* (OECD/INFE, 2013, p. 52)
- d. Financial planning: *“The extent to which people have plans in place to ensure their future financial wellbeing is an important indicator of their levels of financial literacy”* (OECD/INFE, 2013, p. 68)
- e. Financial knowledge and understanding: *“It is commonly recognised as a crucial component of financial literacy. These questions offer a range of possibilities for capturing financial knowledge and understanding”* (OECD/INFE, 2013, p. 71)

The descriptions of five major domains above were used to guide the design of the survey instrument for measuring financial literacy. First, the domain of financial knowledge and understanding formed a foundation as it evaluated the basic knowledge and concepts in personal finance. The questions in the domain of financial knowledge and understanding were knowledge questions. This domain helped us measure tertiary students' fundamental financial knowledge and understanding. In addition, the domain of financial control enabled us to measure their attitudes and behaviours towards managing personal finance and credit products. The questions in this

domain were more practical and reflected their money and credit management activities. The remaining three domains (making ends meet, choosing appropriate financial products, and financial planning) focused more on advanced skills, proactive behaviours and attitudes towards financial planning and management. The researcher examined and adapted questions from the OECD/INFE (2013) toolkit to map the three dimensions (financial knowledge, financial attitudes, and financial behaviours) with five domains of financial literacy.

The OECD/INFE (2013) toolkit served as the conceptual and methodological reference for the survey design. However, the individual questions were adapted and contextualised for the Hong Kong tertiary student population. Such contextual localisation was required to ensure cultural relevance and linguistic clarity for bilingual Hong Kong tertiary students. Moreover, the topics of the financial education program were developed with reference to the Hong Kong Financial Competency Framework (Yu & Law, 2015), the survey questions might not correspond in all cases to the wording used in the toolkit's template. The decision to adapt survey questions rather than adopt them directly therefore reflected a methodological choice grounded in the local research context. Table 3.5b shows the question distribution used in the pre- and post-surveys:

Table 3.5b Question distribution summary - Parts 1 to 3 of pre- and post-surveys

No	Question item	Five domains of financial literacy (OECD/INFE, 2013)						Variables
		Financial knowledge and understanding	Financial control	Making ends meet	Choosing appropriate financial products	Financial planning		
1	Financial charges of credit cards	✓						The construct of financial knowledge (5 questions in Part 1)
2	Provident fund	✓						
3	Insurance intermediaries	✓						
4	Investment diversification	✓						
5	Margin trading fees	✓						
6	Tracking expenses			✓				The construct of financial behaviour (7 questions in Part 2)
7	Setting financial goals			✓				
8	Checking statements		✓					
9	Saving money			✓				
10	Seeking financial advice					✓		
11	Reviewing investment performance					✓		
12	Reading Financial Info		✓					The construct of financial attitudes (9 questions in Part 3)
13	Credit card spending		✓					
14	Loan		✓					
15	Bankruptcy					✓		
16	Risk and return				✓			
17	Investing				✓			
18	Insurance					✓		
19	Financial plan					✓		
20	Emergency money			✓				
21	Investment products				✓			
Total		5	4	4	4	4	21	

Part 4 of the pre-survey

No.	Question item	Variable
22	Gender	Demographic characteristics
23	Age	
24	Job status	
25	Monthly income	
26	Education level	
27	Study major	

Part 4 of the post-survey

No.	Question item	Variable
22	Lecturers	Program outputs
23	Study notes	
24	Case study videos	
25	Mobile app	
26	Exercise	
27	Webpages	
28	Overall program	

A total of 21 questions were developed to construct the survey instruments for financial literacy measurement. The questions covered all five domains of financial literacy and were assigned to three dimensions (financial knowledge, financial attitudes, and financial behaviours). The OECD/INFE (2013) toolkit indicates that the socio-demographic questions give authorities the ability to analyse the financial literacy level within certain groups and compare across groups. Key socio-demographic questions were included in part four of the pre-survey, i.e., gender, age, job status, monthly income, education level, and study major. The demographic variables helped answer the second research question because the financial literacy score in different demographic subgroups could vary depending on the individuals' personal profiles. The survey outcomes for these six demographic areas could serve as guidance to help develop financial education programs

in the future. To answer research question three, seven program outputs were identified in the logic model. Seven questions were constructed in part four of the post-survey to collect students' feedback on the variables of lecturers, study notes, case study videos, mobile app, exercise, webpages, and overall program. Then, it was necessary to consider the question-and-answer types. Data scales or measurements are classified into four types: nominal, ordinal, interval, and ratio (Stevens, 1946; Stevens, 1951). The details of the survey instrument are discussed below. Moreover, to ensure the equal weighting for all questions 1 to 21, each scored answer had the same maximum of five marks.

3.5.2.1 Financial Knowledge

Part one of the pre- and post-surveys consisted of five financial knowledge questions. They were nominal-single selection questions. The questions measured the financial knowledge of respondents. The answers were either "True" or "False", and respondents might select "Don't know" if they were not familiar with specific financial services or products that they had never used. For each question, if the answer was correct, it was coded as "Correct". The wrong answer was coded as "Incorrect". For each question, five marks were given for the correct answer, and a zero mark was coded for the wrong answer. If the student ticked "Don't know" in the answer or left the answer blank, the response was coded as a zero mark.

Survey questions were developed to capture the financial knowledge under the domain of financial knowledge and understanding. Five financial knowledge questions were tested: financial charge of credit cards (Q1), provident fund (Q2), insurance intermediaries (Q3), investment diversification (Q4), and margin trading fees (Q5). Each question that reflected the financial

knowledge was scored and analysed separately. To evaluate the students' overall financial knowledge, a financial knowledge score was calculated as a composite score for the construct of financial knowledge. All five questions were used to calculate the financial knowledge score. The answers to Q1 and Q5 were coded and added to the financial knowledge score. The total mark of the financial knowledge score was 25, and the lowest mark was 0. A higher financial knowledge score indicated that the student was more financially literate than those with lower scores. As each student was tested before and after the program, each student had a financial knowledge score on the pre-test and another on the post-test. The pre- and post-financial knowledge mean scores were calculated by averaging the financial knowledge scores of all students in the pre- and post-surveys, respectively.

3.5.2.2 Financial Behaviours

There were seven questions for the construct of financial behaviours to measure students' financial behaviours. As shown in Table 3.5b, Q6 to Q12 were related to four domains of financial literacy: Making ends meet (Q6 Tracking expenses; Q7 Setting financial goals; and Q9 Saving Money); Financial control (Q8 Checking statements; and Q12 Reading Financial Info); Financial planning (Q10 Seeking financial advice); Choosing appropriate financial products (Q11 Reviewing investment performance). For these behavioural questions dealing with financial activities, the nominal-single selection was used, and the answers included “Yes”, “No”, or “NA”. Participants were asked if they had ever done the relevant financial behaviours in the pre-survey. “NA” referred to non-available because some students did not have those financial products or had never used those financial services. Five marks were given to each “Yes” answer, and a zero mark was given to “No” or “NA” answers. If the student did not answer the question or left the answer blank, the

response was coded as a zero mark. Five marks were the maximum mark for each question, and it was to align with the weighting of other questions. As students were tested by the same set of behavioural questions in the post-survey, some students who answered “NA” in the pre-survey might change to “Yes” or “No” in the post-survey if they had done those financial behaviours. The program lasts at least one month, so they might start using those financial products and services during this period. Otherwise, if their situation remained unchanged, they might continue to answer “NA” in the post-survey. To focus on the behavioural changes, the “NA” answers in the pre- or post-surveys were not counted to eliminate unmatched samples. On the other hand, if the student missed the answer or left it blank in either pre- or post-surveys, the paired data was removed from that question because the change in financial behaviour could not be calculated. As a result, the responses were measured in a dichotomous way, either “yes” or “no”, to record whether they had conducted the relevant financial behaviours. The financial behaviour score was the composite score summing up the scores of all financial behaviour questions. The total score of Q6 – Q12 was the financial behaviour score, ranging from 0 to 35. Each student had a financial behaviour score in the pre-survey and another in the post-survey. Their scores were added and averaged to produce the pre- and post-financial behaviour mean scores in the pre- and post-surveys, respectively.

3.5.2.3 Financial Attitudes

In part three, Q13 to Q21 were the dimension of financial attitudes. They covered four domains of financial literacy: Financial control (Q13 Credit cards and Q14 Loan); Financial planning (Q15 Bankruptcy; Q18 Insurance; and Q19 Financial plan); Choosing appropriate financial products (Q16 Risk and return; Q17 Investing; and Q21 Investment products); Making ends meet (Q20 Savings). Financial attitudes were taken into consideration when measuring the level of financial

literacy. Nine attitudinal questions were measured by a five-point Likert-type scale. There were five answer options. Their responses were scored as follows: Strongly Agree (5 marks), Agree (4 marks), Neutral (3 marks), Disagree (2 marks), and Strongly Disagree (1 mark). The questions were written in positive statements, and the students were asked to rate the scale in each statement. Each response was weighed from 5 marks (Strongly Agree) to 1 mark (Strongly Disagree). However, it was acknowledged that several attitudinal statements were framed using the modal verb "should", which might have reflected respondents' understanding of normative financial principles rather than their spontaneous personal attitudes. This issue might also have been influenced by translation, because the bilingual survey instrument was administered in Hong Kong tertiary institutions where the medium of instruction depended on the language policy of each tertiary institution.

The implications of this framing for interpreting the financial attitude results were discussed in the limitations section. If the students did not answer the question or left the answer blank, the response was coded as a zero mark. The maximum mark for each financial attitude question was five to keep the score weighting in line with other questions. The questions captured various aspects of students' attitudes towards financial issues and were calculated and analysed separately. The responses from Q13 to Q21 were summed up to generate a financial attitude score. Thus, the total mark of the financial attitude score was 45. As students were asked the same questions before and after the program, pre- and post-financial attitude mean scores were computed by averaging the financial attitude scores, respectively, in the pre-survey and post-survey.

3.5.2.4 Financial Literacy Score

To facilitate comparisons of the financial literacy level of tertiary students, a summary measure was constructed by calculating a financial literacy score based on the interviewees' responses to the survey questions. By mapping survey questions to each component of the financial literacy framework, the survey provided a comprehensive measurement across different components of financial literacy. In this context, all survey answers were added to a financial literacy score. The financial literacy score was helpful to provide a basis for benchmarking improvements in financial literacy levels before and after the program. The total financial literacy score was created by adding points according to the responses to each question for each respondent. So, the financial literacy score was the sum of the three dimensions (financial knowledge, financial attitudes, and financial behaviours).

As each question weighed a maximum of five marks, the total mark of the financial literacy score was one hundred and five. This scoring approach was similar to the national financial literacy surveys conducted by Monetary Authority of Singapore (2005) and ANZ Social Research Centre (2011). They used a simple scoring approach which aggregated the scores assigned to each question. The scores for all the responses were aggregated to derive a financial literacy score. This summary metric also helped to explore the diverse ways in which financial literacy varied across different demographic and socio-economic segments. The simple scoring approach was a simple and straightforward way to construct the aggregated score. The pre- and post-financial literacy mean scores were computed by averaging the financial literacy scores, respectively, in the pre-survey and post-survey.

3.5.2.5 Program Outputs

Regarding the third research question, there were seven questions about the program outputs in part four of the post-survey. The purpose was to evaluate if students agreed or disagreed with the program outputs that helped them learn financial literacy. As discussed in the section on the logic model, seven program outputs were identified. They were “lecturers”, “study notes”, “case study videos”, “mobile app”, “exercise”, “webpages”, and “overall program”. Students were asked to rate each program output. The responses were measured on a five-point Likert scale: Strongly Disagree (1 mark), Disagree (2 marks), Neutral (3 marks), Agree (4 marks), and Strongly Agree (5 marks). A five-point Likert scale lets students express a neutral opinion between agreement on one side and disagreement on the other. The responses were then coded according to the points above.

3.5.2.6 Interview Guide

The interview guide was developed relying on the conceptual framework of the Family Resource Management Theory (Deacon & Firebaugh, 1988) and the OCED’s financial literacy measurement approach (OECD, 2011a, 2011b). The in-depth interviews were semi-structured and conducted individually and face-to-face. The semi-structured interviews are the most common type of qualitative data collection. DiCicco-Bloom and Crabtree (2006) stated that semi-structured interviews were centred on a predetermined set of open-ended questions, supplemented by additional queries that arose from the interaction between the interviewer and interviewee. In this study, the interview guide instrument covered open-ended questions with various prompts, allowing for flexibility when exploring the in-depth views of their participation in the financial education program. The interview guide was further divided into five different sections that

directed the interview flow. All sections were designed to provide a comprehensive understanding of the interviewees' backgrounds, experiences before and after the program, and detailed insights into financial literacy and the program. The interview guide also aimed for a more open and fluid discussion with the interviewees. Questions were asked to explore their experience in learning financial literacy before and after the financial education program. The researcher also wrote the probing questions to let interviewees further elaborate on their opinions to capture the dynamics of the process of financial literacy improvement. The interview guide, along with the pre- and post-surveys, was reviewed by a panel of experts and tested through a pilot study.

3.5.3 Pilot Study

After the survey instrument was adapted from the OECD/INFE (2013) toolkit, the researcher prepared the questions to make amendments and improvements for readability and localisation. The topics of the financial education program were also considered because the questions should align with the topics taught in the program. The researcher then translated the questions from English to Chinese. Both the pre- and post-surveys were bilingual. Because the financial education program was either in Chinese or English, the medium of instruction depended on the language policy of tertiary institutions.

The drafts of pre-survey, post-survey and interview guide were given to the panel of four experts to review the accuracy, clarity, and comprehensibility. These four experts were all professionals in the field of personal finance. A panel was formed to review the reliability and validity of the survey instrument. As the surveys targeted tertiary students, the researcher found experts from different universities, colleges, financial institutions, and public organisations. The experts included two lecturers from a university and a college, one certified financial planner from an international bank, and one financial education manager from a public organisation. The researcher sent the drafts to the panel for review, and amendments were made based on their comments. The expert panel finally examined and validated the survey instrument and the interview guide. They verified that the surveys were a valid measurement of financial literacy with the dimensions of financial knowledge, financial attitudes, and financial behaviours.

The survey instrument was also validated by the pilot study. The pre- and post-surveys were first validated by the expert panel, and then they were used for the pilot study. The pilot study helped improve the questionnaires, which made the data collection more accurate. This was because it could examine whether the questions and translations confused respondents. The pilot test was done to identify potential issues before pre- and post-surveys were implemented. Twenty tertiary students were recruited from a tertiary institution for the pilot test. The researcher used convenience sampling for the pilot site and sample selection because the availability and accessibility were limited. Two out of twenty students were purposely selected for the pilot study of the interview guide. After reviewing their feedback, improvements were made to the surveys and interview guide. The data from the pilot study was not included in the actual research. Yaghmale (2003) pointed out that content validity referred to the degree to which the instrument covered the content it was supposed to measure. Content validity was first reviewed by the expert panel, which examined the accuracy, clarity and comprehensibility of the pre-survey, post-survey and interview guide. The researcher used the pilot study to calculate the internal consistency of the survey instrument. The internal consistency of the pilot study was measured by Cronbach's alpha coefficient. The pilot study had a sample size of twenty students and assessed internal consistency for the 21-item financial literacy scale covering financial knowledge, financial attitudes and financial behaviour. The scale revealed a Cronbach's alpha coefficient of 0.835, indicating acceptable internal consistency

3.6 Data Collection and Analysis

This section covered the procedures for data collection and analysis in the study. As discussed in the sampling section, six tertiary institutions in Hong Kong were selected as study sites. After the approval was obtained, they started to recruit students for the financial education program.

3.6.1 Financial Education Program

The financial education program was designed with reference to Yu and Law's (2015) Hong Kong Financial Competency Framework (“HKFCF”). They pointed out that the HKFCF delineated the essential knowledge, abilities, mindsets, incentives, and actions essential for promoting financial literacy within Hong Kong's educational framework. The structure of HKFCF is outcome-based education and contains four key components (Attitudes, Motivations, Knowledge and skills, and Behaviours) and seven themes (Income and Taxation; Money and Banking; Saving and Investing; Consumer Rights and Responsibilities; Spending and Credit; Financial Planning; Protection and Risk). The financial education program used the HKFCF to develop program outputs (study notes, case study videos, mobile app, exercises, webpages, and lecturers) in this study. However, the motivations component was not selected from HKFCF as it was not studied in this research or taught in the program. The topics taught in the financial education program were detailed in Table 3.6a. It also presented the mapping between the topics and the survey instrument. This ensured that the survey questions measured the program outcomes.

Table 3.6a Financial Education Program based on Yu and Law's (2015) Hong Kong Financial Competency Framework

Topics of the Financial Education Program		HKFCF Key Components		
		Knowledge and skills	Attitudes	Behaviour
HKFCF Themes	Money and banking			<ul style="list-style-type: none"> Tracking expenses (Q6)
	Income and taxation	<ul style="list-style-type: none"> Provident fund (Q2) 		
	Saving and investing	<ul style="list-style-type: none"> Investment diversification (Q4) Margin trading fees (Q5) 	<ul style="list-style-type: none"> Investing (Q17) Investment products (Q21) 	<ul style="list-style-type: none"> Saving money (Q9) Reviewing investment performance (Q11)
	Spending and credit	<ul style="list-style-type: none"> Financial charge of credit cards (Q1) 	<ul style="list-style-type: none"> Credit card spending (Q13) Loan (Q14) Bankruptcy (Q15) 	
	Consumer rights and responsibilities	<ul style="list-style-type: none"> Insurance intermediaries (Q3) 		<ul style="list-style-type: none"> Checking statements (Q8) Reading Financial Info (Q12)
	Financial planning		<ul style="list-style-type: none"> Financial plan (Q19) 	<ul style="list-style-type: none"> Setting financial goals (Q7)
	Protection and risks		<ul style="list-style-type: none"> Risk and return (Q16) Insurance (Q18) Emergency money (Q20) 	<ul style="list-style-type: none"> Seeking financial advice (Q10)
		Construct of Financial Knowledge	Construct of Financial Attitude	Construct of Financial Behaviour
Survey Questions (No.)				

The financial education program consisted of two lectures. The first lecture was conducted in October 2018, and the second lecture was held one month later in November 2018. The purpose was to ensure that students would have adequate time to execute what they learned from the first lecture. The financial education program was co-organised by six tertiary institutions and the IEC. The lecturers taught two lectures and delivered the program outputs to the students. The IEC provides financial education to the public in Hong Kong and collaborates with most tertiary institutions to carry out financial education programs.

In the Financial Education Program Logic Model (Figure 3.3), program activities constitute the program development phase, transforming program inputs into program outputs for the target participants. The program outputs were designed to encompass the seven themes of the HKFCF, comprising study notes, case study videos, the mobile app, exercises, and webpages. The lecturers used these program outputs to teach the three key components of financial literacy outlined in the HKFCF: financial knowledge, financial attitudes, and financial behaviours. Table 3.6b shows the coverage of Program Outputs and how the lecturers used them to teach financial knowledge, attitude, and behaviour, in order to improve financial literacy.

Table 3.6b Coverage of Program Outputs

Topics	Program Outputs							Construct of Financial Knowledge	Construct of Financial Behaviour	Financial Literacy
	Lecture 1			Break	Lecture 2					
	Study Notes	Case Study Video	Mobile App	Exercise	Study Notes	Case Study Video	Webpages			
Financial charges of credit cards	✓	✓					✓			
Provident fund	✓				✓		✓			
Insurance intermediaries					✓		✓			
Investment diversification					✓	✓	✓			
Margin trading fees					✓	✓	✓			
Tracking expenses	✓	✓	✓	✓			✓			
Setting financial goals	✓	✓	✓	✓			✓			
Checking statements	✓	✓	✓	✓			✓			
Saving money	✓		✓	✓	✓		✓			
Seeking financial advice					✓	✓	✓			
Reviewing investment performance					✓	✓	✓			
Reading Financial Info	✓	✓	✓	✓	✓	✓	✓			
Credit card spending	✓	✓	✓	✓			✓			
Loan	✓	✓					✓			
Bankruptcy	✓	✓					✓			
Risk and return					✓	✓	✓			
Investing					✓	✓	✓			
Insurance					✓	✓	✓			
Financial plan	✓	✓	✓	✓	✓		✓			
Emergency money	✓		✓	✓			✓			
Investment products					✓	✓	✓			

Lecture one

The study notes for the first lecture covered topics on money management, credit products, savings and provident funds, consumer rights and responsibilities. The study notes were developed to build financial knowledge by clearly explaining key concepts. The lecturers prompted students to examine their money attitudes and encouraged behavioural changes. Then, the case study videos were shown to students, and the lecturers portrayed realistic scenarios involving credit card charges, excessive spending, loan defaults, and bankruptcy. Each case study video concluded with "decision points" where students reflected and considered their actions in similar circumstances. Following the case study discussions, the lecturers instructed students on utilising the mobile app for expense tracking and personal financial management. The mobile app was developed for reinforcing learning and developing financial skills. The mobile app shaped attitudes and fostered behavioural changes through daily engagement, progress tracking, and making financial management a regular routine. At the end, the lecturers introduced a take-home exercise to students.

Exercise between lecture one and two

To reinforce the practical application of financial knowledge and help students become more aware of their financial habits, students were assigned the exercise requiring them to create budgets and track their expenses. These activities enhanced the application of financial knowledge through guided practice with real financial scenarios. The exercise encouraged students to work with their actual financial matters during the period, thereby building financial habits that could be sustained long after the end of the program.

Lecture two

The second lecture's study notes covered more advanced topics, including investing, financial planning, risk management, insurance products, and financial intermediaries. These materials deepened financial knowledge by explaining investment principles, risk assessment, and financial planning strategies. The lecturers presented additional case study videos addressing stock and fund investment, investment diversification, and trading fees. The case study discussions, facilitated by the lecturers, encouraged the development of students' favourable attitudes and responsible behaviours towards investing. The case studies equipped students with the skills to research investment options, compare investment fees, and regularly review portfolio performance to support their own investment management practices. At the end of the program, the lecturers introduced the program webpages. The program webpages housed all the program resources and provided additional online toolkits. These resources aimed to deepen students' financial knowledge through detailed explanations of various topics. The webpages further supported behavioural changes by providing downloadable worksheets, calculators, and step-by-step guides that students could use independently to manage their personal finances in their daily lives.

3.6.2 Pre- and Post- Surveys

The financial education program was delivered at six tertiary institutions in Autumn 2018. As no personal identity data would be collected, an assigned reference number was given to each student. The reference number was used to match the pre- and post-surveys for the data analysis. When students attended the first lecture, the researcher briefed them at the beginning. The researcher presented the purposes of the research, the details of the pre-survey and other essential information

to the students. They were informed about their right to withdraw from the study at any time during the program. Then, the pre-survey was distributed in person to students, and they were invited to do the surveys on a voluntary basis. The researcher introduced the pre-survey to students and guided them in completing it. The pre-survey was a written questionnaire in a classroom setting. The students were given 10 minutes to complete the pre-survey. The researcher collected the pre-survey from students in each class. After completing the pre-survey, the students started receiving the financial education program. One month after the first lecture, the second lecture was delivered to the students. When they completed the second lecture, the post-survey was distributed to the students. The researcher used the same procedures to give instructions and collect the results of the post-survey. As attendance at the financial education program was voluntary for students, some students might not complete the whole program or both surveys. In the end, the total number of matched pairs collected was 150.

3.6.3 In-depth Interviews

All in-depth interviews were conducted immediately after the post-survey. The purpose was to gather qualitative information from the participants. The researcher gained permission from the lecturers and the officers to select appropriate samples from the classes. After the post-survey, the researcher introduced the arrangement of in-depth interviews with students. Judgment sampling was exercised to choose two samples for each class. Twelve students who had completed the financial education program were recruited across six tertiary institutions for in-depth interviews. The in-depth interviews were carried out at the same places of classes or on the same campus. The in-depth interviews were undertaken in person and face-to-face. The format of in-depth interviews was a semi-structured conversation, and the duration was from 30 minutes to 45 minutes. The researcher briefed each interviewee about their rights. The researcher gave participants a written participant information sheet and a consent form explaining the research details. All interviewees acknowledged and signed the consent forms before the in-depth interviews.

The audio recording device was used to record the interviews, and interviewees were informed that the conversation was audio-recorded. The researcher acted as the interviewer to hold all in-depth interviews. Interviewees were asked to express their opinions freely and in-depth. As the interview guide was developed in a semi-structured format to construct a flow of open-ended questions, the researcher followed the interview guide to raise questions and prompted the interviewees to seek more detailed descriptions. The researcher prompted the interviewees if any interesting and important views were identified. The interviewees would elaborate on their ideas and give further details. As the discussion of the in-depth interviews was recorded on electronic

devices, all files with personal data were properly protected with passwords in a safe place. The interview data were then used for the qualitative analysis.

3.6.4 Data Analysis

To analyse the quantitative data collected from pre- and post-surveys, the researcher employed various statistical tests for hypothesis testing, including paired samples t-test, McNemar's Chi-square test, exact binomial test, one-way ANOVA, and mixed design ANOVA. Hypotheses were developed for each research question, and the statistical tests were used to examine the p-value at the significance level of .05. The assumptions of statistical tests were checked to ensure the data satisfied the assumptions. If the p-value was lower than the significance level, the null hypothesis was rejected. The researcher could conclude that there was sufficient evidence of a significant difference between the means. Otherwise, if the p-value was above the significance level, it was concluded that the null hypothesis was supported. There was no significant difference between the means. In addition to p-values, effect sizes were calculated to indicate the magnitude of the observed differences. For paired-samples t-tests, Cohen's d for dependent samples was computed by dividing the mean of the paired differences by the standard deviation of the paired differences. For the one-way ANOVA, mixed model ANOVA, and simple effects analyses, partial eta squared (η_p^2) was calculated as the ratio of the effect sum of squares to the sum of the effect sum of squares and the error sum of squares. The use of different effect size indices reflected the different statistical procedures employed in the study. The data were entered into SPSS 27 for statistical analysis.

Regarding the qualitative data analysis, the audio of in-depth interviews was transcribed into paragraphs, and the transcription was input into NVivo 12. The qualitative analysis techniques originated from the Grounded Theory (Glaser & Strauss, 1967). After decades of growth in qualitative analysis, Braun and Clarke (2006) identified thematic analysis as a widely adopted approach within qualitative research methodologies. The thematic analysis offered a systematic process for identifying, examining, interpreting, and documenting significant themes that emerged from qualitative datasets. This study selected the inductive thematic analysis because it provided a systematic method with no pre-existing coding frame through which new themes could emerge and provided a rich data description. According to Boyatzis (1998), thematic analysis represented a systematic method through which qualitative data were encoded and organised into meaningful patterns. The researcher used Braun and Clarke's (2006) six-phase method for the thematic analysis.

For research question 1, the hypothesis testing was examined by a paired samples t-test, McNemar's Chi-square test, and the exact binomial test. The mean scores on the dimensions of financial knowledge, financial attitudes, and financial behaviours were tested to prove if there were any significant differences before and after the financial education program. The financial literacy scores were measured based on the three dimensions. The mean difference in financial literacy scores from the pre-test to the post-test was tested by a paired samples t-test to investigate if the effect of the financial education program was statistically significant on the financial literacy scores.

To answer research question 2, the researcher first employed a one-way ANOVA model to examine if there were any significant differences in pre-financial literacy scores among distinct

groups of demographic characteristics before they participated in the financial education program. Then, a mixed design ANOVA was developed to investigate the main effects and interaction effects of the demographic factors on the financial literacy scores following the financial education program. For multiple comparisons, Tukey's post-hoc test was performed to determine which pairs of group means were significantly different.

For research question 3, the researcher used the mixed design ANOVA to examine whether any significant differences in financial literacy scores resulted from the interaction between the factors of program outputs and the time factor (following the program) or simply due to one of the factors. If the program outputs had a significant effect, multiple comparisons would be conducted using Tukey's post-hoc test. The purpose was to assess the significant differences between pairs of group means.

Research question 4 was answered by Braun and Clarke's (2006) six-phase thematic analysis of qualitative data. The researcher explored the subjective experiences and opinions of twelve tertiary students in the financial education program. The semi-structured interview questions aimed to capture rich, in-depth qualitative data while staying focused on the research question. The first step was to get familiar with the data. Interview data were audio-recorded and then transcribed by the researcher. The next phase was the generalisation of the initial codes. Valuable texts that were relevant to the research question were coded using NVivo 12 and manual methods. The third phase was the formation of themes. The codes were reanalysed to develop descriptions and broad themes. The fourth phase was to review themes to ensure they were correct and coherent. Next, the researcher named and defined all themes. In the final phase, the researcher wrote up the report of

the themes with the interview excerpts. The thematic analysis was reported with reference to the Family Resource Management System Theory. The researcher investigated evidence to understand how the tertiary students used the resources of the financial education program as input to produce throughputs that met the desired output of financial literacy. In the interviews, the tertiary students identified and discussed the program outcomes they had in the program. Then, the researcher analysed their views to understand how these program outcomes led to the demand met in financial literacy at the output stage. The thematic analysis of qualitative data answered how tertiary students perceived the financial education program and its impact on their financial literacy.

3.7 Reliability and Validity

Reliability and validity are essential for the instruments to produce accurate findings in the study. Creswell (2005) stated that reliability indicated that the scores obtained from a tool were constant and consistent over time. Mitchell et al. (2013) added that reliability was considered a necessity for validity, but it did not guarantee the validity of findings. Creswell (2005) pointed out that construct validity was established by determining if the scores from an instrument were significant, meaningful, useful, and had a purpose. The domain of interest was informed by survey questions used in prior similar studies (Henry et al., 2001; Joo & Grable, 2005). As discussed earlier, the survey instrument used in this study was informed by the OECD/INFE (2013) toolkit, with questions adapted and contextualised for the Hong Kong tertiary context. It was built on Kempson's (2009) financial literacy survey framework and the study of Atkinson and Messy (2012). Thus, reliability and validity were established.

The questions of the OECD/INFE (2013) toolkit were primarily drawn from previous studies and national surveys, and had all been validated and approved by the OECD/INFE experts. The researcher also invited the expert panel to review the surveys and interview guide in order to strengthen their content validity and overall appropriateness for the study. The surveys and interview guide were further validated by the pilot study. Then, a Cronbach's alpha coefficient was calculated for the 21-item survey scale. The pilot study reported the Cronbach's alpha coefficient of 0.835, indicating satisfactory internal consistency for the relevant survey scale. The pilot study also enhanced the content validity of the interview guide because the instrument was improved before the actual research. In addition, the mixed methods design enhanced the overall quality of the research through the integration of quantitative and qualitative evidence, consistent with Creswell and Plano Clark's (2011) discussion of validity in mixed methods research. As this research used the convergent parallel mixed methods design, the triangulation ensured the validity of the findings. Creswell (2007) pointed out that the triangulation design provided a better examination and understanding of the research problem when either method was inadequate to answer the research problem. The qualitative data served to validate and strengthen the quantitative data. Moreover, the logic model enhanced the construct validity as it guided the program evaluation with the research questions.

3.8 Ethical Considerations

The research was reviewed and approved by the Faculty of Arts and Social Sciences and Management School Research Ethics Committee. The pre- and post-surveys were directly distributed to all class students. They were informed that their participation was voluntary and that no benefits would be conferred. All volunteering participants were included. The students had the

right to decide about their participation in the research. The researcher also stressed that the students should feel free to consent. There was also an introductory paragraph in both surveys stating their voluntary participation. The data would be used solely for research purposes, and participants could exit the surveys at any time. The surveys were anonymous, and direct personal identifiers were not used. An assigned code was given to make a subject identifiable and comparable in the pre- and post-surveys.

For the in-depth interviews, a participant information sheet and a consent form were given to 12 selected interviewees. The participant information sheet and the consent form covered the research details. The researcher explained the research purposes, data collection, risks and duration to the interviewees. They understood and agreed on what they signed up for. Finally, they signed the consent forms and returned them to the researcher. The researcher informed the interviewees that they had the right to withdraw from the research during the interviews or up to 6 weeks after the interviews. The researcher used a coding system to make anonymised quotes for the interviewees. No direct personal identifiers were used. As the discussion of the in-depth interviews was recorded, all files in the notebook containing personal data were properly protected with passwords in a safe place. After 12 interviewees completed the interviews, they were offered an incentive of HKD\$ 150 shopping coupons to compensate for their time. The interview process might last an hour, so the incentive amount should be reasonable to get students involved. The researcher also told interviewees that their comments did not affect the incentives and that they should feel free to express their ideas. As financial conditions and privacy issues might be sensitive, the researcher took care of the interviewees' feelings and kept mindful of any emotional problems during the

interviews. This prevented the interviewees from feeling stressed or uncomfortable during the interviews.

3.9 Limitations of the Study

There were several limitations in this study. First, this was not a longitudinal study, which limited the ability to evaluate the long-term impacts of the financial education program on participants' financial literacy. This study had a limitation in that students might have received financial education from other sources before or during the program. The research findings might not have accurately reflected the effects of the program. This was because other sources of financial education were not studied in the research, and factors outside the study might have affected the observed changes in dependent variables.

Moreover, a limitation of the attitude subscale was that most of the statements in Q13 – Q21 were framed using the modal verb “should”. Such wording might have prompted respondents to report what they believed to be the appropriate or socially desirable course of action, particularly after exposure to the financial education program, rather than their underlying personal attitudes. As a result, pre- to post-program changes in the financial attitude scores may partially capture increased recognition of recommended behaviours rather than attitudinal shifts. The findings should therefore be interpreted with this constraint in mind. Another limitation was the schedule of the post-survey because it was conducted right after the end of the program. Their post-survey answers might only reflect their intention to change. The actual changes would demand a longer duration to be observed and measured. In addition, the sample size was 150 students from six tertiary institutions, using convenience sampling. The survey findings reflected the sample statistics of

those participants only. Moreover, the subjects were not randomly assigned to the classes. There was only one treatment group with no control group. This was a limitation of the experimental design because the tertiary institutions had their own policies on student recruitment and class management. The researcher was not authorised to make a control group or to assign students randomly. Thus, the one-group pre-test and post-test design was chosen in this study. Regarding the program content, the same financial education program was delivered at all tertiary institutions. As the scope of financial literacy is extensive and in-depth, due to the limited time and human resources, the financial education program covered selected topics but not the full scope. This study was based on the program content to evaluate the changes in financial literacy.

3.10 Chapter Summary

The overview of the methodology employed in the study was discussed in this chapter. The methodology outlined the research design, conceptual framework, research plan, sampling methods, data collection, analysis and processes developed to answer the research questions. The justification for incorporating quantitative and qualitative methods into the research design was discussed. The conceptual framework and the logic model were established. The survey questions were designed with the setup of variables and levels of measurement. The instrument for the surveys and interview guide was explained, and the related pilot study was discussed. The reliability and validity were presented, as well as the limitations of the study. The procedures for the data collection were described, followed by the data analysis methods.

Chapter 4 - Findings and Analysis

This research aimed to investigate the financial literacy of tertiary students and determine the effects of the financial education program on their financial literacy. A quantitative investigation was developed to pursue the findings. The survey instrument had a range of items that captured participants' (a) financial knowledge, (b) financial attitudes, (c) financial behaviours, (d) demographics, and (e) rating of program outputs that improved financial literacy. The 150 students from 6 classes in different colleges were asked to complete pre- and post-surveys. The pre-survey was conducted before the financial education program. Upon completion of the program, students were requested to fill out the post-survey. All survey and interview findings were discussed in the order of the research questions. All pre- and post-survey responses were analysed statistically to generate findings. The research questions about these findings were explored. Qualitative data analysis was also conducted to investigate tertiary students' feedback further. This qualitative analysis helped provide additional context and explanation for the quantitative findings to address the research questions fully. Overall, the mixed methods approach combining quantitative statistical analysis and qualitative exploration of tertiary students' perspectives provided a comprehensive set of research findings to understand the effects of the financial education program.

Research Question 1: How and to what extent did participation in the financial education program impact the financial literacy of tertiary students?

4.1 Financial Knowledge

The financial literacy level of tertiary students could be traced back to Chen and Volpe's (1998) survey, which examined the personal financial literacy of college students. Their research concluded that college students lacked adequate knowledge about personal finance, which hindered their capacity to make well-informed choices. Financial knowledge is a key aspect that reflects the financial literacy of students. In both the pre- and post-surveys, Q1 to Q21 were the same questions used to evaluate differences in the respondents' responses before and after the program. The first five questions were designed to assess tertiary students' financial knowledge. As mentioned in the methodology section, the responses to survey questions Q1 - Q5 were coded dichotomously as either "correct" or "incorrect". The dichotomous variable had only two outcomes: correct or incorrect. Thus, it resulted in a binomial distribution. McNemar's test was employed because each dichotomous variable had repeated measurements in the pre-test and post-test. McNemar's test is a non-parametric test that assesses the difference between paired nominal data. This test was used to assess the marginal homogeneity of two dichotomous variables. Discordant pairs related to the count of observations reflecting changes in status. However, if the sum of discordant pairs is small (<25), an exact binomial test should be used. McNemar's test was conducted to compute the Chi-Square and p-value of each question.

As shown in Table 4.1a, Q1, Q3, and Q5 were tested using McNemar's test because the sum of discordant cells was greater than 25 for all of them. The exact binomial test was applied to Q2 and Q4 because the sum of discordant pairs was less than 25. Table 4.1a indicated that the p-values of Q1, Q3, Q4 and Q5 were lower than the significance level of .05. These results were statistically significant. The proportion of correct responses after the program was statistically significantly different in four financial knowledge questions: Q1 Financial charge of credit cards ($p < .001$); Q3 Insurance intermediaries ($p = .031$); Q4 Investment diversification ($p < .001$); Q5 margin trading fees ($p < .001$). The p-values were lower than .05, and students improved at a level that could not easily be explained by chance. A higher proportion of correct answers was achieved after the program. The most significant improvement was on the question of margin trading fee; sixty-seven students changed their answers from incorrect to correct, and just nine students changed their answers from correct to incorrect. The next was the financial charge of credit cards, fifty-four students were initially wrong but became correct on the question following the program.

However, not all financial knowledge could be improved significantly by the program. In the Q2 provident fund, the exact p-value was .687, larger than the significance threshold at .05. There was no significant distinction in the percentage of correct responses after the program. The provident fund question was the easiest among the five financial knowledge questions. 93.3% of students answered correctly before the program. Although the program taught the functions of provident funds and their contribution to retirement planning, there was insufficient evidence to show a significant improvement in this question.

Table 4.1a Test Statistics – Financial Knowledge

	Q1Pre & Q1Post	Q2Pre & Q2Post	Q3Pre & Q3Post	Q4Pre & Q4Post	Q5Pre & Q5Post
Chi-Square ^b	22.368		4.654		42.750
Asymp. Sig.	.000		.031		.000
Exact Sig. (2-tailed)		.687 ^b		.000 ^b	

a. McNemar's test

b. Binomial distribution used.

The financial knowledge score was computed as the sum of points across the five questions, yielding a scale from 0 to 25. Changes in financial knowledge were evaluated based on shifts in the financial knowledge scores between the pre-test and post-test. To test Hypothesis H1a, a paired sample t-test was performed to test their financial knowledge scores and check if there was a significant difference between the two paired samples. Table 4.1b reported that the mean and standard deviation of the financial knowledge scores in the post-test were $M = 20.90$, $SD = 4.49$, while that of the pre-test was $M = 17.27$, $SD = 5.07$. Table 4.1c showed that the mean difference was 3.63 with a 95% confidence interval that ranges from 2.676 to 4.591. The test statistic was $t = 7.50$, with 149 degrees of freedom, and the p-value was less than .001. Hypothesis H1a was supported. As a result, there was a significant increase in the financial knowledge score after the financial education program ($M = 20.90$, $SD = 4.49$) compared to the pre-test ($M = 17.27$, $SD = 5.07$), $t(149) = 7.50$, $p < .001$.

The results demonstrated that students showed statistically significant improvements in four out of five financial knowledge questions after completing the financial education program, with p-values below the .05 significance level. However, the provident funds (Q2) question regarding the knowledge of retirement planning did not show a significant improvement following the program,

as evidenced by the p-value of .687. This finding suggested that the high pre-test knowledge level (93.3% correct answers) was maintained after the program. The Q2 result showed an outcome contrary to expectations derived from prior studies. Lusardi and Mitchell (2007) emphasised that financial knowledge was a key determinant of retirement planning. However, the program could not increase retirement planning knowledge as intended, and further improvement was required. Except for Q2, the overall results found the program improved students' financial knowledge, as evidenced by the mean difference in financial knowledge scores from 17.27 (pre-test) to 20.90 (post-test), with a t-value of 7.50 and a p-value less than .001. Thus, the findings supported Hypothesis H1a of a significant improvement in financial knowledge through the program. These results aligned with prior studies by Borden et al. (2008) and Peng et al. (2007) that showed that participation in personal finance courses increased college students' financial knowledge, particularly credit and investment knowledge.

Table 4.1b Paired Samples Statistics - Financial Knowledge Score

	Mean	Std. Deviation	Std. Error Mean
Financial knowledge score (Post)	20.90	4.490	.367
Financial knowledge score (Pre)	17.27	5.070	.414

Table 4.1c Paired Samples Test – Financial Knowledge Score (Post – Pre)

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Financial knowledge score (Post – Pre)	3.633	5.933	.484	2.676	4.591	7.500	149	.000

4.2 Financial Behaviours

Vieira et al. (2019) found that financial knowledge and attitude positively impact university students' financial behaviour. Kartini et al. (2020) identified that financial attitudes and basic financial knowledge directly influence financial behaviour among homemakers. Shim and Serido (2011) found that those who continued to learn about personal finances had more responsible financial behaviours when compared to others. The survey included seven questions (Q6-Q12) to construct financial behaviours. A composite scale was constructed to generate an overall quantitative measure of financial behaviours by summing dichotomously coded responses across the seven relevant survey questions to generate an overall quantitative measure of financial behaviours. One hundred fifty participants completed the pre- and post-surveys. Due to a variety of factors, including some respondents not answering certain questions or the applicability of specific questions to different individuals, there was a variation in the number of matched samples, resulting in differing N values for each question. For example, Q8, Q10, Q11, and Q12 had samples that matched less than the other questions. Q11 (Reviewing investment performance) had only sixty-six matched responses because many students had no investment products. As the response data were repeated measures of the same individuals, McNemar's test was performed for Q6 – Q12 to test any differences between the pre-test and post-test. If the count of discordant cells was less than 25, the exact binomial test was used. McNemar's test was conducted to compute the Chi-Square and p-value of each financial behaviour.

Table 4.2a was the summary of the results of McNemar's test. P-values were calculated, and all were less than the significance level of .05. There were significant improvement effects of the program intervention on all financial behaviours: tracking expenses ($p < 0.001$), setting financial

goals ($p < 0.001$), checking statements ($p < 0.001$), saving money ($p = 0.001$), seeking financial advice ($p < 0.001$), reviewing investment performance ($p < 0.001$), and reading financial info ($p < 0.001$). It was found that a higher proportion of students completed the financial behaviours after the program. The most significant improvement was “Tracking Expenses”. Eighty students changed their behaviour from “not tracking expenses” to “tracking expenses”, and only three students changed their behaviour in the opposite way. The exact binomial test was employed on Q9 “Saving Money” because the size of discordant cells was 19, lower than 25. As the exact p -value was 0.001, the behavioural change from “not saving money” to “saving money” was significant after the program.

Table 4.2a Test Statistics^a - Financial Behaviours

	Q6Pre & Q6Post	Q7Pre & Q7Post	Q8Pre & Q8Post	Q9Pre & Q9Post	Q10Pre & Q10Post	Q11Pre & Q11Post	Q12Pre & Q12Post
N	147	149	139	148	136	66	113
Chi-Square	69.59	62.645	24.025		35.558	18.893	26.694
Asymp. Sig.	.000	.000	.000		.000	.000	.000
Exact Sig. (2-tailed)				.001 ^b			

a. McNemar's test

b. Binomial distribution used.

A paired sample t -test was performed to test Hypothesis H1c. From Table 4.2b, the mean and standard deviation of the financial behaviour scores in the post-test were 30.97, $SD = 6.29$, higher than the pre-test ($M = 19.20$, $SD = 8.09$). Table 4.2c showed that the mean difference was 11.767 with a 95% confidence interval that ranged from 10.383 to 13.150. The test statistic was $t = 16.81$, with 149 degrees of freedom, and the p -value was lower than the significance level of .05. Thus, Hypothesis H1c was supported. It was concluded that there was a significant treatment effect of

the program on students' financial behaviours, with $t(149) = 16.81, p < .001$. The overall findings supported existing literature emphasising the impact of financial education programs on financial behaviours. Batty et al. (2015) highlighted the role of previous financial experience and the potential for financial education to improve attitudes and behaviours, particularly in younger students. This finding aligned with Xiao and Porto's (2018) research, which found that insurance advice-seeking was positively associated with high school and workplace financial education. Similarly, in this study, the tertiary students who participated in the program also demonstrated a significant improvement in seeking financial advice. Kaiser and Menkhoff (2017) also discovered a positive correlation between financial behaviours and financial literacy. They also highlighted the importance of education intensity and timing. According to Lyons et al. (2006), individuals with lower levels of financial behaviour before the program showed the most significant improvement in their financial behaviour. In this study, all financial behaviours showed significant changes after the program; "tracking expenses" demonstrated better improvement than the other behaviours. This pronounced improvement might be related to the expense tracking exercise in the program, and the qualitative results from student interviews will serve to support this observation.

Table 4.2b Paired Samples Statistics - Financial Behaviour Score

	Mean	N	Std. Deviation	Std. Error Mean
Financial behaviour score (Post)	30.97	150	6.258	.511
Financial behaviour score (Pre)	19.20	150	8.091	.661

Table 4.2c Paired Samples Test - Financial Behaviour Score (Post – Pre)

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Financial behaviour score (Post - Pre)	11.767	8.575	.700	10.383	13.150	16.805	149	.000

4.3 Financial Attitudes

People with higher financial knowledge tended to develop more positive financial attitudes, which subsequently contributed to better financial behaviours (Joo, 2008). Soroshian and Teck (2013) further highlighted that the money attitude of students positively affected their financial literacy level. Financial attitude is a crucial factor in evaluating the level of financial literacy. To measure the level of financial attitudes, the pre- and post- survey instruments included a series of nine Likert-scale statements encompassing key attitudinal dimensions, as discussed in Chapter 3. As the same sample was tested twice, a paired sample t-test was performed for Q13 – Q21 to test if there were significant differences in their financial attitudes following the program.

From Table 4.3a, the pre-test results showed that students had positive financial attitudes in all aspects before the program. In contrast, students expressed the most positive attitude towards the

bankruptcy statement ($M = 4.67$, $SD = .65$), and the weakest attitude was found on the insurance statement ($M = 4.03$, $SD = .82$). The students were asked the same set of financial attitude statements after the program, it was found that all the mean scores were raised. The post-test results showed that the financial attitudes of students were improved after the program. Bankruptcy and insurance statements remained the highest score ($M = 4.87$, $SD = .38$) and the lowest score ($M = 4.45$, $SD = .71$), respectively, in the post-survey. To test if there was statistical evidence that the program had effects on the changes in financial attitudes, the paired samples t-test was conducted, and the results were reported in Table 4.3b. The paired-samples t-test compared the post-test and pre-test scores from the matched samples. For each financial attitude statement in Table 4.3b, the mean score was calculated by subtracting the pre-test score from the post-test score. A positive mean score indicated there was a gain in a better financial attitude. The results of the paired samples t-test showed statistically significant mean gain scores from Q13 to Q21. It was found that all p-values were lower than .05. The results indicated a significant high gain in the attitude towards insurance, from the pre-test ($M = 4.03$, $SD = .82$) to the post-test ($M = 4.45$, $SD = .71$), $t(149) = 5.87$, $p < .001$, representing the highest improvement in the financial attitude. The lowest mean gain score was the financial attitude towards loans, but the difference between the pre-test ($M = 4.63$, $SD = .52$) and the post-test ($M = 4.75$, $SD = .53$) was statistically significant, $t(149) = 2.20$, $p = .029$. The results also indicated that the financial education program resulted a significant improvement in the financial attitudes towards credit cards ($t[149] = 4.49$, $p < 0.001$), bankruptcy ($t[149] = 4.85$, $p < 0.001$), risk and return ($t[149] = 5.11$, $p < 0.001$), investing ($t[149] = 5.68$, $p < 0.001$), financial plan ($t[149] = 3.43$, $p = 0.001$), savings ($t[149] = 2.94$, $p = 0.004$), and investment products ($t[149] = 3.41$, $p = 0.001$).

Table 4.3a Paired Samples Statistics - Financial Attitudes

		Mean	Std. Deviation	Std. Error Mean
Q13	Credit cards (Post)	4.86	.418	.034
	Credit cards (Pre)	4.60	.645	.053
Q14	Loan (Post)	4.75	.533	.044
	Loan (Pre)	4.63	.523	.043
Q15	Bankruptcy (Post)	4.87	.378	.031
	Bankruptcy (Pre)	4.67	.514	.042
Q16	Risk and return (Post)	4.78	.431	.035
	Risk and return (Pre)	4.54	.587	.048
Q17	Investing (Post)	4.81	.413	.034
	Investing (Pre)	4.53	.575	.047
Q18	Insurance (Post)	4.45	.710	.058
	Insurance (Pre)	4.03	.823	.067
Q19	Financial plan (Post)	4.53	.711	.058
	Financial plan (Pre)	4.33	.671	.055
Q20	Savings (Post)	4.72	.532	.043
	Savings (Pre)	4.56	.607	.050
Q21	Investment products (Post)	4.72	.520	.042
	Investment products (Pre)	4.54	.551	.045

Table 4.3b Paired Samples Test - Financial Attitudes (Post – Pre)

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Q13	Credit cards	.260	.709	.058	.146	.374	4.492	149	.000
Q14	Loan	.113	.630	.051	.012	.215	2.204	149	.029
Q15	Bankruptcy	.200	.505	.041	.119	.281	4.850	149	.000
Q16	Risk and return	.240	.576	.047	.147	.333	5.107	149	.000
Q17	Investing	.273	.590	.048	.178	.368	5.678	149	.000
Q18	Insurance	.420	.877	.072	.279	.561	5.867	149	.000
Q19	Financial plan	.200	.714	.058	.085	.315	3.430	149	.001
Q20	Savings	.160	.666	.054	.052	.268	2.941	149	.004
Q21	Investment products	.180	.646	.053	.076	.284	3.414	149	.001

Differences in means of financial attitude scores were analysed using the paired samples t-test analysis. Hypothesis H1b was tested by comparing the mean of financial attitude scores in the pre-test with the mean of financial attitude scores in the post-test. Table 4.3c showed that the mean and standard deviation of the financial attitude scores were improved from the pre-test ($M = 40.37$, $SD = 3.60$) to the post-test ($M = 42.48$, $SD = 3.35$). Table 4.3d was the result of the paired samples t-test. The p-value was lower than the significance level of .05. The results supported Hypothesis H1b, that the program had a significant treatment effect on the financial attitudes of tertiary students. The mean difference (Post-test – Pre-test) was 2.107, with a 95% confidence interval that ranged from 1.627 to 2.587. The test statistic was $t = 8.67$, with 149 degrees of freedom. It was concluded that there was a significant treatment effect of the program on the financial attitudes of students, $t(149) = 8.67$, $p < 0.001$. Overall, the financial education program resulted in a significant improvement in all financial attitudes, including credit cards, bankruptcy, risk and return, investing, financial plans, savings, and investment products. The observed improvements in financial attitudes among tertiary students were consistent with the conclusions drawn by Potrich et al. (2015). They found that financial education had a positive improvement in financial attitudes. The positive impact on financial attitudes in this study was also in line with the findings of Kaiser and Menkhoff (2017). However, some prior studies had the opposite results. For example, Becchetti et al. (2013) found that financial education showed no significant effects on students' financial attitudes. As their studies assessed financial education programs in secondary schools, the educational context and environment could have produced varying outcomes compared to studies conducted in college settings. In the studies of Borden et al. (2008) and Bowen and Jones (2006), both studies reported that college students had improved their attitudes through financial education

programs. Thus, the financial education programs' impact on financial attitudes remained a subject for further research.

Table 4.3c Paired Samples Statistics - Financial Attitude Score

	Mean	Std. Deviation	Std. Error Mean
Financial attitude score (Post)	42.48	3.349	.273
Financial attitude score (Pre)	40.37	3.600	.294

Table 4.3d Paired Samples Test – Financial Attitude Score (Post – Pre)

	Paired Differences					T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Financial attitude score (Post – Pre)	2.107	2.974	.243	1.627	2.587	8.674	149	.000

4.4 Financial Literacy

As mentioned in Chapter Three, a summary measure was constructed for a financial literacy score based on the student's responses to the survey questions. To evaluate the financial literacy level, the survey construct covered financial knowledge, financial behaviour, and financial attitude (OECD, 2013). The financial literacy score was created by adding points according to the responses to each question for each respondent. The scores for all responses were then aggregated, and the aggregate financial literacy score captured their responses across three dimensions. The financial literacy score was computed to evaluate students' overall financial literacy level. It was a composite dependent variable which combined all the scores of 21 questions. Each question had a score range from 0 to 5. The purpose was to ensure that all questions had the same weighting. If the student did not answer the question or left the answer blank, the response was coded as a zero mark. The maximum point of the financial literacy score was 105. As students were repeatedly measured before and after the program, each student had pre- and post-financial literacy scores.

To test Hypothesis H1d, a paired sample t-test was performed. Table 4.4a showed that the mean and standard deviation of the financial literacy score were improved from $M = 76.84$, $SD = 10.77$ at the pre-test to $M = 94.35$, $SD = 9.47$ after the program. As shown in Table 4.4b, the p-value was lower than the significance level of .05, and the result supported Hypothesis H1d. The mean difference, by subtracting the pre-financial literacy mean score from the post-financial literacy mean score, was 17.507, with a 95% confidence interval that ranges from 15.930 to 19.083. The test statistic was $t = 21.94$, with 149 degrees of freedom. It was found that the financial education program improved the financial literacy score significantly, $t(149) = 21.94$, $p < .001$. Table 4.4d

summarises the effect sizes using Cohen's *d* for the financial education program on tertiary students' financial knowledge, attitudes, behaviours, and overall financial literacy. Cohen's *d* for dependent samples was computed by dividing the mean of the paired differences by the standard deviation of the paired differences. The results indicated substantial effect sizes across all measured dimensions. The effect size for financial knowledge was 0.612, which is considered a medium effect (Cohen, 1988). This finding mirrored Walstad et al.'s (2010) research results, which showed a significant increase in high school students' knowledge following their participation in a financial education program. The effect size indicated that the program effectively improved students' financial knowledge. It enhanced the understanding of credit card charges, insurance intermediaries, investment diversification, and margin trading fees, as demonstrated by the results.

The impact on financial attitudes was pronounced, with a large effect size of 0.709. The large effect size confirmed the significant program effect on financial attitudes and added to the prior research. Amagir et al. (2018) reported that such programs led to improvements in financial knowledge and attitudes. Positive financial attitudes were strongly associated with positive financial behaviours (Joo, 2008; Soroshian & Teck, 2013). The improvement in financial behaviours exhibited a larger effect size of 1.372. This aligned with the findings of Shim and Serido (2011), who concluded that financial education led to more responsible financial behaviours. This study supported the previous findings because the largest effect size of 1.791 was demonstrated in the overall financial literacy. The large effect size was meaningful because it proved that students not only learned financial knowledge but also changed their attitudes and behaviours, which positively enhanced their financial literacy. Overall, these findings supported Hypotheses H1a to H1d and answered the research question one. These findings were consistent

with previous research that supported the effectiveness of financial education programs in enhancing financial literacy among college students (Amagir et al., 2018; Borden et al., 2008; Peng et al., 2007; and Smythe, 2020). The substantial effect sizes indicated that the program not only produced statistically significant results but also had a meaningful impact on the students' financial literacy.

Table 4.4a Paired Samples Statistics - Financial Literacy Score

	Mean	N	Std. Deviation	Std. Error Mean
Financial literacy score (Post)	94.35	150	9.469	.773
Financial literacy score (Pre)	76.84	150	10.773	.880

Table 4.4b Paired Samples Test – Financial Literacy Score (Post – Pre)

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Financial literacy score (Post - Pre)	17.507	9.773	.798	15.930	19.083	21.939	149	.000

Table 4.4c Summary of Effect Sizes

	Effect size (Cohen's d)	t	Sig. (2-tailed)
Financial Knowledge Score (Post - Pre)	0.612	7.50	< .001
Financial Attitudes Score (Post - Pre)	0.709	8.67	< .001
Financial Behaviours Score (Post - Pre)	1.372	16.81	< .001
Financial Literacy Score (Post - Pre)	1.791	21.94	< .001

Research question 2: Did the financial literacy of tertiary students differ by their demographic characteristics following the financial education program?

4.5 Demographic characteristics

Previous studies found that socioeconomic and demographic variables influenced the financial literacy level (Atkinson & Messy, 2012; Chen & Volpe, 1998; Lusardi & Mitchell, 2011). Potrich et al. (2015) developed a model that explained the individuals' financial literacy level through socioeconomic and demographic variables. Their findings suggested that gender, educational level, individual income, and family income were positive and statistically significant variables for the financial literacy level. Thus, demographic characteristics played a role in the financial literacy level. The pre-survey had six demographic questions covering major demographic characteristics, including gender, age, job status, monthly income, education level and study major. Each student's demographic characteristics were coded and matched with their pre- and post-financial literacy scores. To investigate if the student characteristics had any effect on financial literacy before students had the financial education program, a one-way analysis of variance (ANOVA) model was built to examine the difference in pre-financial literacy scores among distinct groups of demographic characteristics. One-way ANOVA was chosen because it compares the means of one or more groups based on an independent variable. In the one-way ANOVA, the pre-financial literacy scores were the dependent variable, and each demographic characteristic was input as the independent variable. The p-value of one-way ANOVA could indicate any significant differences among the groups. If the p-value was less than the significance level of .05, it showed sufficient evidence to support a difference in financial literacy in the groups of demographic characteristics.

Post-hoc tests were then conducted to identify where the differences lie between groups. For the one-way ANOVA, mixed model ANOVA, and simple effects analyses, the effect sizes were reported as partial eta squared (η^2_p) values to determine the magnitude of differences between groups. They were calculated as the ratio of the effect sum of squares to the sum of the effect sum of squares and the error sum of squares.

4.5.1 One-way Model ANOVA – Demographic characteristics

The one-way ANOVA for pre-financial literacy scores was employed, with each demographic characteristic as the independent variable. For the age and job status variables, as their sample sizes of sub-groups were unequal, Levene's test was performed to check the homogeneity of variance and showed non-significant p-values. As the p-value of Levene's test was greater than .05, the assumption of equal variances was met. Regarding the education level variable, it was initially coded into six groups: bachelor year 1, bachelor year 2, bachelor year 3, bachelor year 4, higher diploma year 1 and higher diploma year 2. Due to significantly different sample sizes among the six groups, Levene's test assessed the homogeneity of variances, which resulted in a significant p-value ($< .001$), indicating a violation of the equal variances assumption. To address this issue, the original education levels were recoded into two broader categories to equalise group sizes: "upper years" (combining bachelor year 4 and bachelor year 3) and "lower years" (combining bachelor year 2, bachelor year 1, higher diploma year 2, and higher diploma year 1). The variable was renamed as "Education Levels (Recoded)". A subsequent Levene's test on the recoded groups showed a non-significant p-value: $F(1, 148) = .17, p = .681$, satisfying the assumption of equal variances. Table 4.5a shows the summary table of ANOVA for the main effect of all demographic characteristics. The p-values of all demographic characteristics were all greater than .05. The

results indicated that the effects of all demographic characteristics on pre-financial literacy scores were insignificant. There was no statistically significant relationship between pre-financial literacy scores and all demographic characteristics. This indicated that prior to the financial education program, tertiary students' financial literacy scores did not differ significantly based on their demographic characteristics.

Table 4.5a One-way ANOVA for pre-financial literacy scores by demographic characteristics

Demographic characteristics	Statistical results	Finding
Gender	$F(1, 148) = 0.09, p = .761, \eta^2_p = .001$	Not significant
Age	$F(1, 148) = 0.70, p = .403, \eta^2_p = .005$	Not significant
Job Status	$F(2, 147) = 1.02, p = .365, \eta^2_p = .014$	Not significant
Monthly Income	$F(2, 147) = 2.07, p = .129, \eta^2_p = .027$	Not significant
Education Levels (Recoded)	$F(1, 148) = 0.52, p = .471, \eta^2_p = .004$	Not significant
Study Majors	$F(8, 141) = 1.97, p = .054, \eta^2_p = .101$	Not significant

4.5.2 Mixed Model ANOVA – Demographic characteristics

As discussed in research question 1, the financial education program had a statistically significant positive effect on tertiary students' financial literacy scores. However, the extent to which demographic characteristics influenced financial literacy scores after the financial education program remained unclear. The mixed model ANOVA was conducted to determine the presence of main effects for two independent variables, as well as to test whether there was an interaction effect between them. In the mixed model ANOVA, “time” was a within-subjects factor representing measures taken at two different points. Pre- and post-financial literacy scores were treated as repeated measures within the same subjects. A significant main effect for time would indicate a change in financial literacy scores following the financial education program. Demographic characteristics were introduced as between-subjects factors. A significant main effect for any demographic characteristic would suggest that this characteristic had a significant impact on financial literacy scores. The mixed model ANOVA also examined the interaction effect between demographic characteristics and time. An interaction effect would imply that the impact of a demographic characteristic on financial literacy scores was different following the financial education program.

Table 4.5b Mixed Model ANOVA – All Demographic Variables

Hypothesis	Time (Within-Subjects Effect)	Demographic Variable (Between-Subjects Effect)	Time x Demographic Variable (Interaction Effect)	Summary
H2a Gender	$F(1, 148) = 481.75, p < .001, \eta^2_p = .765$	$F(1, 148) = .04, p = .838, \eta^2_p = .000$	$F(1, 148) = 1.10, p = .295, \eta^2_p = .007$	<ul style="list-style-type: none"> ● Gender's between-subjects effect and interaction effect not significant. ● H2a not supported.
H2b Age	$F(1, 148) = 22.63, p < .001, \eta^2_p = .133$	$F(1, 148) = 3.38, p = .068, \eta^2_p = .022$	$F(1, 148) = 2.16, p = .144, \eta^2_p = .014$	<ul style="list-style-type: none"> ● Age's between-subjects effect and interaction effect not significant. ● H2b not supported.
H2c Job Status	$F(1, 148) = 111.71, p < .001, \eta^2_p = .432$	$F(2, 147) = .29, p = .746, \eta^2_p = .004$	$F(2, 147) = 2.51, p = .085, \eta^2_p = .033$	<ul style="list-style-type: none"> ● Job status' between-subjects effect and interaction effect not significant. ● H2c not supported.
H2d Monthly Income	$F(1, 148) = 346.77, p < .001, \eta^2_p = .702$	$F(2, 147) = 1.28, p = .280, \eta^2_p = .017$	$F(2, 147) = 2.25, p = .110, \eta^2_p = .030$	<ul style="list-style-type: none"> ● Monthly income's between-subjects effect and interaction effect not significant. ● H2d not supported.
H2e Education levels (Recoded)	$F(1, 148) = 475.84, p < .001, \eta^2_p = .763$	$F(1, 148) = .47, p = .494, \eta^2_p = .003$	$F(1, 148) = 8.50, p = .004, \eta^2_p = .054$	<ul style="list-style-type: none"> ● Education levels' between-subjects effect not significant. ● Interaction effect significant. ● H2e supported.
H2f Study Majors	$F(1, 148) = 345.10, p < .001, \eta^2_p = .710$	$F(8, 141) = 3.15, p = .003, \eta^2_p = .151$	$F(8, 141) = .915, p = .506, \eta^2_p = .049$	<ul style="list-style-type: none"> ● Study majors' between-subjects effect significant. ● No interaction effect. ● H2f supported.

Table 4.5b was the mixed model ANOVA summary table. It was found that the within-subjects effect of time was significant across all demographics. However, only study majors reported a significant between-subjects effect, while other demographic variables were found to be insignificant. Moreover, the results showed that gender, age, job status, monthly income and study majors had no significant interaction effect with the time factor. It was concluded that financial literacy scores were significantly affected by the within-subjects effect of time. However, the gender, age, job status and monthly income had no significant between-subjects effect or interaction effect on financial literacy scores. Therefore, no sufficient evidence supported Hypotheses H2a, H2b, H2c and H2d.

The findings of this study contradicted previous research in some aspects. Hogarth (2002) and Worthington (2006) had conducted literature reviews indicating that educational achievement, income, employment status, and age were commonly correlated with financial literacy. Prior studies revealed that boys tended to have significantly higher financial literacy than girls (Lusardi et al., 2010), although gender differences appeared to be small and did not remain consistent over time (Mandell, 2007, 2008). Okamoto et al. (2021) opined that gender differences played a significant role, with women generally being less financially literate than men, but this difference could be attributed to factors such as education and financial assets. In addition to the mixed results between gender and financial literacy, the income factor also yielded mixed results in the research. Liaqat et al. (2020) found that university students with higher parental incomes are more financially literate. However, the study by Adam (2023) reported negative beta coefficients, which reflected an inverse relationship between parental income and various aspects of financial literacy. As limited research has been conducted on the demographic factors associated with financial

education programs among tertiary students, more exploration of these factors should be investigated to understand their influence on financial literacy.

For the variable of education levels (recoded), although the between-subjects effect of education levels was not significant, $F(1, 148) = .47, p = .494$, suggesting no overall difference in the mean change scores between the two groups. However, the interaction effect of time and education levels was significant, $F(1, 148) = 8.50, p = .004$, with a small partial eta squared at $\eta^2_p = .054$. The interaction effect showed that the effects of education levels variable depended on the time. Simple effects analysis was conducted to evaluate the interaction effect, the results were shown in Table 4.5.2 The results suggested that in the post-test, the financial literacy scores achieved by students in lower years ($M = 95.76, SD = 8.697$) were significantly higher than the students in upper years ($M = 92.45, SD = 10.181$), $F(1, 148) = 4.57, p = .034$. However, in the pre-test, the two groups had no significant difference, $F(1, 148) = .52, p = .471$. The line chart was produced in Table 4.5c below, the change in financial literacy score in the “lower years” group was significantly higher than the change in the “upper years” group. These findings suggested that although there was a significant treatment effect on the financial literacy score, there was a much stronger effect for students studying in the lower years. After the financial education program, the increase in financial literacy scores for the “lower years” group was significantly higher than the “upper years” group. As a result, Hypothesis H2e was supported by the evidence. Dewanty and Isbanah (2018) found that education levels played a significant role and positively influenced financial literacy. Atkinson and Messy (2012) also concluded that the education levels had a positive impact on the financial attitudes, both education levels and financial attitudes were directly proportional related. While previous research found a positive relationship between education levels and financial

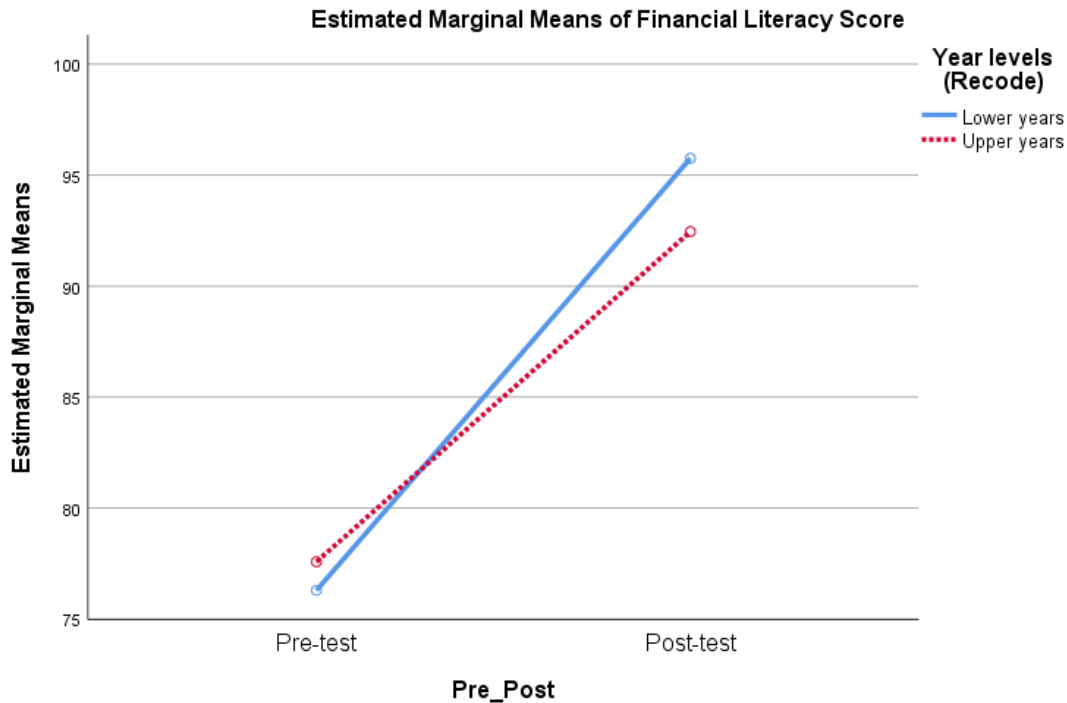
literacy, the results showed this relationship was more complex. Specifically, the researcher found no main effect of education level, but a significant interaction effect with time points, suggesting the influence of the financial education program on financial literacy varied depending on the time point.

Table 4.5c Mixed model ANOVA - Education levels (Recoded)

Simple effects - Univariate Tests

factor1		Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Pre-test	Contrast	60.818	1	60.818	.522	.471	.004
	Error	17233.342	148	116.441			
Post-test	Contrast	400.242	1	400.242	4.571	.034	.030
	Error	12959.731	148	87.566			

Each F tests the simple effects of EduRecode2 within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.



Finally, study majors were treated as the independent variable in the Mixed Model ANOVA, with pre- and post-financial literacy scores as the within-subjects factor. The between subjects effect of study majors was significant, $F(8, 141) = 3.15, p = .003$, with a large partial eta squared ($\eta^2_p = .151$). The results suggested significant differences in financial literacy scores among the different study majors after the intervention. Tukey's post hoc tests were further applied to identify the differences, but were reported as non-significant, likely due to some groups having smaller sizes. As a result, Gabriel's pairwise comparisons, which are better suited for unequal group sizes, were used. Table 4.5d showed that business students ($M = 88.88, SD = 12.681$) scored significantly higher than engineering students ($M = 80.73, SD = 14.501$). The interaction effect between time and study majors was not significant, $F(8, 141) = .915, p = .506$. The groups of study majors did not have significant differences in the changes in financial literacy scores from the pre-test to the post-test. Therefore, Hypothesis H2f was supported by the study majors' between-subjects effect. Prior studies have explored the relationship between study majors and financial literacy. Kirsten and Robert (2016) found that business majors tended to have higher financial literacy. However, Chen and Volpe (1998) found that college students in general, regardless of major, had low levels of financial literacy. These results aligned with the study of Kirsten and Robert (2016).

Table 4.5d Mixed Model ANOVA - Study majors
Post hoc multiple comparisons

Gabriel

(I) Study Major	(J) Study Major	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Business	Arts	8.56	2.831	.060	-.16	17.28
	Education	7.13	2.450	.106	-.59	14.85
	Engineering	10.07*	3.229	.035	.34	19.79
	Finance-related	-.46	2.347	1.000	-7.90	6.99
	Health-related	5.42	2.734	.743	-3.05	13.89
	Others	4.31	2.576	.947	-3.75	12.36
	Science	5.95	3.419	.874	-4.25	16.14
	Social science	2.38	2.303	1.000	-4.94	9.70
Engineering	Arts	-1.51	3.911	1.000	-14.18	11.17
	Business	-10.07*	3.229	.035	-19.79	-.34
	Education	-2.94	3.644	1.000	-14.61	8.74
	Finance-related	-10.52	3.576	.107	-21.92	.88
	Health-related	-4.65	3.841	1.000	-17.07	7.78
	Others	-5.76	3.730	.986	-17.77	6.25
	Science	-4.12	4.356	1.000	-18.27	10.03
	Social science	-7.69	3.547	.624	-18.96	3.59

Based on observed means.

The error term is Mean Square (Error) = 70.830.

*. The mean difference is significant at the .05 level.

Research question 3: Were there any relationships between tertiary students' perceptions of program outputs and their financial literacy?

4.6 Program Outputs

The National Endowment for Financial Education (2010) designed a financial education evaluation manual which promoted the use of logic models to help assess the outcomes of financial education programs. To evaluate the program's effectiveness, the post-survey included seven questions assessing the Program Outputs in the logic model. These program outputs included Lecturers, Study Notes, Case Study Videos, Mobile App, Exercise, Webpages, and Overall Program. Tertiary students answered seven questions to indicate their level of agreement with the extent to which the Program Outputs helped them learn about financial literacy. Responses were recorded on a 5-point Likert scale, with ratings that ranged from "Strongly Disagree (1)" to "Strongly Agree (5)". When compiling the data set, it was observed that most responses fell into the categories of "5" and "4". The quantity of reactions in the categories "2" and "1" was relatively limited, which could potentially affect the statistical power of the analysis. The number of responses in these two categories was small to provide enough information to draw meaningful conclusions. To ensure adequate group sizes for the analysis, the responses were recoded into three aggregated categories based on the levels of agreement. The responses of "5" were categorised in the "SAG" group, indicating a high agreement group. The responses of "4" were placed in the "AG" group, signifying a moderate agreement group. Meanwhile, the responses of "3", "2", and "1" were combined into the "NDG" group, displaying a low to no agreement group. It was necessary to combine them into a single group in order to have a sufficient sample size for analysis. The

constraints of sample size were limitations of the study and were considered when interpreting the results. The effect sizes were reported as partial eta squared values. Partial eta squared values were examined to determine the magnitude of differences between groups, which was important when dealing with small sample sizes.

Table 4.6a showed the summary of the one-way ANOVA for post-financial literacy scores by program outputs. All main effects of program outputs were found significant, with all p-values $<.05$. These results showed that all program outputs had significant effects on the post-financial literacy scores at a significance level of $.05$. The partial eta squared values ranged from medium ($\eta^2_p = .079$) to large effects ($\eta^2_p = .184$) across the program outputs. Students with different agreement levels on program inputs had significant differences in their post-financial literacy scores. In the presence of significant effects of program outputs on the post-financial literacy scores, it was of interest to test the main effects of program outputs and their interaction effect with the time factor.

Table 4.6a One-way ANOVA for post-financial literacy scores by program outputs

Program Output	Statistical results	Finding
Lecturers	$F(2, 147) = 11.82, p < .001, \eta^2_p = .138$	Significant
Study Notes	$F(2, 147) = 11.83, p < .001, \eta^2_p = .139$	Significant
Case Study Videos	$F(2, 147) = 7.12, p = .001, \eta^2_p = .088$	Significant
Mobile App	$F(2, 147) = 8.32, p < .001, \eta^2_p = .102$	Significant
Exercises	$F(2, 147) = 6.28, p = .002, \eta^2_p = .079$	Significant
Webpages	$F(2, 147) = 7.84, p = .001, \eta^2_p = .096$	Significant
Overall Program	$F(2, 147) = 16.54, p < .001, \eta^2_p = .184$	Significant

4.6.1 Mixed Model ANOVA – All Program Outputs

To further investigate all program outputs, the mixed model ANOVA was conducted. In the mixed model ANOVA, “Time” was input as a within-subjects factor (pre- and post- financial literacy scores), and each “Program Output” was input as a between-subjects factor. The purposes were to examine the main effects of the Program Outputs following the program, as well as the interaction effect between these time points and the Program Outputs. The mixed model ANOVA results were summarised in Table 4.6a. The main effect of Time on the change in financial literacy scores was significant across different Program Outputs, with p-values < .001. The consistently large partial eta squared values for the main effect of Time (from 0.367 to 0.761) suggested that the intervention

duration played an effective role in enhancing financial literacy. For instance, the partial eta squared for Time for Lecturers was 0.367, which indicated that nearly 37% of the variance in financial literacy scores was attributed solely to the duration of the intervention. It suggested that the longer students were exposed to the financial literacy program, the more likely they were to improve their financial literacy scores, regardless of the specific program outputs they engaged with.

Table 4.6b demonstrated the significant main effects of all Program Outputs, with p-values < .05. These Program Outputs contributed to the improvement of financial literacy from pre-test to post-test. Moreover, medium to large partial eta squared values (from 0.068 to 0.135) were observed across different Program Outputs. While partial eta squared values were smaller than those for Time, they still highlighted the importance of individual program outputs in influencing financial literacy scores. The Overall Program stood out with the largest partial eta squared value (0.135), indicating a strong association with financial literacy scores. This was followed by Mobile App (0.103) and Webpages (0.106). In contrast, the Case Study Videos had the lowest partial eta squared value (0.068) among the Program Outputs. The Case Study Videos showed a less pronounced but still meaningful relationship with financial literacy when compared to other Program Outputs. This finding invited further exploration into how Case Study Videos could be improved to enhance the educational impact.

Moreover, the interaction effect between Time and Program Output offered insights into how the effectiveness of each Program Output on financial literacy might change over Time. Mixed results were shown in the interaction effects. Certain Program Outputs, including Lecturers, Study Notes, and the Overall Program, demonstrated significant interaction effects, with p-values $< .05$ and small partial eta squared values (from 0.045 to 0.051). These results suggested that their impact on financial literacy was more pronounced after the completion of the program. However, some Program Outputs had no significant interaction effect, such as Case Study Videos, Mobile App, Exercise, and Webpages. The absence of significant interaction effects for these Program Outputs suggested that their impact on financial literacy might be more consistent throughout the program.

The large partial eta squared values for Time highlighted the importance of the duration and structure of the program in enhancing financial literacy. However, the smaller interaction partial eta squared values revealed that the timing of specific program outputs should be carefully considered. For educators, this emphasised the potential benefits of a varied and well-timed educational approach. Furthermore, the varying partial eta squared values across different Program Outputs suggested areas for future research, particularly in identifying and understanding the factors that could further optimise the efficacy of financial literacy programs. For instance, the lesser partial eta squared associated with Case Study Videos invited investigation into how such resources can be better utilised or integrated with other Program Outputs to maximise their educational impact.

As the main effects of Time and all Program Outputs were significant in Table 4.6b, Hypotheses H3a to H3g were all supported. Lecturers, Study Notes, and the Overall Program showed significant variation in their effectiveness following the program. These Program Outputs had a greater impact on financial literacy once the program was completed. However, Case Study Videos, Mobile App, Exercise, and Webpages indicated a stable improvement effect on financial literacy throughout the program. The significant main effects and interaction effects highlighted the temporal dynamics of learning in the financial education program.

Table 4.6b Mixed Model ANOVA – All Program Outputs

Hypothesis	Time (Main Effect)	Program Output (Main Effect)	Time × Program Output (Interaction Effect)	Summary
H3a Lecturers	$F(1, 148) = 85.24, p < .001,$ $\eta^2_p = .367$	$F(2, 147) = 7.12, p = .001,$ $\eta^2_p = .088$	$F(2, 147) = 3.44, p = .035,$ $\eta^2_p = .045$	<ul style="list-style-type: none"> ● Lecturers' main effect significant. ● Interaction effect significant. ● H3a supported.
H3b Study Notes	$F(1, 148) = 306.48, p < .001,$ $\eta^2_p = .676$	$F(2, 147) = 7.14, p = .001,$ $\eta^2_p = .089$	$F(2, 147) = 3.53, p = .032,$ $\eta^2_p = .046$	<ul style="list-style-type: none"> ● Study Notes' main effect significant. ● Interaction effect significant. ● H3b supported.
H3c Case Study Videos	$F(1, 148) = 241.69, p < .001,$ $\eta^2_p = .622$	$F(2, 147) = 5.32, p = .006,$ $\eta^2_p = .068$	$F(2, 147) = .96, p = .387,$ $\eta^2_p = .013$	<ul style="list-style-type: none"> ● Case study videos' main effect significant. ● Interaction effect not significant. ● H3c supported.
H3d Mobile App	$F(1, 148) = 468.89, p < .001,$ $\eta^2_p = .761$	$F(2, 147) = 8.44, p < .001,$ $\eta^2_p = .103$	$F(2, 147) = .42, p = .657,$ $\eta^2_p = .006$	<ul style="list-style-type: none"> ● Mobile app's main effect significant. ● Interaction effect not significant. ● H3d supported.

Hypothesis	Time (Main Effect)	Program Output (Main Effect)	Time × Program Output (Interaction Effect)	Summary
H3e Exercises	$F(1, 148) = 391.75, p < .001,$ $\eta^2_p = .727$	$F(2, 147) = 6.92, p = .001,$ $\eta^2_p = .086$	$F(2, 147) = .098, p = .907,$ $\eta^2_p = .001$	<ul style="list-style-type: none"> ● Exercises' main effect significant. ● Interaction effect not significant. ● H3e supported.
H3f Webpages	$F(1, 147) = 446.19, p < .001,$ $\eta^2_p = .752$	$F(2, 147) = 8.76, p < .001,$ $\eta^2_p = .106$	$F(2, 147) = .08, p = .927,$ $\eta^2_p = .001$	<ul style="list-style-type: none"> ● Webpages' main effect significant. ● Interaction effect not significant. ● H3f supported.
H3g Overall Program	$F(1, 148) = 252.83, p < .001,$ $\eta^2_p = .632$	$F(2, 147) = 11.48, p < .001,$ $\eta^2_p = .135$	$F(2, 147) = 3.97, p = .021,$ $\eta^2_p = .051$	<ul style="list-style-type: none"> ● Overall program's main effects significant ● Interaction effect significant. ● H3g supported.

4.6.2 Program Output - Lecturers

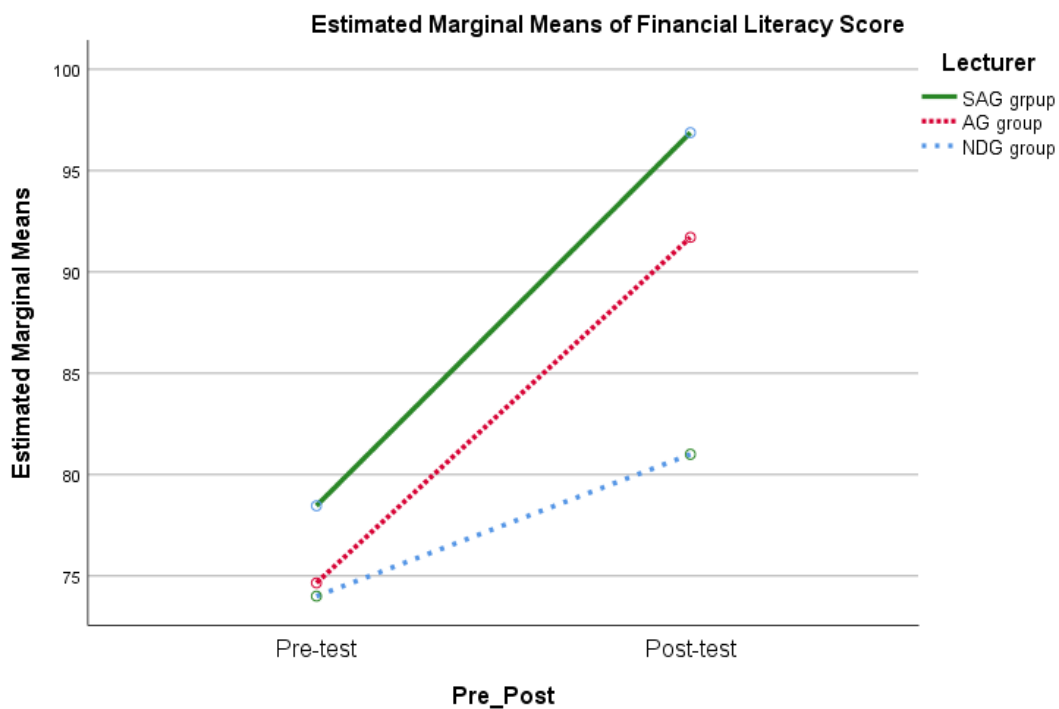
Lecturers showed a significant improvement in financial literacy with a moderate partial eta squared. This highlighted the key role of Lecturers because Lecturers had the ability to create a supportive learning environment (Forté, 2013), and financial capabilities to provide financial education (Beckker et al., 2019). As the interaction effect of Lecturers x Time was significant, $F(2, 147) = 3.44, p = .035$, a simple effects analysis was conducted to evaluate the interaction effect. In Table 4.6c, the pre-test showed no significant differences between groups, $F(2, 147) = 2.39, p = .095$. Upon completion of the program, a significant difference was reported, $F(2, 147) = 11.82, p < .001$. Those students with higher agreement level with the Lecturers led to higher financial literacy scores than the NDG group, the interaction was depicted at the line chart of Table 4.6c. To further identify group differences in the post-test, Post Hoc tests using the Tukey test were

employed. It further confirmed that the SAG group ($M = 87.67$, $SD = 13.143$) had significantly higher financial literacy scores compared to the AG group ($M = 83.18$, $SD = 13.398$) and the NDG group ($M = 77.5$, $SD = 10.721$). However, the AG and NDG groups had no significant difference. Worthington (2002) found that student perceptions and characteristics had a significant impact on teaching evaluations in financial education, emphasising the teacher's competence and effectiveness in financial education. The interaction effect reflected the importance of the timing of Lecturers' impact on students' learning. In the first lecture, the Lecturers provided foundational knowledge that students were able to build upon more effectively as the program progressed. After the second lecture, the Lecturers' contribution to students' learning became stronger. The effectiveness of Lecturers depended on engaging students and securing their commitment to learning. Engaging students in financial education could be achieved through active learning methods (Macy, 2010). When students strongly believe in the value of the Lecturers, they might be more likely to actively participate and pay attention, leading to better financial literacy scores. Deng et al. (2013) suggested that the effectiveness of financial education programs was also influenced by the financial literacy of the teachers themselves. These findings highlighted the impactful role that Lecturers played in shaping learning outcomes and the value of positive student-teacher dynamics in the program.

Table 4.6c Program Output - Lecturers

Simple effects - Univariate Tests

Time		Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Pre-test	Contrast	545.447	2	272.724	2.394	.095	.032
	Error	16748.713	147	113.937			
Post-test	Contrast	1850.347	2	925.173	11.816	.000	.138
	Error	11509.626	147	78.297			



Post Hoc Tests - Multiple Comparisons

Tukey HSD

(I) Lecturers	(J) Lecturers	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
NDG	AG	-5.68	3.982	.330	-15.11	3.75
	SAG	-10.17	3.929	.029	-19.47	-.86
AG	NDG	5.68	3.982	.330	-3.75	15.11
	SAG	-4.49	1.448	.007	-7.91	-1.06
SAG	NDG	10.17	3.929	.029	.86	19.47
	AG	4.49	1.448	.007	1.06	7.91

4.6.3 Program Output – Study Notes

In this study, the Study Notes were found to have a significant interaction effect, $F(2, 147) = 3.53$, $p = .032$. The results of simple effects analysis were shown in Table 4.6d. No significant differences were found between groups before the program, $F(2, 147) = 2.45$, $p = .090$, but significant differences emerged after the program, $F(2, 147) = 11.83$, $p < .001$. The financial literacy scores of the SAG group ($M = 88.16$, $SD = 13.383$) were significantly higher than those in the AG ($M = 83.96$, $SD = 13.542$) and the NDG ($M = 80.95$, $SD = 11.013$) groups. The AG group also demonstrated a significant improvement compared to the NDG group. The interaction effect was illustrated in the line chart shown in Table 4.6d. The chart indicated greater improvements in financial literacy scores for the SAG and AG groups, compared to the NDG group from pre-test to post-test. The enhanced effectiveness of Study Notes after the second lecture implied the importance of “teachable moments”, customisation, and integration of program materials within the curriculum design framework. Similarly, Lerman (2006) also called for a more rigorous evaluation of the program effects and suggested a combination of broad financial curricula and focused “teachable moments”.

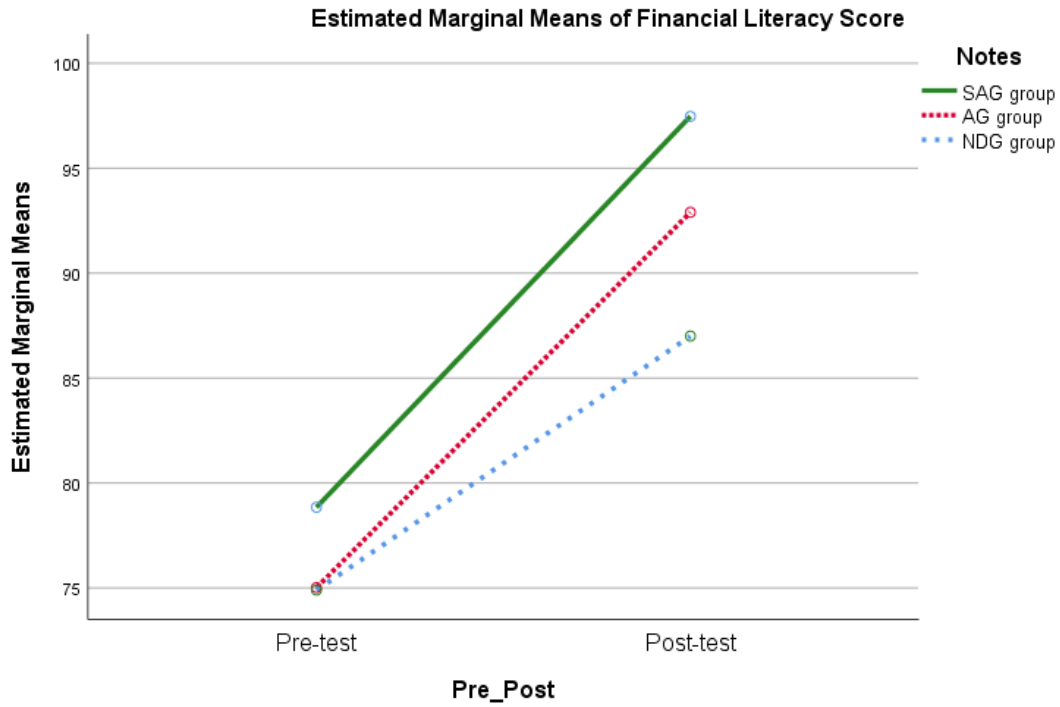
As the main effects of Study Notes were also significant, Post hoc tests using the Tukey test were used to study the differences between groups at the post-test. It further confirmed that the SAG group ($M = 89.01$, $SD = 13.143$) was significantly different from both the AG group ($M = 84.20$, $SD = 13.475$) and the NDG group ($M = 78.60$, $SD = 11.297$). However, unlike the results from the post-test contrasts, the AG group did not significantly differ from the NDG group. The simple effects analysis indicated that 'Study Notes' were a significant factor in enhancing financial literacy,

particularly after two lectures. The findings offered insights for developing the financial literacy curriculum and identifying "teachable moments".

The Study Notes were developed on the outcome-based framework of Yu and Law's (2015) HKFCF. Cohen (2018) suggested that the outcome-based curriculum was beneficial for tertiary students in higher education, enabling them to develop financial literacy and tackle various financial challenges. Furthermore, the highest impact was observed in the student group with a strong agreement level, which corresponded with a study by Zhang and Zhang (2023). Their survey showed that the curriculum, professional knowledge and educational concepts had a significant impact on students' satisfaction and practical abilities in accounting courses. Varcoe et al. (2013) supported the idea that implementing a well-designed curriculum could enhance the financial literacy of secondary school students.

Table 4.6d Program Output - Study Notes
Simple effects - Univariate Tests

Time		Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Pre-test	Contrast	558.068	2	279.034	2.451	.090	.032
	Error	16736.092	147	113.851			
Post-test	Contrast	1852.639	2	926.320	11.833	.000	.139
	Error	11507.334	147	78.281			



Post Hoc Tests – Multiple Comparisons

Tukey HSD

(I) Study Notes	(J) Study Notes	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
NDG	AG	-3.01	2.253	.378	-8.35	2.32
	SAG	-7.21*	2.203	.004	-12.43	-2.00
AG	NDG	3.01	2.253	.378	-2.32	8.35
	SAG	-4.20*	1.500	.016	-7.75	-.65
SAG	NDG	7.21*	2.203	.004	2.00	12.43
	AG	4.20*	1.500	.016	.65	7.75

Based on observed means.

The error term is Mean Square (Error) = 72.973.

*. The mean difference is significant at the .05 level.

4.6.4 Program Output – Case Study Videos

Head (2014) found that the utilisation of case studies was beneficial for students to put their skills into practice. It was also suggested that case studies should integrate knowledge, beliefs, and behaviours with financial concepts. Consequently, students were able to observe the outcomes of financial decisions within these cases and gain both the information and motivation for applying these skills in future situations. Zhu (2010) discussed the distinctive features and advantages of utilising multimedia for teaching, emphasising the active adoption of this modern teaching approach by many universities. However, he suggested that more in-depth studies be done for the application of multimedia in financial education. In this study, case study videos showed a more modest partial eta squared (.068), suggesting a less pronounced but still meaningful relationship with financial literacy.

Despite the case study video having the lowest partial eta squared among the program outputs, it still represented a contribution factor in the learning process. There was a non-significant interaction effect between the case study videos and time, $F(2, 147) = .96, p = .387$. The impact of the case study videos did not differ significantly across time points. For the main effect of the case study videos, it reported a significant value, $F(2, 147) = 5.32, p = .006$. Post hoc analysis was employed with the Tukey test, which indicated that the SAG group ($M = 96.73, SD = 7.754$) was significantly higher than both the AG ($M = 92.46, SD = 10.137$) and NDG ($M = 88.00, SD = 11.818$) groups. However, the AG group did not significantly differ from the NDG group. The significant main effect of case study videos supported Hypothesis H3c.

The use of the case study videos was associated with higher financial literacy scores regardless of the time factor. This invited exploration into how the case study videos might be optimised or integrated with other program elements to maximise their educational impact. A range of studies have explored the use of multimedia in financial education, highlighting its potential benefits and providing practical insights. Zeng (2011) examined the benefits and drawbacks of using multimedia in teaching financial and economic laws and provided recommendations to enhance teaching results. Lusardi and Mitchell (2014) and Smythe (2020) further supported the idea that using visual tools, narratives, and financial education seminars could effectively enhance self-efficacy and confidence in making financial decisions. Solis (2018) provided practical examples of the development and use of interactive multimedia in economic learning activities. Suhuan (2015) underscored the positive impact of multimedia technology to enhance the teaching of finance courses. The consistent effects of case study videos across the lectures made them a flexible and useful component in the design of financial education programs. By optimising and combining case study videos with interactive case discussions and teaching methods, financial educators could maximise the impact and help students develop a deeper understanding of financial literacy.

Table 4.6e Program Output - Case Study Videos

Post Hoc Tests - Multiple Comparisons

Tukey HSD

(I) Case study videos	(J) Case study videos	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
NDG	AG	-2.94	2.656	.511	-9.23	3.35
	SAG	-6.73*	2.584	.027	-12.85	-.62
AG	NDG	2.94	2.656	.511	-3.35	9.23
	SAG	-3.79*	1.498	.033	-7.34	-.25
SAG	NDG	6.73*	2.584	.027	.62	12.85
	AG	3.79*	1.498	.033	.25	7.34

Based on observed means.

The error term is Mean Square (Error) = 74.656.

*. The mean difference is significant at the .05 level.

4.6.5 Program Output – Mobile App

Atkinson et al. (2006) discovered that in the United Kingdom, 40% of survey participants obtained financial information from those traditional media channels, including television, newspapers, and radio. In contrast, their survey found that there were differences in the sources of financial information between the young people and the elderly. The youth usually used mobile phones, the internet, and social media to access financial information. In the program, the participants were taught to use the mobile app for recording their expenses and making budgets. The time x mobile app interaction effect was not significant, $F(2, 147) = .42, p = .657$. However, the main effect of the mobile app reported a significant value, $F(2, 147) = 8.44, p < .001$. This suggested significant differences among the three mobile app groups.

To make multiple comparisons for these three groups, the Tukey post hoc tests were used to identify which groups differed significantly to prove they were significantly different. The SAG group's post-financial literacy mean score ($M = 97.98$, $SD = 6.90$) was significantly greater than those of the AG ($M = 93.74$, $SD = 9.74$) and NDG ($M = 90.53$, $SD = 10.40$) groups. However, the AG and NDG groups had no significant difference. The mobile app showed a moderate partial eta squared (.103), and the significant main effect of mobile app supported Hypothesis H3d. The mobile app was found to be effective at enhancing financial literacy regardless of the time factor. The results demonstrated consistency with the study by Mueangpud et al. (2019), which found that using mobile learning applications helped in promoting youth financial knowledge. French et al. (2019) further conducted research on a suite of four mobile phone applications using the United Kingdom Financial Capability Outcome Framework. Their findings indicated that these apps had a notable positive impact on financial capability, as users had a higher likelihood of recording their daily expenses and income. These behavioural changes were also observed among the students in this study. Zeng (2011) suggested the wide application of multimedia in the financial and economic courseware. Educators and policymakers might use mobile phone applications as one of the engagement strategies and supplemental resources in financial education programs.

**Table 4.6f Program Output - Mobile app
Post Hoc Tests - Multiple Comparisons**

Tukey HSD

(I) Mobile app	(J) Mobile app	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
NDG	AG	-2.28	1.739	.391	-6.40	1.84
	SAG	-6.87*	1.732	.000	-10.97	-2.77
AG	NDG	2.28	1.739	.391	-1.84	6.40
	SAG	-4.59*	1.639	.016	-8.47	-.71
SAG	NDG	6.87*	1.732	.000	2.77	10.97
	AG	4.59*	1.639	.016	.71	8.47

Based on observed means.

The error term is Mean Square (Error) = 71.818.

*. The mean difference is significant at the .05 level.

4.6.6 Program Output – Exercise

National Council of Teachers of Mathematics (2011) advocated for the integration of practical financial exercises in the curriculum and acknowledged the relationship between financial literacy and numerical skills. Real-life budgeting and expense tracking exercises were designed for students in the program. The factor of exercise was examined with the time factor, but their interaction effect was not significant, $F(2, 147) = .098, p = .907$. The main effect of exercise yielded a significant F ratio of $F(2, 147) = 6.92, p = .001$, with a moderate partial eta squared of .086, indicating significant differences in financial literacy scores among the exercise groups. Post hoc comparisons using the Tukey test reported that the post-financial literacy mean score for the SAG group ($M = 97.48, SD = 7.87$) was significantly higher than the NDG group ($M = 89.92, SD = 11.18$). There was a significant difference between the SAG and AG groups ($M = 93.68, SD = 9.22$). There was no significant difference between the AG and NDG groups.

The evidence supported Hypothesis H3e in terms of the main effect of exercise, as the SAG group showed higher financial literacy scores. Simulated exercises are usually used in financial education programs to provide real-life experience for participants, such as the JA Finance Park. Carlin and Robinson (2010) studied data from the JA Finance Park and found that students who participated in the exercises showed good improvement in financial decision-making. However, Yuan (2015) argued that budgeting exercises did not influence students' budgeting behaviours, with the length of awareness of spending habits being identified as a more influential factor. The results demonstrated that exercises contributed positively to financial literacy, particularly within the high-agreement-level group. The forthcoming qualitative analysis would provide deeper insights into the mechanisms behind it, potentially offering guidance on optimising financial education programs to address behavioural outcomes.

Table 4.6g Program Output – Exercise Post Hoc Tests - Multiple Comparisons

Tukey HSD

(I) Exercise	(J) Exercise	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
NDG	AG	-3.27	1.957	.220	-7.91	1.36
	SAG	-7.28*	2.055	.002	-12.14	-2.41
AG	NDG	3.27	1.957	.220	-1.36	7.91
	SAG	-4.01*	1.557	.030	-7.69	-.32
SAG	NDG	7.28*	2.055	.002	2.41	12.14
	AG	4.01*	1.557	.030	.32	7.69

Based on observed means.

The error term is Mean Square (Error) = 73.178.

*. The mean difference is significant at the .05 level.

4.6.7 Program Output – Webpages

The OECD (2015) advocated for utilising various media to convey financial education content, so as to make the coverage more comprehensive and raise the exposure to the audience. Program webpages were designed to include all learning materials and online financial toolkits for students. The interaction effect between the webpages and time was not significant, $F(2, 147) = .08, p = .927$. The main effect of the webpages was significant with a moderate partial eta squared, $F(2, 147) = 8.76, p < .001, \eta^2_p = .106$. Post hoc tests using the Tukey test indicated that the post-financial literacy mean score of the SAG group ($M = 97.28, SD = 7.438$) was not significantly different from that of the AG group ($M = 94.54, SD = 9.270$) but showed a significant difference with the NDG group ($M = 89.41, SD = 10.827$). The AG group also had a significant difference in the post-financial literacy mean score compared to the NDG group.

The findings substantiated Hypothesis H3f that the use of webpages could significantly impact students' financial literacy, and the effect was consistent over time. This consistency further supported the effectiveness of the webpages as a reliable tool for financial education, regardless of when they were accessed during the program. Taylor et al. (2011) observed that financial education programs were diversely offered through both government and non-government websites. The OECD (2015) also suggested that financial education websites should be interactive with advice and information. However, Gartner and Todd (2005) found no definitive evidence supporting the effectiveness of online financial education. Despite this, they noted that college students who received online financial education demonstrated significantly more responsible

credit card behaviours. This study provided additional evidence to further inform research in financial education.

**Table 4.6h Program Output - Webpages
Post Hoc Tests - Multiple Comparisons**

Tukey HSD

(I) Webpages	(J) Webpages	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
NDG	AG	-5.34*	1.800	.010	-9.60	-1.08
	SAG	-7.73*	1.858	.000	-12.13	-3.33
AG	NDG	5.34*	1.800	.010	1.08	9.60
	SAG	-2.39	1.577	.287	-6.12	1.34
SAG	NDG	7.73*	1.858	.000	3.33	12.13
	AG	2.39	1.577	.287	-1.34	6.12

Based on observed means.

The error term is Mean Square (Error) = 71.541.

*. The mean difference is significant at the .05 level.

4.6.8 Program Output - Overall Program

“Overall program” was evaluated as the final program output in the Mixed Model ANOVA because it allowed the researcher to assess the collective impact of the program, with all the components together, on the financial literacy of participants. The time x overall program interaction effect was significant, $F(2, 147) = 3.97, p = .021$, with a small partial eta squared value of .051. As there was a significant interaction effect, the effect of the overall program varied depending on the time of intervention. Simple effects analysis was conducted to evaluate the interaction effect. The results suggested that in the pre-test, the financial literacy scores achieved in the SAG group ($M = 80.03, SD = 10.927$) were significantly higher than those in the AG group ($M = 74.96, SD = 10.482$) and NDG group ($M = 73.13, SD = 8.535$), but there was no significant

difference between the AG and NDG groups. In the post-test, the financial literacy scores achieved in the SAG group ($M = 97.98$, $SD = 7.159$) were significantly higher than the AG group ($M = 93.43$, $SD = 9.101$) and NDG group ($M = 84.07$, $SD = 11.291$). The AG group also scored significantly higher than the NDG group. The interaction between the two factors was reflected in the line chart of Table 4.6i. Both the SAG and AG groups achieved higher financial literacy scores following the financial education program, but the NDG group had weaker growth in the financial literacy scores from the pre-test to the post-test when compared to the SAG and AG groups.

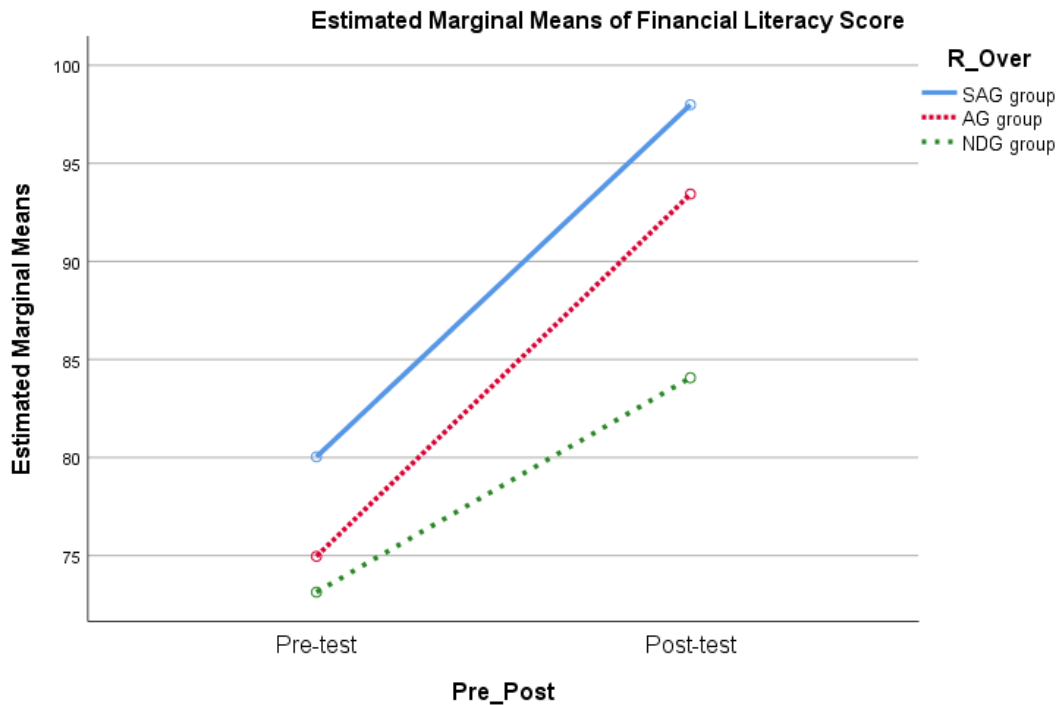
The main effect of the overall program on the financial literacy scores was significant, $F(2, 147) = 11.48$, $p < .001$. There were significant differences in the financial literacy scores among the three agreement-level groups. It showed the highest partial eta squared (.135) among all program outputs, supporting a strong relationship between the overall program and post-financial literacy scores. Post hoc tests using the Tukey test were further conducted. It was found that the SAG group ($M = 89.01$, $SD = 13.143$) had significantly higher financial literacy scores compared to both the AG group ($M = 84.20$, $SD = 13.475$) and NDG group ($M = 78.60$, $SD = 11.297$). The AG group also significantly differed from the NDG group. By testing the overall program, the evidence validated that the whole program produced the intended outcome of improving financial literacy. Hypothesis H3g was supported by the overall program's main effect and its interaction effect with the time factor.

These results highlighted the students' perceptions and engagement in the financial education program. Students who perceived and engaged with the overall program positively tended to be more effective in improving their financial literacy. The program's impact on financial literacy

might build up gradually. Financial education programs have shown varying efficacy over time, with some studies reporting immediate and long-lasting impacts (Frisancho, 2022), while others suggested that one-time programs produced short-term effects (Lusardi & Mitchell, 2014). Mundy (2008) opined that if financial education was not compulsory, there should be some incentives for students to pursue financial education, such as awards for successful financial education programs. Program designers should consider incorporating elements that were likely to be viewed positively by participants into the overall program. Moreover, strategies to boost engagement and positive perception among participants should be a priority from end to end. Given that the improvement effect changed over time, a longitudinal tracking of participants' progress was suggested to provide deeper insights for overall program improvement. The significant interaction effect observed for the Overall Program further emphasised that the program's effectiveness was subject to temporal influences, suggesting that the sequential and cumulative experiences within the program could affect learning outcomes. This could imply that the program's various components interacted synergistically over time, and the full benefit of the program might manifest in a complex manner as participants progressed through the program outputs.

**Table 4.6i Program Output - Overall Program
Simple effects - Univariate Tests**

Time		Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Pre-test	Contrast	1089.614	2	544.807	4.942	.008	.063
	Error	16204.546	147	110.235			
Post-test	Contrast	2453.894	2	1226.947	16.538	.000	.184
	Error	10906.079	147	74.191			



Post Hoc Tests - Multiple Comparisons

Tukey HSD

(I) Overall program	(J) Overall program	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
NDG	AG	-5.60*	2.356	.049	-11.18	-.02
	SAG	-10.41*	2.398	.000	-16.09	-4.73
AG	NDG	5.60*	2.356	.049	.02	11.18
	SAG	-4.81*	1.439	.003	-8.22	-1.40
SAG	NDG	10.41*	2.398	.000	4.73	16.09
	AG	4.81*	1.439	.003	1.40	8.22

Based on observed means.

The error term is Mean Square (Error) = 69.250.

*. The mean difference is significant at the .05 level.

Research question 4: How did tertiary students perceive the financial education program and its impact on financial literacy?

4.7 Qualitative Findings

As previously discussed in Chapter Three, this study utilised a convergent parallel mixed methods approach. In this part, the qualitative data collection and analysis were done to address the research question 4. The findings of qualitative data also helped explain the results of quantitative analysis. The qualitative data collection consisted of semi-structured, in-depth interviews. These interviews were conducted with 12 participants. The participants were tertiary students who completed the financial education program. The selection of this sample size was sufficient because Crouch and McKenzie (2006) suggested that a group of smaller samples (under 20 samples) could facilitate closer researcher-participant relationships in qualitative studies, resulting in improved open and frank exchange of information. In addition to the quantitative pre- and post-surveys, they were selected to provide qualitative open-ended responses regarding their experience. The samples consisted of 5 males and 7 females from 6 tertiary institutions. Semi-structured interviews with these students were conducted. The researcher used the interview guide and encouraged participants to engage in the dialogue. The characteristics of the participants were reported in Table 4.7.

Table 4.7 The characteristics of the participants

Participant Abbreviation	Gender	Age	Tertiary institution	Education level	Major
Student-1	Female	20	Education University of Hong Kong	Bachelor's degree year 3	Music
Student-2	Female	19	Education University of Hong Kong	Bachelor's degree year 2	Special education
Student-3	Male	19	Hong Kong Institute of Vocational Education	Higher diploma year 2	Social work
Student-4	Female	20	Hong Kong Baptist University	Bachelor's degree year 3	Chinese medicine
Student-5	Female	20	Hong Kong Baptist University	Bachelor's degree year 3	Chinese medicine
Student-6	Male	21	The School of Professional Education and Executive Development	Top-up degree year 1	Accounting
Student-7	Male	21	The School of Professional Education and Executive Development	Top-up degree year 1	Accounting
Student-8	Female	19	Hong Kong Institute of Vocational Education	Higher diploma year 2	Early childhood education
Student-9	Male	19	Hong Kong Community College	Associate degree year 2	Business administration
Student-10	Female	18	Hong Kong Community College	Associate degree year 2	Business administration
Student-11	Male	21	University of Hong Kong	Bachelor's degree year 4	Medicine
Student-12	Female	22	University of Hong Kong	Bachelor's degree year 4	Politics and translation

For the interview excerpts taken from the participants, every student was given a numerical code, and they were identified by the abbreviations, such as Student-1, Student-3 and Student-10. The researcher used thematic analysis for these qualitative responses to identify themes. The thematic analysis involved coding the data, identifying patterns, and categorising these patterns into themes. Key themes were identified with the support of quotes from the participants. An analysis of the interview and a review of the different themes were used to reach the findings. It showed that the participants had key themes in common. Four key themes emerged from the data as follows:

Theme 1: Importance of financial literacy;

Theme 2: Ways and barriers to accessing financial education;

Theme 3: Learning through the financial education program;

Theme 4: Perceptions of the program's impact on their financial literacy.

These themes reflected tertiary students' perceptions of the financial education program and its impacts on their financial literacy in a structured and comprehensive way. These four themes were explained with excerpts from the interviews.

4.7.1 Theme 1: Importance of Financial Literacy

The interview questions started with their general background. Questions such as "Tell me about yourself and your study so far?" and "Why did you decide to take this financial education program?" aimed to gather contextual background information, which was essential for understanding their baseline financial literacy and needs for financial education. The researcher also probed for more details and examples to elicit their perceptions and experiences on managing personal finances. 11 out of 12 students recognised the importance of financial literacy and expressed a need for financial education to keep up with evolving financial trends and challenges. Student-2 said, "I think financial literacy is really required because I value money a lot. I always pay attention to news and tips about managing personal wealth and am willing to learn more about it.". The conversations showed that the majority of students considered financial literacy a necessary skill for prudent financial management. Student-5 agreed, "Yes, financial literacy is an essential life skill for university students. If we don't know how to manage our money, we might run into financial problems. Without savings, we hardly handle those emergency events". Their statements collectively suggested that prior experience played a role in determining financial literacy. Frijns et al. (2013) noted that prior experience significantly influenced the importance of financial literacy, as it had been found to have a positive and causal effect on financial literacy.

Despite the fact that the students were from different academic majors in universities, some students had prior exposure to studying finance and economics in their secondary education. They recognised financial literacy and felt interested to learn more about it. Student-1 claimed, "I've got a fair bit of interest in finance and economics. At secondary school, I took subjects in business,

accounting and financial studies. So, I've got a decent understanding of these areas. Even though I'm now majoring in music, I'm still keen on finance and investment-related fields because I believe financial literacy is helpful". This showed that even those studying non-finance fields could appreciate the value of financial literacy if they had some foundational exposure to the concepts earlier in their education. Student-11 echoed, "The main reason I chose to take this financial education program was because I'm interested in personal finance. Although I am a medical student, I studied accounting and financial studies during secondary school". On the other hand, one student majoring in business pointed out that despite her academic program, including finance-related modules, she would like to enhance her financial literacy further. Student-10 expressed, "I'm currently enrolled in an investment module. I am participating in this program because I want to strengthen the financial concepts I've learned from the module. This program further reinforces my prior learning". Her statement aligned with earlier findings from Hypothesis H2f, where business students significantly outperformed engineering students in financial literacy scores. This evidence supported the finding that business students with a stronger foundation in finance performed better in their financial literacy scores after the program. Business majors usually have core finance courses that give business students a general understanding of financial concepts. Kozina and Ponikvar (2015) also highlighted the role of education that students in business programs with finance and economics courses demonstrated better financial literacy. Prior learning further enhanced business students' performance in the financial literacy scores.

Eight students discussed how financial literacy helped them to reach their financial goals. Student-6 remarked, "I believe financial literacy is crucial in personal life planning. I have a savings goal at present, yet I do not have a financial plan to grow those savings in a more effective way." Some

students acknowledged that financial literacy was beyond academic theory, recognising it as a fundamental life skill. Student-8 commented, "Financial knowledge and skills are vital in our daily lives. They should be practical rather than academic. There are many life events that involve money transactions, such as shopping, dining, and entertainment. Sometimes we may encounter different life events and accidents, and we need financial skills to deal with them". Several students noted that financial literacy was not merely an extracurricular knowledge but a lifelong skill. Student-10 explained, "Our lecturers introduced us to this extracurricular program. Compared to the financial concepts taught in academic courses, financial literacy is more relevant and practical to daily life. Like this money management app, I use it daily to track my expenses". They thought the program emphasised the role of financial literacy in personal development and future planning.

Overall, most students expressed the practical importance of financial literacy in everyday life and future planning. Their opinions highlighted the perceived significance of being financially literate in a complex economic environment. As Mandell (2006) pointed out, the growing complexity of financial products and the reduction of economic safety nets had led to an increased recognition of the significance of financial literacy in society. Moreover, the students thought financial literacy was integral to personal growth and necessary for achieving financial independence. The findings supported the first theme that emerged from the interviews.

4.7.2 Theme 2: Ways and Barriers to Accessing Financial Education

The interview responses reflected an important theme of how tertiary students access financial education in various ways and the barriers they faced before the program. Eleven out of twelve students shared their previous exposure to financial education and the diverse sources from which they learnt financial literacy. Only one student expressed unfamiliarity with this topic. Student-3 shared, "Television financial news programs have given me a basic understanding of investment and personal finance. When watching the financial news, financial market information is covered, and different financial experts discuss their views and analysis. Although I don't fully grasp all the details, these are the financial insights I've come across". Student-7 elaborated on his online experience, stating, "I have personally found online forums and YouTube channels to be incredibly useful in learning about personal finance. Those netizens and YouTubers have shared credit card promotions and cashback tips; I can spend my money wisely and make informed financial decisions". These different sources demonstrated the variety of ways tertiary students access financial messages.

Family education also played an influential role, as many students mentioned being taught about money management by their parents. Student-12 said, "My financial knowledge didn't come from school. My mum taught me how to save money and manage money matters. I still remember my parents opening a kid savings account for me, and the bank staff offered a kid money guide to me. That's how I learned the benefits of saving". Shim et al. (2010) pointed out that school education,

working places and parents played a role in developing college students' financial knowledge, attitudes, and behaviour. However, despite the various ways in which students accessed financial information, Zhu and Chou (2018) found that the students from Hong Kong lacked sufficient financial understanding and resources, and their main sources of financial information were media and friends, rather than acquiring it through formal education. While formal financial literacy education was not embedded in the official curriculum in Hong Kong secondary schools, students might seek financial information through various sources such as personal experiences, family discussions, media, and online resources. Student-4 commented that she had not learned about financial literacy before because her secondary school did not teach it. She was not aware of any financial education activities in her secondary school. Student-6 expressed a similar sentiment, "Before I study accounting in this college, I had very little knowledge about stock investment from my high school. However, my parents taught me how to invest in stocks, and I ended up with a significant return on investment. I also followed my parents' advice to use my investment fund to buy an apartment". With the financial support from his parents, Student-6 realised that he had a deeper understanding of investment and financial skills than his peers. He stated, "I am very familiar with the investment content covered in this program, but I think other classmates may be eager to learn". His family background provided insights into research question two. Student-6's experience highlighted the impact of parental guidance and personal experiences in shaping one's financial literacy. Putri et al. (2020) and Novitasari et al. (2021) both suggested the positive impact of parental financial socialisation, with factors such as role modelling, financial communication, and money allowance. Sabri et al. (2010) and Tang et al. (2015) further emphasised the importance of discussing family finances and parents' financial experience in enhancing financial literacy.

Eight out of twelve students had expressed interest in accessing financial education opportunities to stay updated on the latest trends in financial products, including mobile payments, e-wallets, and cryptocurrencies. They suggested diverse ways, such as financial guest talks, consultations with financial planners, student programs held by non-governmental organisations and banks, workshops organised by the student affairs office, online resources, and more. However, the interviews also uncovered significant barriers that prevented or limited tertiary students from accessing financial literacy. About half of the students discussed different barriers that could hinder their participation in the financial education program. The most prevalent barrier was students' busy schedules and competing priorities, such as coursework, which reduced their ability to participate in financial literacy initiatives. Student-5 mentioned, "What would hinder me in the financial literacy learning? It's probably dealing with schoolwork and projects. I'm already overwhelmed with it, and I find it hard to make time for anything else". This view was echoed by several other students, highlighting the challenge that busy academic schedules pose in accessing financial education. Student-1 added, "Not every student will participate in extracurricular programs, especially after class when everyone is busy with their things. Hong Kong students usually place a high value on GPA, and there are abundant tests and exams. Like this two-lecture program, it can be challenging for college students to find extra time for it unless they have a particular interest in financial literacy". Two more students also explained that having part-time jobs could make it challenging for them to prioritise financial education. Student-9 said, "I'm quite interested in wealth management because I have part-time jobs and earn money myself. However, I don't have much time to take a credit-bearing financial literacy module, so I prefer a bite-size program". Student-3 added, "I have to deal with the social work fieldwork placement outside. If my friend had not informed this program, I may not have known the college offers financial

education resources". Their viewpoints could help address the outcome of Hypothesis H2c. Although job status had no significant effect on the improvement of financial literacy following the program, both working and non-working students expressed their learning difficulties due to their limited schedules and competing priorities. They also lacked awareness of financial education resources. Research showed that job status could be a barrier to financial education, particularly for low-income individuals (Edmiston & Fisher, 2006; Kaur et al., 2013; Zhan et al., 2006). However, financial education programs in the workplace had been found to be effective in improving financial knowledge and behaviour (Edmiston & Fisher, 2006; Loibl & Hira, 2005; Zhan, 2006). One method of addressing this barrier was to develop and promote targeted financial education programs for students, providing them with more flexible opportunities to learn about personal finance within the context.

In conclusion, it was evident from the interviews that tertiary students in Hong Kong relied on a variety of sources to gain financial education, including online forums, family education, and personal experiences. The lack of formal financial literacy education in secondary schools led students to seek financial information from the media, parents, and online resources. While there was a keen interest among tertiary students to access financial learning opportunities, there were significant barriers, such as busy schedules, academic workloads, and job commitment, that hindered their participation in financial education programs. The impact of parental guidance and personal experiences on shaping financial literacy before the financial education program was highlighted and discussed.

4.7.3 Theme 3: Learning Through the Financial Education

Program

Learning through the financial education program emerged as the third common theme. All 12 students shared their learning experience in the financial education program, including how and what they learned, as well as their level of engagement and evaluation of all program outputs (including the lecturers, study notes, case study videos, the mobile app, the exercise, and webpages). Most students (8 out of 12) agreed that engaging and interactive delivery methods, such as interactive videos, case discussions, and budgeting exercises enhanced interest and comprehension of financial literacy concepts. Student-9 said, "The program covers a comprehensive range of popular financial products. The lecturers provided clear explanations and discussed current hot market trends. The case videos aren't just interesting but get us chatting and bouncing thoughts off each other". Student-8 mentioned, "The program offers practical online tools and a mobile app for managing money, allowing us to track our expenses and set savings goals. I can use the mobile app to snap photos of the receipts and track what I'm spending. It's handy for use in daily life". Many students collectively emphasised the significance of interactive methods and innovative resources, which provided an engaging approach to have a lasting impact on their financial literacy. As Hypothesis H3g suggested that students who strongly agreed with the overall program would attain better financial literacy scores, student feedback provided insights into the effective use of program outputs to enhance student learning. Previous research suggested various innovative methods to enhance the involvement and interactivity of students in financial education. These included peer-to-peer events with multimedia presentations (Solis, 2018) and the use of interactive online learning objects (Biktimirov & Nilson, 2004). Case studies had

been found to be particularly effective in personal and family finance courses (Gudmunson et al., 2015), and the use of online resources had been linked to improved student performance (Kofoed, 2004).

During the interviews, all students provided valuable opinions on different program outputs, along with suggestions to enhance learning in the financial education program. Many students gave positive feedback on the performance of the lecturers, which matched the survey results. Student-8 said, "The lecturer is a real professional in the finance industry. Knows their stuff about the financial market inside out. His presentation is top-notch, using study notes and videos to discuss financial concepts with real-life examples. Overall, I'd say the lecturer's quality is good". However, student-8 recommended that it would be more beneficial if the lecturers could avoid using too much finance jargon since it posed difficulties for those without a finance background to comprehend. Regarding the interaction with the lecturers, student-11 praised the case discussion led by the lecturers, stating that it was very insightful. Student-11 said, "I believe the lecturers are quite impressive. We have numerous opportunities to engage with the lecturers during the courses. He facilitates discussions on cases, and I actively participate in them. This involvement assists us in placing greater emphasis on developing financial attitudes and behaviours". Most students acknowledged that case studies were helpful for analysing and discussing real-life financial scenarios. Student-2 remarked, "I feel that sharing real case studies would attract me more. The interactive videos, in these cases, are more inspirational than theoretical lectures. Don't just tell me how good it would be if I did this and what would happen if I didn't do that, but share real case studies to leave us with deeper impressions. I find this sharing more valuable". O'Neill and Hensley (2016) discovered that effective teaching of personal finance was contingent upon

teachers' own understanding of financial literacy and their ability to engage students. The interviews showed that the lecturers successfully guided students in translating theoretical knowledge into practical case scenarios. The lecturers used the case studies to strengthen students' problem-solving and decision-making abilities. The favourable feedback supported Hypotheses H3a and H3c: both the lecturers and the case study videos played a significant role in improving the students' financial literacy.

Tschache (2009) observed that students perceived financial education as beneficial, particularly when the financial concepts taught in the curriculum were valued. Half of the students provided favourable comments regarding the study notes and their significant impact on understanding financial literacy. Student-12 pointed out, "The study notes have provided quite comprehensive financial topics, it also contains graphs, figures, and relevant market data. It helps me learning those complex financial concepts. I can find several online financial calculators in the webpages. These online calculators are useful and help me to connect the concepts with practical, real-world applications." Five students agreed that the program webpages were well-developed and that all learning materials were easy to access. Student-6 felt the webpages could cover more in-depth content on cryptocurrencies. Student-6 suggested, "Cryptocurrencies are quickly becoming a vital part of the investment market. It would be great if the program could extend the coverage on this topic. You know that in the reality, people making investment decisions usually lack of detailed information on the products they're considering. While I acknowledge that's the program constraints and it's hardly cover every investment product within a program, I believe that the content coverage should have more hot topics to enhance our understanding on those virtual assets". Achieving a balance between breadth and depth was an ongoing challenge, especially in a fast-

changing finance industry. The content improvement request provided insights into the interaction effect outlined in Hypothesis H3b. After the completion of the program, certain students felt that the content did not fully meet their needs or help them improve as much as other students did, following the program. It became apparent that expanding the coverage of current and emerging financial topics was necessary to keep pace with the changing financial market. Student opinions on the webpages aligned with the positive outcomes shown in Hypothesis H3f results. The result was also consistent with the findings of Wolla (2017) that online learning strategies could enhance students' financial literacy.

Yin et al. (2022) found that integrating financial literacy into the course through digital tools significantly improved savings intentions, practices, decision-making, and accountability. Student responses echoed their findings and also aligned with the positive effects reported in Hypotheses H3d and H3e results. The program encouraged students to use the online tools and mobile applications for the budgeting exercise. During the interviews, four students praised the digital learning approach, particularly its usefulness in monitoring spending patterns and creating a budget. Student-4 commented, "The program taught this mobile app for managing personal finance, and the lecturers illustrated how to use it in the first lesson. So, I tried it out, and this mobile app is easy to use. It shows me exactly where all my money goes every day. It's really helping me keep track of my expenses and create a budget". The program includes an exercise after the 1st class, where students must use the mobile app to create a budget and set a savings goal. Several students found that this exercise helped them learn financial literacy by providing practical experience in managing their finances. Students considered the budgeting activity as an engaging way to put financial literacy principles into practice. Student-7 remarked, "Going through the budgeting

exercise opened my eyes to how much thought needs to go into money management. It made me realise that I need to plan my spending and savings more carefully. Managing finances is definitely a life skill that requires careful consideration and planning. Taking control of your spending habits is essential for good financial literacy". The responses of students showed that the mobile app and budgeting exercise improved their application of financial literacy and helped them develop positive financial habits.

In sum, the third theme that emerged from the interviews was learning through the financial education program. Most students emphasised the importance of engaging and interactive delivery methods for facilitating learning in financial literacy within the financial education program. The findings supported the positive effects of Hypotheses H3a to H3g, demonstrating that all program outputs from the engaging lecturer delivery, comprehensive study notes, insightful case study videos, informative webpages, easy-to-use mobile app to practical budgeting exercises, had a significant improvement effect on tertiary students' financial literacy after the financial education program. This was consistent with the findings of Wolla (2017) that effective financial education seminars could increase students' financial knowledge and confidence. Many students commented that the study notes and webpages were particularly helpful in providing clear and comprehensive financial knowledge with real-life examples. The student feedback offered insights into the interaction effect described in Hypothesis H3b. It prompted the suggestion that future content should be tailored to the evolving priorities of students, incorporating emerging financial topics and updated information. The majority of the students concurred that the lecturers were finance experts who taught the courses impartially and guided them through productive case study discussions. Pang (2010) found that students taught by teachers with better financial literacy

outperformed their peers. Mueangpud et al. (2019) also highlighted the potential of mobile learning applications to promote financial management competency and household savings. Several students shared a similar viewpoint as they thought the mobile app and budgeting exercise were effective in promoting regular financial behaviours, such as managing expenses and setting saving goals. Angel (2018) explained that the budgeting smartphone app increased students' awareness of their current account balance. Carlin and Robinson (2010) also found that financial literacy education, such as budgeting exercises, positively impacted financial behaviour.

4.7.4 Theme 4: Perceptions of the Program's Impact on their Financial Literacy

The last theme that emerged from the student interviews was their perceptions of the financial education program's impact on their financial literacy. Most of the students explored the impacts on financial literacy across different dimensions: financial knowledge, attitudes, and behaviours. Ten out of twelve students reported that they perceived positive impacts from the program. They identified these effects after the first or second class. These effects enhanced their financial literacy, confidence, and capabilities to manage their personal finances. Student-2 stated, "I've definitely seen a change in how I manage my credit cards after the first class. Because the lecturers taught a lot about credit card usage and debt management. I feel much more confident making decisions before using my credit cards. Just last week, instead of using my credit card for online shopping, I took some time to review my credit card statements first and verify the charges to prevent any additional fees from the online stores.". This impact on personal finance was echoed by Student-1. She felt more knowledgeable about her personal finances and became confident in how to make

a clearer financial plan towards her life goal. Student-1 said, "I've noticed a shift in my perspective on my spending habits. I become more careful about checking the details of discount codes and benefits offered by the e-wallets and credit cards. This program reminds me to be a smart consumer. We should compare the products and make wiser choices in that regard". They described that these impacts were likely attributed to improved knowledge, shifted attitudes, and greater intention to change their behaviours. Student-4 shared, "Indeed, the program may not take effect immediately. I will put it this way... the experience feels like learning by doing. At first, my approach to managing finances was not organised. However, in the first class, I learned the advantages of long-term investment and compounding interest. I begin to think of my cash flows and pay closer attention to the returns of investment products in the market. As I become more involved, it is prompting me to oversee my daily finances with a plan to achieve my investment target". Student-4 was prompted to explain the dynamics behind the changes, she further reflected that the program impact could be attributed to several factors, "First comes the knowledge. A deeper understanding of financial concepts has changed my perspective on investment management. Shifting my mindset also plays a role, I would consider investment as a great opportunity to grow wealth rather than a risky thing. Lastly, doing what I've learned. I start to put a portion of money into the investment fund and make the investment". Their reflections highlighted the program's impact on their enriched knowledge, shifted attitudes and behavioural changes. The observations aligned with the positive outcome of Hypothesis H1d, which demonstrated a significant increase in financial literacy level after their engagement with the program. The observations were also consistent with a prior study that targeted financial education initiatives could improve financial literacy and behaviours (Joo & Grable, 2004). Borden et al. (2008) and Smythe (2020) both agreed that

financial education increased financial knowledge, responsible attitudes towards credit, and intentions to engage in effective financial behaviours.

The student perceptions of the program's impact on their financial literacy also complemented the findings from Hypothesis H1a, which showed that financial knowledge was significantly improved through the program. The statistical results of financial knowledge questions also indicated significant p-values, except for Question 2 (The provident fund). Several students expressed mixed views on the part of the provident fund in the program. Student-12 said, "I haven't paid attention to the retirement benefits of my provident fund. Although I have a provident fund account, I seldom review it. Perhaps retirement seems distant to me. However, after the program, I will reconsider. It's because the program included a few slides on financial planning for various life stages. It also offers steps and tips on managing different provident fund accounts. Once I understand how the provident fund can support my retirement, I start to check my account and make the provident fund re-allocation". Student-12 agreed that he learned more about the provident fund. However, two students argued that the content of the provident fund was inadequate. Student-7 pointed out, "I think the program could talk more about the provident fund. This topic is very meaningful to working students. My provident fund has incurred investment loss; the market fluctuations are unavoidable. Nevertheless, the program did not provide any guidance on selecting good provident funds". The students' responses regarding the provident fund were mixed. These offered insights into the lack of significant changes in retirement planning knowledge after the program. Further research and tailored interventions in financial education programs should be warranted, so as to secure comprehensive coverage of retirement planning. Early study of Bernheim et al. (2001) supported that financial education affected long-term savings and retirement funds positively. Van

Rooij et al. (2011) further pointed out the significant relationship between financial literacy and effective retirement planning. Despite the mixed views on the provident fund topic, the students generally acknowledged that participation in the financial education program showed a favourable effect on enhancing their understanding of financial concepts.

For the program's impact on financial attitudes, six students expressed that they became more prudent and rational in financial matters after the program. Student-9 stated, " Through the discussion on the life insurance policy, I learned more real-life cases where insurance has made the difference between financial stability and hardship. My attitude towards risk has changed, and I am now more open to consider insurance products for protection. Life is full of unexpected events and accidents. They can occur at any time. So, I will think ahead and take proactive steps to manage future risks". In the statistical test of financial attitude questions, student attitudes towards insurance were the weakest but demonstrated the greatest improvement. The students' feedback found that the discussion on life insurance had an effect on their attitudes towards risk, financial stability, and insurance protection. The findings were in line with the study of Wells et al. (2015) that insurance classes could change student attitudes towards insurance. Other students also discussed positive changes in their attitudes towards financial planning and investment. They were encouraged to adopt a mindset focused on long-term financial planning and rational investment, especially avoiding risky investments. The student responses complemented the statistical results and supported Hypothesis H1b. Brugiavini et al. (2015) stated that a small-scale training intervention had an effect on both financial knowledge and investment attitudes, however certain previous research yielded mixed results on the impact of financial education on financial attitudes

(Amagir et al., 2018). Nevertheless, the findings in this study contributed additional insights to the literature.

When students discussed the impact of the program on financial behaviours, they frequently mentioned key action words, such as budgeting, saving, and tracking expenses. These were the practical skills that students highlighted as part of their financial routine done after the first class. Through the budgeting exercise, many students agreed that they were able to apply these skills in their daily lives. Student-11 shared, "I tried the mobile app that the lecturers introduced to the class. I believe it offers a platform for practising money management skills by recording daily spending, inputting income, and setting up a saving plan. Afterwards, I explored more money apps with similar functions. One suggestion I have is for the app to include a reminder function to notify users when milestones are approaching. Some money management apps even allow you to set budgets with pre-set categories for expenses and income, such as transportation and shopping." Students not only applied what they had learnt but also seek out additional resources to help improve their behaviours. They also provided recommendations to enhance the mobile app functions. In the statistical tests of financial behaviour questions, the most significant improvement was "Tracking Expenses" and "Saving Money". Their feedback aligned with the findings on their changes of financial behaviours, the budgeting exercise with the mobile app was found to be effective in driving the impact, particularly in budgeting, saving, and tracking expenses. The use of digital tools, particularly technological methods, was widely used in conducting financial activities, and was associated with younger age and higher education (Sunderaraman et al., 2019). Although the statistical results of "Reviewing Investment Performance" showed improvement, less than half of the students had investment products. Therefore, some students could only express

their intention to review the investment performance in the future. The impact of the program on investment behaviours might not be immediately observable due to the limited number of students who engaged in investment activities. However, for those with investment accounts, they replied that they checked their investment statements and the position of their investment portfolios. The student feedback aligned with the statistical findings and supported Hypothesis H1c. Numerous previous studies consistently demonstrated the positive impact of financial education programs on financial behaviours (Batty et al., 2015; Kaiser & Menkhoff, 2017; Lyons et al., 2013; Wagner & Walstad, 2018). Their studies concluded that financial education programs lead to improved financial knowledge and behaviours, particularly in the long-term impact on financial literacy. However, the effectiveness of these programs might vary depending on different factors, including the timing of the intervention and the specific financial behaviours targeted.

4.8 Chapter Summary

In summary, the quantitative and qualitative results both supported that the financial education program positively influenced the financial literacy of tertiary students. Both the lecturers' quality and the overall program were key factors in this success. The student feedback suggested that future financial education should continue to use innovative and practical teaching methods. Students also expressed different concerns on the financial education program, including the barriers to student participation and the lack of emerging financial topics. The study notes and webpages should extend the coverage to more current financial trends to maintain relevance. Incorporating student feedback could ensure the programs meet their changing priorities and expectations. Students reflected that they had begun to integrate learned financial life skills into their lives. Their transition from financial knowledge to practical financial management showed a critical step towards financial literacy.

Chapter 5 - Summary

5.1 Summary of the Study

This study examined the effects of a financial education program on the financial literacy of tertiary students in Hong Kong. This study aimed to address research gaps concerning the evaluation of financial education programs for tertiary students and the measurement of financial literacy of tertiary students. A theory-driven program evaluation approach was developed for assessing the financial education program's impacts on financial literacy. This research was guided by four research questions concerning the impact of the financial education program, the role of demographic characteristics, the effects of program outputs, and students' perceptions of the program.

Chapter 3 discussed the conceptual framework that guided this study. The framework was based on Deacon and Firebaugh's (1988) Family Resource Management System Theory and the OECD's (2011a, 2011b) financial literacy measurement approach. This study's conceptual framework used the input-throughput-output model to serve as a lens to examine inputs, throughputs, and outputs related to financial literacy. Inputs included internal (e.g., demographic characteristics) and external (e.g., financial education program) resources. The OECD's (2011a, 2011b) financial literacy measurement approach complemented the conceptual framework by providing a detailed view of financial literacy. It examined financial literacy through three determinants: knowledge, attitudes, and behaviours. Previous research commonly used the OECD's (2011a, 2011b) framework for studying financial literacy (Agarwalla et al., 2013; Atkinson & Messy, 2012; Filipiak & Walle, 2015; Firli, 2017; Klapper et al., 2012; Lusardi & Mitchell, 2011; Potrich et al.,

2015; Rai et al., 2019). The study's conceptual framework adapted the Family Resource Management System Theory and the OECD's (2011a, 2011b) financial literacy measurement approach to provide a comprehensive understanding of financial literacy. This framework informed how the financial education program and individual demographic characteristics (Inputs) influenced financial knowledge, attitudes, and behaviours (Throughputs), which in turn affected financial literacy (Output). For the theory-based program evaluation, the logic model was developed and applied in the conceptual framework to evaluate the financial education program. The OECD's (2010a, 2010b, 2013) logic model was used to establish the "Financial Education Program Logic Model". The theory of change was that "tertiary students who completed the financial education program should show positive effects in their financial knowledge, financial attitudes, and financial behaviours, thereby improving their financial literacy." This integration provided a structured basis for understanding how program interventions affected different aspects of financial literacy. Through this framework, the study provided empirical insights into the theory-based evaluation model for financial education programs, thereby strengthening the program's effectiveness and enhancing the financial literacy of tertiary students.

The data collection for the study was systematically designed and carried out across six tertiary institutions in Hong Kong. All six tertiary institutions, including three universities and three colleges, had extensive experience in delivering financial education programs. They also had large student enrolment sizes, encompassing a diverse range of student types. The financial literacy program included two lectures. The outcome-based program structure and content were developed based on the Hong Kong Financial Competency Framework outlined by Yu and Law (2015), which generated the program outputs in this study, including study notes, case study videos, mobile

app, exercises, webpages, and lecturers. These lectures took place in Autumn 2018, with a one-month interval between them. This program design allowed students to spend a month using the budgeting mobile app, applying their learning to demonstrate changes in financial knowledge, attitudes, and behaviours.

To gather quantitative data, pre- and post-surveys were distributed to the students who completed the program. The survey instrument was developed using questions adapted from the OECD/INFE (2013) toolkit, reviewed by the expert panel, and validated through the pilot study. A total of 150 students completed both surveys, providing paired data for analysis. For qualitative data, a judgment sampling method was employed to select twelve students from the total participants for in-depth interviews. The quantitative data collected through surveys were analysed to test the proposed hypotheses. Statistical techniques were applied in order to determine the significance of these changes and to explore emerging patterns in the findings. This thematic analysis involved transcribing the interviews, coding the responses, and identifying recurring themes, which provided a better understanding of the participants' experiences and views regarding the financial education program. The integration of both quantitative and qualitative data allowed for a comprehensive analysis of the program's effectiveness. To ensure an in-depth exploration, the combination of pre- and post-surveys with in-depth interviews was used. In this study, the convergent parallel mixed methods design facilitated a multifaceted investigation of the financial education program's effects, leading to findings that were statistically robust and informed by the students' personal experiences.

Despite extensive efforts to mitigate study limitations, several obstacles hindered the completion of the entire process. There were several primary constraints associated with this research. Firstly, this study was conducted across six tertiary institutions, which only accounted for 13% of the tertiary institutions in Hong Kong. Many tertiary institutions had not been involved in this study, and the diversity in student and institution types presented a limitation. Replicating this research in a larger number of universities and colleges in the future will help address the limitation of focusing on only a small number of tertiary institutions. Secondly, this study had a sample size of 150 tertiary students. The findings of this study were limited to the results of samples and could not represent the entire population of tertiary students in Hong Kong. Atkinson et al. (2006) suggested that a successful survey tracking changes in the financial literacy of society needed a large enough sample size of 5,000. Future research should be performed with a larger sample population to provide additional research data.

Another limitation of this study was that the samples did not include postgraduate students. The samples of this study only covered undergraduate students in universities and sub-degree students in colleges. Postgraduate students in Hong Kong exhibited distinct demographic characteristics compared to undergraduate and sub-degree students because local students constituted less than 30% of the postgraduate student population in Hong Kong. Further studies should study the financial literacy of entire tertiary student bodies at tertiary institutions to check for any differences and similarities. In this study, the financial education program was not mandatory for students to attend. Some students were encouraged by their departments or student affairs offices to participate in the program, but participation was voluntary. The results of this research represented the individuals who were inclined towards receiving financial education. Those who chose not to

attend the program might show different outcomes. Financial education was not compulsory for all tertiary students in Hong Kong. Moreover, not every tertiary institution provided financial education to its students. Future studies should engage with tertiary institutions with compulsory financial education programs and those without any financial education programs. This would enhance the current research data and make comparisons to provide insights. Due to the study's limitations, the researcher was not able to conduct a longitudinal study on the samples. Additional longitudinal studies should be recommended to track the long-term impact of financial education programs on tertiary students. This will provide useful data to verify if the financial education programs affect the financial behaviours of participants later in life.

5.2 Summary of Findings

This study contributed to the existing literature on the impact of financial education programs on the financial literacy of tertiary students. It also added to the body of knowledge about financial education program evaluation and financial literacy of tertiary students in Hong Kong. The research objectives were achieved by addressing the four research questions and their corresponding hypotheses. The financial literacy levels of tertiary students were assessed based on their demographic characteristics, including age, gender, job status, monthly income level, education level, and study majors, following the program. Furthermore, the relationships between tertiary students' perceptions of program outputs and their financial literacy were investigated. Quantitative analysis was performed to address the research questions, involving McNemar's Test, Exact Binomial test, Paired t-test, One-way ANOVA, and Mixed Model ANOVA. The study also examined students' perceptions of the program and how it impacted their financial literacy. A

qualitative examination was carried out to analyse the findings of in-depth interviews using thematic analysis. The qualitative findings also complemented the quantitative analysis by providing a deeper understanding of student experiences and perceptions of the program.

For the first research question concerning the impact of financial education on tertiary students' financial literacy, four alternative hypotheses were posited. McNemar's test was employed to analyse paired nominal data from pre- and post-surveys. It showed significant improvements in students' financial knowledge on four out of the five assessed topics after the education program. However, the topic of provident funds (Q2) did not show significant improvement. This exception could be attributed to an already high baseline knowledge level. The students' feedback reflected a mix of comments about the teaching of provident fund content in the program. This mirrored the limited impact of the program on retirement planning knowledge. Expanding research efforts and deploying targeted interventions in the financial education program should be suggested for enhancing the area of retirement planning. In contrast, the analysis of financial knowledge through McNemar's test on questions Q1, Q3, Q4, and Q5 indicated a statistically significant improvement. These significant results confirmed that the program effectively addressed gaps in knowledge related to financial charges of credit cards, insurance intermediaries, investment diversification, and margin trading fees. The majority of students improved their answers, demonstrating the program's capacity to correct misconceptions and enhance understanding in these areas. The financial knowledge score was calculated, and a paired sample t-test was conducted to examine Hypothesis H1a. The results provided support for H1a, indicating an enhancement in the financial knowledge score following participation in the financial education program.

Before the program, students displayed the highest score for attitude towards bankruptcy (Q15) and the lowest score for attitude towards insurance (Q18). After the program, the paired samples t-test results demonstrated statistically significant mean gains for all financial attitude statements (Q13 - Q21), including credit cards, bankruptcy, risk and return, investing, financial plans, savings, and investment products. The most significant enhancement was observed in the attitude towards insurance (Q18), with the least average increase seen in attitudes towards loan (Q14). The paired samples t-test was used to examine the financial attitude scores in the pre- and post-tests. The findings provided support for Hypothesis H1b that the program had an impact on the financial attitudes of tertiary students. The qualitative responses from students also reflected a positive shift in attitudes towards risk, financial planning, and investment. This provided further insights into attitude changes in insurance (Q18), risk and return (Q16), investing (Q17), financial plans (Q19), and investment products (Q21).

McNemar's test was applied because it could compare the frequency of positive financial behaviours (Q6 - Q11) following the program. Seven financial behaviours were assessed, including tracking expenses, setting financial goals, checking statements, saving money, seeking financial advice, reviewing investment performance, and reading financial information. McNemar's test showed improvements in all financial behaviours, particularly in tracking expenses (Q6). The interview findings revealed that many students credited the budgeting exercise for driving behavioural changes. The exercise was found to be effective in budgeting, saving, and tracking expenses. Regarding the financial behaviour score, the paired sample t-test reported a significant treatment effect of the program on the financial behaviours of students. Hypothesis H1c was supported.

For Hypothesis H1d, the pre- and post-financial literacy scores were calculated by aggregating all responses. A paired sample t-test was performed to yield a p-value. The p-value was lower than the significance level of .05, and the result supported Hypothesis H1d. This comprehensive score significantly increased from the pre-test to the post-test, confirming a robust treatment effect of the financial education program.

All four confirmed hypotheses, H1a to H1d, were used to answer research question 1. The financial education program had a significant and positive impact on the financial literacy of tertiary students, particularly in enhancing financial knowledge and attitudes and promoting positive financial behaviours. However, particular areas, especially the provident fund knowledge, highlighted opportunities for further educational improvements. These results also laid the groundwork for refining financial education programs to align more closely with the interests of tertiary students.

For research question two, this study implemented the one-way ANOVA to assess the baseline financial literacy level across various demographics before the program. Levene's test was conducted to address potential variance inequality among groups. This ensured that the assumption of equal variances across the groups for each demographic variable was met. The year level variable was re-coded to address significant sample size differences. This re-coding and subsequent analysis ensured a more reliable comparison by balancing group sizes. The one-way ANOVA analysis showed that before the financial education program, there were no significant

differences in financial literacy scores when categorised by gender, age, job status, monthly income, education levels, and study majors. The results suggested a level playing field among tertiary students regarding financial literacy, regardless of their demographic background.

Then, the research took a more detailed approach by using mixed model ANOVA to investigate how demographic characteristics interacted with the effects of the financial education program over time. In the mixed model ANOVA, demographic variables were examined as between-subject effects, and time was considered the within-subject effect. By including demographics as between-subject effects, the study aimed to examine how different demographic groups responded to the program. The within-subject effect of time allowed for the evaluation of changes in financial literacy scores from pre-test to post-test within the same individuals. It indicated that financial literacy scores increased significantly after the program, regardless of demographic groups. However, there were no significant main effects or interaction effects for gender, age, job status or monthly income, and their p-values were above the .05 significance level. Hypotheses H2a, H2b, H2c and H2d were not supported. For the variable of education levels, although it reported no significant between-subjects effect, there was a significant interaction effect. The interaction effect revealed that students in the "lower years" showed greater gains in financial literacy scores compared to students in the "upper years" after the program. Hypothesis H2e was supported by the significant interaction effect with time points. Finally, the analysis of study majors showed a significant main effect ($F = 3.15, p = .003$), supporting Hypothesis H2f. After completing the program, students in different study majors displayed varying levels of financial literacy. After conducting a post hoc analysis, it was found that business students outperformed engineering

students. However, study majors showed no significant difference in the improvement of financial literacy as a result of the program.

With regard to the second research question, this study yielded evidence that although the initial level of financial literacy among college students showed no significant differences across demographic factors, the effects of the financial education program did. Specifically, study majors and education levels were significant moderators of the program's effectiveness. The study majors influenced financial literacy scores after the program, with business students outperforming engineering students. These findings contributed to the understanding of the role of demographic characteristics in shaping the outcomes of financial education programs. The results confirmed the positive impact of financial education programs on financial literacy. Also, they highlighted how certain demographic factors, such as education levels and study majors, influenced the degree of this impact. These findings were important for designing targeted financial education programs and tailoring them to effectively influence different student groups.

Research question 3 aimed to investigate the impact of various program outputs on the financial literacy of tertiary students. The program outputs examined included lecturers, study notes, case study videos, the mobile app, the exercise, webpages, and the overall program. Mixed model ANOVAs were then conducted to check the main effects of program outputs, as well as the interaction effects between time and program outputs on financial literacy scores. In the mixed model ANOVAs, "time" was a within-subjects factor, and the agreement levels with the program outputs were a between-subjects factor. The results showed that the main effect of time was

significant for all program outputs, with large partial eta squared values (η^2_p , ranging from .367 to .761). This indicated that the financial education program significantly improved the financial literacy scores of tertiary students, regardless of the program outputs. The main effects of the program outputs were also significant, with medium to large partial eta squared values (η^2_p , ranging from .068 to .135). However, there were significant differences in financial literacy scores across three agreement groups (SAG, AG, and NDG) for each output. The results provided strong evidence that specific components of the financial literacy program played an impactful role in enhancing students' financial literacy. The program outputs, such as lecturers and study notes, demonstrated significant main effects and interaction effects with time. This indicated that the influence of these instructional approaches changed over time. After two lectures, tertiary students who highly agreed with the lecturers showed greater improvement in financial literacy compared to their peers. However, the group with moderate agreement did not show a significant difference compared to the low-to-no agreement group. The study notes yielded a similar interaction effect. These results could be used to make decisions about students' feedback on the lecturers and study notes in order to optimise learning outcomes.

Conversely, the program outputs, such as case study videos, the mobile app, the exercise, and webpages, showed significant main effects without significant interaction effects. These program outputs appeared to contribute to the development of financial literacy in a more uniform manner and could be considered stable elements that consistently reinforce learning objectives throughout the educational intervention. For the final program output, the overall program, showed a significant main effect that reaffirmed the impact of the program in enhancing financial literacy as a whole. The significant interaction effect observed for the overall program further emphasised

that the program's effectiveness was subject to temporal influences. The sequential and cumulative experiences within the program affected the learning outcomes of financial literacy. This implied that the program's various components interacted together over time, and the full benefit of the program manifested in a complex manner as participants progressed through the educational materials. All hypotheses (H3a to H3g) were supported based on the significant main effects of the program outputs. It was concluded that the lecturers, study notes, case study videos, the mobile app, the exercise, webpages, and the overall program had a significant positive impact on the financial literacy of tertiary students. The analysis of research question three yielded insightful conclusions regarding the impact of various program outputs on financial literacy, with varying degrees and types of impact. Case study videos, the mobile app, the exercise, and webpages exhibited a consistent influence, while lecturers and study notes showed varying effectiveness at different stages. This indicated a dynamic interaction with the learning process. In sum, the agreement level with the helpfulness of each program output influenced the magnitude of improvement in the financial literacy of tertiary students.

Research question 4 provided a comprehensive insight into tertiary students' perceptions of a financial education program and its impact on their financial literacy. Four key themes emerged from the in-depth interviews with 12 students, enriching the quantitative survey findings. Firstly, the importance of financial literacy was a prominent theme. Students recognised financial literacy as an essential life skill, particularly in personal finance management, future planning and achieving life goals. The students emphasised the advantages of being financially literate in a complex economic environment. Financial literacy is necessary not only for making informed financial decisions but also for long-term financial wellness. Moreover, the students thought

financial literacy was integral to personal growth and necessary for achieving financial independence. Even though students came from different academic backgrounds, they perceived the financial education program as valuable and beneficial to their overall development. Feedback from students suggested that their previous experiences influenced how they valued financial literacy. The second theme was related to the ways and barriers of accessing financial education. Students identified diverse sources from which they had previously accessed financial information, such as financial news, television, family, online forums, and YouTubers. The lack of formal financial education and activities in schools led students to seek financial information from other sources. Family education and personal experience played a significant role in financial education, with many students learning about money management from their parents. Busy schedules, competing academic priorities, and part-time work commitments were highlighted as obstacles to engaging in financial education. The findings aligned with previous research about the value of accessible financial education. Accessible financial education accommodated students' time constraints and unique learning preferences. Students proposed various activities for providing financial education in tertiary institutions, including online resources, guest talks by financial experts, consultations with financial planners, workshops or programs organised by non-governmental organisations, banks, and student affairs offices. The third theme highlighted the student learning experience through financial education programs. Students reflected that the program's interactive methods and innovative resources, such as case study discussions, interactive videos, the mobile app, and the budgeting exercise, were particularly well-received. These program outputs facilitated an engaging learning experience. Students appreciated the practical applications of financial literacy in their everyday lives. Positive feedback on the lecturers and study notes aligned with the survey results. However, difficult financial jargon should be

simplified for better understanding, and more hot financial topics should be covered in the study notes. Many students described these impacts as being likely attributed to improved knowledge, shifted attitudes, and greater intention to change their behaviours. These impacts were reflected in their credit card usage, spending patterns, financial decisions and attention to investment. Financial knowledge was strengthened, but the provident fund part showed mixed responses. Positive shifts in their attitudes towards risk, financial planning and investment were observed. Behavioural changes, such as budgeting, saving, and tracking expenses, were more evident in students who completed the budgeting exercise.

5.3 Implications of the Study

This study had important implications for policymakers, program practitioners, financial educators and researchers in the field. These implications included the significance of more applied research in guiding policy decisions, education strategies, and practical initiatives in the realm of financial education. The first implication for policymakers was that tertiary students acknowledged the value of financial literacy, but it was not typically taught in tertiary institutions. They turned to family, friends, media and online channels for financial information and decision-making. Furthermore, the financial education program in this study was developed with reference to Yu and Law's (2015) Hong Kong Financial Competency Framework, which provided implications for education policymakers. The Hong Kong Financial Competency Framework (Yu and Law, 2015) presented a structured approach consistent with the OECD's (2011a, 2011b) financial literacy measurement approach, in which financial literacy comprises three dimensions: financial knowledge, financial attitudes, and financial behaviours. Education policymakers should outline the learning objectives and outcomes to ensure that tertiary students receive a coherent and

cumulative financial education in tertiary institutions. Another implication concerned program practitioners and financial educators. The findings of this study suggested that program practitioners and financial educators should consider incorporating interactive and digital learning methods into their financial education programs. This should involve using mobile applications, online resources, interactive videos, and case study discussions to engage students in a more practical and accessible way of learning about financial literacy. Loibl and Hira (2005) also found that self-directed online financial learning materials significantly improved personal financial management.

The next implication centred on the expansion of financial education opportunities for tertiary students. Tertiary institutions, program practitioners, and financial educators should collaborate to organise more financial education programs among diverse stakeholders, including banks, non-government organisations, and financial service providers. Partnerships should be fostered across different sectors to strengthen the collaboration. The research results revealed that targeted financial education programs should be tailored to specific groups, including non-business major students and working students. As financial education programs varied in content, format, and pedagogical methods, there was no "one-size-fits-all" financial education program. Such a universal approach was unlikely to accommodate every tertiary student. The programs should be actively promoted to raise student awareness of the available financial education resources and to engage a diverse student population.

5.4 Contributions of the Study

5.4.1 Contributions to the Literature

This study addressed a research gap in the literature focused on the financial literacy of tertiary students in Hong Kong. Prior research had been limited in exploring the impact of financial education on this demographic. By systematically examining the effects of the financial education program, this study provided empirical evidence to support the enhancement of financial knowledge, attitudes, and behaviours among tertiary students in a distinct cultural and economic context. It also provided essential evidence on the program evaluation model and its effectiveness in improving financial literacy outcomes among tertiary students. This study applied Deacon and Firebaugh's (1988) Family Resource Management System Theory and the OECD's (2011a, 2011b) financial literacy measurement approach to frame the research, which informed the effects of the financial education program and individual demographic characteristics (Inputs) towards financial knowledge, financial attitudes and financial behaviours (Throughputs), then towards financial literacy (Output).

The findings contributed to this theoretical landscape by empirically demonstrating the interconnectedness of these elements in the context of tertiary education. This theoretical approach affirmed the relevance of these theories in analysing financial literacy and also expanded their application by providing new insights into financial education for tertiary students. In particular, the results highlighted the role of financial education programs as an external resource that

enhanced financial literacy through improved financial knowledge, attitudes, and behaviours. This affirmed Deacon and Firebaugh's (1988) Family Resource Management System Theory that external inputs shaped individual outputs. At the same time, the study provided empirical evidence on how the financial education program influenced three dimensions that financial literacy comprises, as identified within the OECD's (2011a, 2011b) financial literacy measurement approach.

Moreover, this study generated new theoretical insights into the body of knowledge. The findings affirmed the existing theories on financial literacy and also expanded them by incorporating the perspectives of tertiary students within the context of Hong Kong's tertiary education. This research also affirmed previous theories that financial education could improve financial knowledge, attitudes, and behaviours among students. However, it also offered a partial contradiction to some existing literature by demonstrating that not all aspects of financial knowledge improved as expected. In particular, knowledge relating to provident funds did not improve significantly. The complexity of certain financial concepts, such as provident funds for retirement, might require more tailored and in-depth educational approaches. Moreover, the study expanded on existing literature by showing how financial literacy was influenced by a financial education program within a specific demographic context. This enhanced the understanding of the theories in practice and suggested that financial education is a multidimensional concept. Financial education was influenced by various factors and was not a “one-size-fits-all” approach. This study offered new insights into tertiary students' financial literacy development and how financial education programs should be tailored for certain student groups, such as non-business students and working students. Furthermore, the study had empirical contributions by providing significant

data on the changes in the financial literacy of tertiary students following the program. It generated valuable empirical data on financial literacy among tertiary students in Hong Kong and produced statistically significant and in-depth findings regarding financial education program outputs.

5.4.2 Contributions to Methodology

The study made several contributions to the methodology of researching financial literacy among tertiary students. It demonstrated the value of a mixed methods approach, with quantitative surveys and qualitative interviews providing complementary insights into the research questions. The use of pre- and post-surveys with statistical analysis established the effectiveness of the financial education program, while the thematic analysis of qualitative interviews offered depth and context to the quantitative findings. By integrating quantitative data with rich qualitative insights, the study provided an alternative approach to the one-dimensional approaches used in financial literacy research, offering a replicable methodology for future investigations. The adaptation of the OECD/INFE (2013) financial literacy measurement toolkit to fit the unique characteristics of tertiary students in the context of Hong Kong signified a methodological progression that offered direction for comparable research in various educational and cultural settings. It also put forward a theory-based logic model to guide financial education program evaluation.

The OECD's (2010a, 2010b, 2013) logic model offered a structured approach for assessing program inputs, program activities, program outputs, and program outcomes. This model informed future evaluations of financial education programs, making significant practical contributions to stakeholders in the field of financial education. The findings showed that a well-structured

financial education program with effective program outputs improved financial literacy among tertiary students. Despite its strengths, the study's methodological approach was not without limitations. The reliance on the use of self-reported data potentially led to a degree of bias, and the unique cultural setting might restrict the applicability of the results to other contexts. Thus, it is suggested that future studies should adopt longitudinal approaches to monitor the development of financial literacy over extended periods. It is also important to expand the demographic scope, so that a more diverse participant pool should be included. It could offer broader insights into the universality of the theoretical framework applied.

5.5 Recommendations and Conclusion

This study concluded that the financial education program had a significant impact on the financial literacy of tertiary students in Hong Kong. The increasing complexity of financial products in the evolving market made it essential for tertiary students to receive quality financial education. Despite prior research on financial literacy and financial education, studies focusing on the financial literacy of tertiary students in Hong Kong, and impact evaluations of financial education programs at the tertiary level had noticeable gaps. Therefore, this study formulated targeted research questions and hypotheses, leveraging a mixed methods approach to evaluate the influence of the financial education program on tertiary students' financial literacy. This study presented evidence that the financial education program had a positive effect on the financial literacy of tertiary students, with improvements in their financial knowledge, attitudes, and behaviours. It was concluded that prior to the financial education program, there were no significant differences in financial literacy scores when segmented by gender, age, job status, monthly income, education level, and study major. However, it was found that the stronger improvement effect in financial

literacy scores was dependent on tertiary students' education levels and study majors. The study also explored a range of program outputs from the financial education program, including the lecturers, study notes, case study videos, the mobile app, the budgeting exercise, and webpages. These program outputs had significant effects on improving the financial literacy of tertiary students. Moreover, students' positive perceptions of program outputs were correlated with their enhanced financial literacy. This research made a contribution to the current body of literature in the field of financial education by providing empirical evidence supporting the implementation of financial education programs in tertiary institutions. Furthermore, it highlighted the value of theory-based program evaluation models in assessing the effectiveness of financial education initiatives.

5.5.1 Recommendations for Practice

It is recommended that policymakers and financial educators develop financial education programs that cater to tertiary students with different education levels and study majors. They should promote the programs to students and encourage them to develop their financial literacy throughout their tertiary studies. More interactive and experiential learning activities should be included in the programs to enhance students' application of financial concepts and skills. Financial simulation cases and real-life exercises are beneficial for students to implement their financial expertise and abilities in life scenarios. The program content should not only provide knowledge but also emphasise the development of financial attitudes and behaviours. Financial educators should regularly review the program content and add new financial topics, such as cryptocurrencies, to update students about emerging market products. Financial educators should promote the use of online platforms and mobile applications to deliver financial education, making

it accessible to a broader audience. Policymakers should encourage collaboration and knowledge-sharing among financial professionals, educators, researchers, and corporate community managers through conferences, workshops, and programs. This will help foster the exchange of ideas, best practices, and research, thereby strengthening financial education programs on an ongoing basis.

It is recommended that policymakers invest in financial literacy research and evaluation to assess the effectiveness of financial education programs and identify best practices for program design and delivery. Following the practices of the OECD, member countries' authorities regularly evaluate the national financial literacy levels and financial education initiatives to ensure they remain relevant in addressing the evolving market. The widespread availability and accessibility of financial education programs should provide more financial education opportunities to tertiary students. Thus, policymakers should encourage partnerships and collaboration between tertiary institutions, financial service industries, employers, and non-profit organisations to develop comprehensive and sustainable financial education programs. Non-governmental organisations should collaborate with the financial services industry to develop and organise financial education programs for tertiary students. The financial services industry should contribute education funds, expertise, and fintech support for financial education in universities and colleges.

5.5.2 Recommendations for Future Research

Based on the findings, future research should replicate this study in various contexts and with different populations to verify the generalisability of the results. Future research could investigate the impact of financial education on various student demographics, including race, ethnicity, and socioeconomic background. This could provide a more comprehensive understanding of the

effectiveness of financial education programs across diverse groups. A second recommendation is that longitudinal studies should be conducted to examine the long-term effects of financial education programs on students' financial literacy. The longitudinal studies would be valuable for examining the lasting effects of financial education programs over an extended period of time, capturing any sustained changes in knowledge, attitudes, and behaviours among tertiary students. Understanding the sustained program impacts would contribute to the development of evidence-based best practices in financial education programs. Furthermore, future research could also investigate the roles of family and social media in influencing students' financial literacy, as this would provide a broader generalisability and enhance the credibility of the findings. Moreover, exploring how formal financial education interacts with informal learning contexts could give a better understanding of the overall development of financial literacy among tertiary students. These insights could provide a more holistic view of factors affecting student financial literacy and contribute to the practical applications of research findings.

Future research should investigate the impact of different delivery methods and formats of financial education. In addition to integrating into credit-bearing general education modules or the tertiary curriculum, other delivery methods might include peer-led experiential learning projects, webinars, or one-on-one counselling. Such comparative research could assess the impacts of different delivery methods in improving financial knowledge, attitudes, and behaviours among tertiary students. Such work could offer valuable perspectives on the most effective approaches for delivering financial education to tertiary students. Financial educators could make better decisions about resource allocation and program design. Future research could explore cost-

effectiveness and long-term sustainability factors associated with each method for delivering financial education to tertiary students.

Moreover, future research could study the potential effects of financial education on other aspects of tertiary students' lives, such as financial stress and well-being. Assessing the link between financial education, financial stress management, and long-term financial security could provide a more holistic perspective on the benefits of financial education. By examining the intersection of financial education with psychological and holistic well-being factors, future research could contribute to the development of financial education programs that enrich students' lives beyond financial knowledge, attitudes, and behaviours.

Another area for future research is the integration of financial technology and innovation in financial education. With the rapidly evolving financial market, it would be useful to examine the effectiveness of incorporating digital platforms, mobile applications, and gamified learning experiences in financial education programs. Exploring the use of immersive and interactive technology in simulating financial decision-making scenarios could further enhance students' engagement and their practical application of financial concepts.

5.5.3 Final Conclusion

Overall, the recommendations for practice and future research highlighted the importance of ongoing collaboration, innovation, and evaluation in advancing financial education in tertiary institutions, ultimately contributing to the financial literacy of tertiary students and the broader community. This study provided empirical evidence that the financial education program had positive impacts on the financial literacy of tertiary students in Hong Kong. By equipping tertiary students with improved financial knowledge, attitudes and behaviours, the financial education program contributed to students' overall financial literacy. Although the empirical data in this study were collected in Autumn 2018, the findings retain critical relevance because tertiary students continue to confront increasingly complex financial decisions within a rapidly evolving financial market. These include decisions related to digital wallets, mobile payments, virtual assets, and leveraged financial products that have proliferated significantly since 2018. The literature on financial literacy and financial education has also evolved in notable directions since 2018. For instance, the COVID-19 pandemic accelerated the adoption of digital financial education, thereby reinforcing the relevance of robust financial education programs (OECD, 2021). Furthermore, amidst the rapid growth of financial technology, Respati et al. (2023) demonstrated that digital financial literacy significantly influences university students' financial behaviour, which in turn acts as a critical determinant of their overall financial well-being.

In conclusion, this study demonstrated that a structured and theory-grounded financial education program could produce statistically significant improvements in the financial literacy of tertiary students in Hong Kong. This study also contributed a theory-based program evaluation approach

to assess the effects of financial education programs. It is recommended that policymakers and financial educators use the theory-based program evaluation approach to evaluate and refine financial education programs in tertiary institutions. Moreover, the findings inform the design of financial education programs in tertiary institutions. Accordingly, program organisers and educators should tailor their content and delivery methods to accommodate tertiary students' diverse learning needs and educational backgrounds. Future research should replicate and extend this study using updated instruments and longer-term follow-up designs, including longitudinal tracking to determine whether observed post-program improvements persist beyond program completion.

Reference:

Adam Ndou (2023). The Interplay of Parental Financial Behaviour and Financial Literacy and The Moderating Effects of Parental Income. GLOBAL BUSINESS FINANCE REVIEW

Agarwalla, S.K., Barua, S.K., Jacob, J. & Varma, J.R. (2013). “Financial literacy among working young in urban India,” IIMA Working Paper No. 2013-10-02, pp. 1–27.

Ajzen, I. (1991). The theory of planned behaviour. *Organisational Behaviour and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)

Álvarez, Adriana & González, Jaime. (2021). Financial Literacy: Gaps Found Between Mexican Public and Private, Middle, and High-School Students. 10.4018/978-1-7998-8049-3.ch028.

Ary, Donald, Lucy Cheser Jacobs, Christine K. Sorensen, and Asghar Razavieh. (2010). *Introduction to Research in Education*. USA: Wadsworth Cengage Learning.

Atkinson, A. (2005). Introducing financial capability skills: A pilot study with Fairbridge West, Bristol. Personal Finance Research Centre, University of Bristol.

Atkinson, A., McKay. S., Kempson. E. and Collard. S. (2006). Levels of Financial Capability in the UK: Results of a baseline survey, Personal Finance Research Centre, University of Bristol.

Atkinson, A. & F. Messy (2012). *Measuring Financial Literacy: Results of the OECD / International Network on Financial Education (INFE) Pilot Study*, OECD Working Papers on Finance, Insurance and Private Pensions, No. 15, OECD Publishing.

Amagir, A., Groot, W., Maassen van den Brink, H., & Wilschut, A. (2018). A review of financial-literacy education programs for children and adolescents. *Citizenship, Social and Economics Education*, 17, 56 - 80.

ANZ Social Research Centre (2008). ANZ Survey of Adult Financial Literacy in Australia.

ANZ Social Research Centre (2011). Adult Financial Literacy in Australia, Full Report of the results from the 2011 ANZ Survey.

Australian Securities and Investments Commission (2011). REP 230 Financial literacy and behavioural change. Australian Securities and Investments Commission, Sydney.

Bamberger, M., J. Rugh, & L. Mabry. (2006). Real World Evaluation: Working under budget, time, data, and political constraints. Thousand Oaks, CA: Sage.

Basic Skills Agency. (2004). Adult financial capability framework. London: Basic Skills Agency.

Frijns, B., Gilbert, A., & Tourani-Rad, A. (2013). Learning by doing: the role of financial experience in financial literacy. *Journal of Public Policy*, 34, 123 - 154.

Batty, M.M., Collins, J.M., & Odders-White, E. (2015). Experimental Evidence on the Effects of Financial Education on Elementary School Students' Knowledge, Behaviour, and Attitudes. *Journal of Consumer Affairs*, pp. 49, 69–96.

Becchetti, L., Caiazza, S., & Coviello, D. (2013). Financial education and investment attitudes in high schools: evidence from a randomised experiment. *Applied Financial Economics*, 23, 817 - 836.

Biktimirov, Ernest N. and Nilson, Linda. (2004). Adding Animation and Interactivity to Finance Courses with Learning Objects. *Journal of Financial Education* 33, Summer 2007, 36–48., Available at SSRN: <https://ssrn.com/abstract=2467953>

Bernheim, D., D. Garrett, & D. Maki (2001). “Education and saving: The long-term effects of high school financial curriculum mandates,” *Journal of Public Economics*, 85, 435–565.

Borden, L., Lee, S., Serido, J., & Collins, D. (2008). Changing college students' financial knowledge, attitudes, and behaviour through seminar participation. *Journal of Family and Economic Issues*, 29(1), 23–40.

Bowen CF, Jones HM (2006). Empowering young adults to control their financial future. *Journal of Family and Consumer Sciences* 98(1): 33–39.

Boyatzis, R. (1998). *Transforming qualitative information: Thematic analysis and code development*. Thousand Oaks, CA: Sage.

Boyce, L., Danes, S.M. (1998). *Evaluation of the NEFE High School Financial Planning Program, 1997– 1998*. Mimeo, University of Wisconsin.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77–101.

Brugiavini, A., Cavapozzi, D., Padula, M., & Pettinicchi, Y. (2015, January 1). *Financial Education, Literacy and Investment Attitudes*. Social Science Research Network. <https://doi.org/10.2139/ssrn.2637878>

Burk, Diana. (2011). *Evaluation of the USU Retirement and Savings Seminar*. All Graduate Theses and Dissertations. 1057.

Burk, D., Jean M Lown, & Lisa K Boyce. (2014). “Financial Education Program Evaluation”. *Journal of Human Sciences and Extension* 2 (1). <https://www.jhseonline.com/article/view/587>

Carlin, Bruce & Robinson, David. (2010). *What Does Financial Literacy Training Teach Us?*. National Bureau of Economic Research, Inc., NBER Working Papers. 43. 10.2307/23248951.

Campbell, J.Y. (2006). Household Finance. *The Journal of Finance*, 61, 1553-1604.
<http://dx.doi.org/10.1111/j.1540-6261.2006.00883.x>

Chau, W., Chan, S., & Chan, Y. (2004). Study on financial management practices of university students in Hong Kong. Healthy Budgeting Family Debt Counselling Centre, Tung Wah Group of Hospitals

Chen, H., & Volpe, R. (1998). An analysis of personal financial literacy among college students. *Financial Services Review*, 7(2), 107–128.

Chowa, G.A.N., Despard, M., & Osei-Akoto, I. (2012, July). Financial knowledge and attitudes of youth in Ghana. (Youth Save Research Brief No. 12-37).

Cimigo (2015). A Review of Financial Education Initiatives in Hong Kong.

Clark R.L. & d'Ambrosio M. B. (2003). Ignorance is not bliss: The importance of Financial Education. Published by the TIAA-CREF Institute.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioural Sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.

Cohen, Steven L. (2018). PRACTITIONER'S GUIDE TO STUDENT FINANCIAL LITERACY. Doctoral Dissertation, University of Pittsburgh. (Unpublished)

Creswell, J. W. (2005). *Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research* (2nd Ed.). Pearson Merrill Prentice Hall.

Creswell, J.W, & Plano Clark, V. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.

Creswell, J.W. & Plano Clark, V.L. (2011). *We are designing and Conducting Mixed Methods Research: 2nd Edition*, Sage Publications, Los Angeles.

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research (4th ed.)*. Boston, MA: Pearson.

Creswell, J. W. & Poth, C. (2017). *Qualitative Inquiry and Research Design Choosing among Five Approaches*. Sage, London.

Crouch, M., & McKenzie, H. (2006). The logic of small samples in interview-based qualitative research. *Social Science Information*, 45(4), 18. Doi: 10.1177/0539018406069584)

Collins, J. Michael and O'Rourke, Collin, *Financial Education and Counseling — Still Holding Promise (2010)*. *Journal of Consumer Affairs*, 44(3), 483-498., Available at SSRN: <https://ssrn.com/abstract=1529422> or <http://dx.doi.org/10.2139/ssrn.1529422>

Colmar Brunton (2006). *New Zealand Retirement Commission Financial Knowledge 2006 Survey*.

Commission for Financial Literacy and Retirement Income. (2012). *Charting a course: A review of financial education in New Zealand*. Wellington, New Zealand.

Cude, B., Lawrence, F., Lyons, A., Metzger, K., LeJeune, E., Marks, L., & Machtmes, K. (2006). College students and financial literacy: What they know and what we need to learn. *Proceedings of the Eastern Family Economics and Resource Management Association*, 102–109.

Danes, S. M. (1994). Parental perceptions of children's financial socialisation. *Financial Counselling and Planning*, 5, 1 27 -146.

Daniel Fernandes, John G. Lynch, & Richard G. Netemeyer (2014). "Financial Literacy, Financial Education, and Downstream Financial Behaviours," *Management Science, INFORMS*, vol. 60(8), pages 1861-1883, August.

De Beckker, K., Compen, B., De Bock, D., & Schelfhout, W. (2019). The capabilities of secondary school teachers to provide financial education. *Citizenship, Social and Economics Education*, 18, 66–81.

De Meza, D., Irlenbusch, B., Reyniers, D. (2008). *Financial Capability: A Behavioural Economics Perspective. A Report Prepared for the Financial Services Authority. Consumer Research.*

Deacon, R. E., & Firebaugh, F. M. (1988). *Family resource management: Principles and applications.* Boston, MA: Allyn and Bacon.

Deng, H., Chi, L., Teng, N., Tang, T., & Chen, C. (2013). Influence of Financial Literacy of Teachers on Financial Education Teaching in Elementary Schools. *International Journal of e-Education, e-Business, e-Management and e-Learning.*

DeVaney, J. (2008). Challenging output based performance management in child protection. In M. Calder (Ed.), *Contemporary Risk Assessment in Safeguarding Children* (pp. 15–24). Article Chapter 2 Russell House Publishing.

Dewanty, Novia & Isbanah, Yuyun. (2018). Determinant of The Financial Literacy: Case Study on Career Woman in Indonesia. *ETIKONOMI*. 17. 10.15408/etk.v17i2.6681.

DiCicco-Bloom, B., & Crabtree, B. F. (2006). The Qualitative Research Interview. *Medical Education*, pp. 40, 314–321. <https://doi.org/10.1111/j.1365-2929.2006.02418.x>

Dos Santos Felipe, Israel José & Ceribeli, Harrison & Lana, Túlio. (2017). Investigating the level of financial literacy of university students. *Revista de Administração de Administração, Contabilidade e Economia*. 16. 845. 10.18593/race.v16i3.13458.

East, R. (1993). Investment decisions and the theory of planned behaviour. *Journal of Economic Psychology*, 14(2), 337–375. [https://doi.org/10.1016/0167-4870\(93\)90009-7](https://doi.org/10.1016/0167-4870(93)90009-7)

Edmiston, Kelly, Fisher, Mary Gillett (2006). Financial education at the workplace: evidence from a survey of Federal Reserve Bank employees, No 2006-02, Community Affairs Research Working Paper, Federal Reserve Bank of Kansas City, <https://EconPapers.repec.org/RePEc:fip:fedkcw:2006-02>.

Elliott, A, Dolan, P, Vlaev, I, Adriaenssens, C, & Metcalfe, R. (2010). Transforming Financial Behaviour: Developing interventions that build financial capability, CFEB Consumer Research Report 01, Consumer Financial Education Body, London.

European Commission (2007). Communication from the Commission: Financial education (COM(2007) 808 final). Brussels: European Commission. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52007DC0808>

Filipiak, U. & Walle, Y.M. (2015). “The financial literacy gender gap: a question of nature or nurture?”, Discussion Papers No. 176, Courant Research Centre: Poverty, Equity, and Growth.

Firli, A. (2017). Factors that Influence Financial Literacy: A Conceptual Framework. IOP Conference Series: Materials Science and Engineering. 180. 012254. 10.1088/1757-899X/180/1/012254.

FINRA Investor Education Foundation (2009). Financial Capability in the United States, National Survey.

Fitzsimmons, V. & Leach (1994). Net Worth Change: Beginning and Expanding Life Cycle Stages. *Journal of Financial Counseling and Planning*, 5(1).

Forté, K.S. (2013). Educating for Financial Literacy: A Case Study With a Sociocultural Lens. *Adult Education Quarterly*, 63, 215–235.

Fox, Jonathan J., Suzanne Bartholomae, & Jinkook Lee. (2005). Building the Case for Financial Education. *Journal of Consumer Affairs*, 39 (Summer): 195–214.

Fox, J.J. & Bartholomae, S. (2008). Evaluation of the 2008 Women & Money Program. <http://www.osu.edu/search/index.php>

Fox, J.J., Bartholomae, S., & Trombitas, K. (2012). Evaluating Financial Education Programs.

French, D., Mckillop, D.G., & Stewart, E. (2019). The effectiveness of smartphone apps in improving financial capability. *The European Journal of Finance*, 26, 302–318.

Frisancho, V. (2022). Is School-Based Financial Education Effective? Immediate and Long-Lasting Impacts on High School Students. *The Economic Journal*.

Grable, J. E., & Joo, S. (1998). Does financial education affect knowledge, attitudes, and behaviour? An empirical analysis. *Personal Finances and Worker Productivity*, 2(2), 213–220.

Glaser, B., & Strauss, A. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Mill Valley, CA: Sociology Press.

Go, Charles, Karen Varcoe, Tina Eng, Wilson Pho, and Laura Choi. (2012). *Money Savvy Youth: 27 Evaluating the Effectiveness of Financial Education for Fourth and Fifth Graders*. Federal Reserve Bank of San Francisco.

Godwin, D. D. (1994). Antecedents and consequences of newlyweds' cash flow management. *Financial Counseling and Planning*, 5, 161–190. Google Scholar.

Goldsmith, E. B. (2005). Women and estate planning. *Journal of Practical Estate Planning*, 7 (1), 25–28.

Greninger, S. A., Hampton, V. L., Kitt, K. A., & Achacoso, J. A. (1996). Ratios and benchmarks for measuring the financial well-being of families and individuals. *Financial Services Review*, 5(1), 57–70. [https://doi.org/10.1016/S1057-0810\(96\)90027-X](https://doi.org/10.1016/S1057-0810(96)90027-X)

Grifoni, A. and F. Messy (2012). “Current Status of National Strategies for Financial Education: A Comparative Analysis and Relevant Practices”; OECD/INFE (2012), “OECD/INFE National Strategies for Financial Education - Summary, APEC Experiences, and High-Level Principles”

Gudmunson, Clinton & Zuiker, Virginia & Katras, Jo & Sabri, Mohamad Fazli. (2015). ENHANCING PERSONAL AND FAMILY FINANCE COURSES USING CASE STUDIES. *College student journal*. 49. 321–330.

Gudmunson, C. G., & Danes, S. M. (2011). Family financial socialization: Theory and critical review. *Journal of Family and Economic Issues*, 32(4), 644–667. <https://doi.org/10.1007/s10834-011-9275-y>

Gutter, Michael & Garrison, Selena & Copur, Zeynep. (2010). Social Learning Opportunities and the Financial Behaviours of College Students. *Family and Consumer Sciences Research Journal*. 38. 387–404. [10.1111/j.1552-3934.2010.00034.x](https://doi.org/10.1111/j.1552-3934.2010.00034.x).

Hathaway, I., & Khatiwada, S. (2008). Do financial education programs work? Federal Reserve Bank of Cleveland Working Paper No. 08-03 (April).

Head, L.S. (2014). Influences on Financial Knowledge and Behaviour.

Heckman, S., Lim, H., & Montalto, C. (2014). Factors related to financial stress among college students. *Journal of Financial Therapy*, 5(1), 19–39. <https://doi.org/10.4148/1944-9771.1063>

Henry, R. A., Weber, J. G., & Yarbrough, D. (2001). Money management practices of college students. *College Student Journal*, pp. 35, 244–249.

Highsmith, R. J. (1989). A Survey of State Mandates for Economics Instruction.

Hilgert, Marianne A., Jeanne M. Hogarth, & Sondra G. Beverly. (2002). Household financial management: The connection between knowledge and behaviour. Fed.Res. Bull. 89: 309-22.

Hira, T. K. (2012). Promoting sustainable financial behaviour: implications for education and research. *International Journal of Consumer Studies*, 36(5), 502-507

Hogarth, J. M. (2002). Financial literacy and family and consumer sciences. *Journal of Family & Consumer Sciences*, 94 (1), 15–28.

Hogarth, J. M. (2006). Financial education and economic development. Paper presented at Improving Financial Literacy: International Conference Hosted by the Russian G8 Presidency in Cooperation with the OECD. Retrieved June 19, 2008, from <http://www.oecd.org/dataoecd/20/50/37742200.pdf>

HKFYG (Hong Kong Federation of Youth Groups) (2013). The Daily Needs and Financial Pressures of Young People with Government Loans. Youth Study Series.

Hung, A.A., Parker, A.M., & Yoong, J.K. (2009). Defining and measuring financial literacy, Working paper 708, RAND Labor and Population.

Huston, S. J. (2010). Measuring financial literacy. *The Journal of Consumer Affairs*, 44, 296–316.

IEC. (2015). A review of financial education initiatives in Hong Kong. Hong Kong: Investment Education Centre.

IEC. (2016). OECD/INFE International Survey of Adult Financial Literacy Competencies - Hong Kong Report.

IEC. (2018). A Stocktake of Financial Education Initiatives in Hong Kong.

Jacobs-Lawson, J. M., & Hershey, D. A. (2005). The influence of future time perspective, financial knowledge, and risk tolerance on retirement saving behaviours. *Financial Services Review*, 14(4), 331.

Jacob, M. (2016). Pedagogy of Financial Education among College Students. *Economics and Culture*, 13, 23–34.

Jean, M. Lown, and Samantha Nelson. (2012). Logic Model-Based Financial Education Program Evaluation. *Journal of Consumer Education* (2012) 29, (14–24).

Jodi L. Parrotta & Phyllis J. Johnson. (1998). The impact of financial attitudes and knowledge on financial management and satisfaction of recently married individuals. *Association for Financial Counselling and Planning*, Vol. 9(2).

Johnson, B. & Onwuegbuzie, A. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher* 33(7), 14–26 (2004).

Joo, S. & Grable, J.E. (2004). An Exploratory Framework of the Determinants of Financial Satisfaction. *Journal of Family and Economic Issues*, 25(1), 25–50.

Joo, S. H., & Grable, J. E. (2005). Employee education and the likelihood of having a retirement savings program. *Financial Counseling and Planning*, 16(1), 37–49.

Joo, S. (2008). Personal financial wellness. In J. J. Xiao (Ed.), *Handbook of Consumer Research*. New York, Springer. Doi: 10.1007/978-0-387-75734-6_2.

Jorgensen, B. L., & Savla, J. (2010). Financial Literacy of Young Adults: The Importance of Parental Socialization. *Family Relations*, 59, 465-478.

JumpStart Coalition. (2007). National Standards in K-12 Personal Finance Education. <http://www.jumpstart.org/guide.html>.

Junk, V., Stenberg, L., & Anderson, C. (1993). Retirement planning for the sandwich generation. *Journal of Home Economics*, 85(1), 4–11.

Kahneman, D. & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk, *Econometrica*, 47 (2), 263–292.

Kaiser, T., & Menkhoff, L. (2017). Does financial education impact financial literacy and financial behaviour, and when? *The World Bank Economic Review*, 31(3), 611e630. <https://doi.org/10.1093/wber/lhx018>

Kartini, K., Fitri, F., Rabiya, U., & Anggraeni, D. (2020). Analysis of the Financial Literacy Behaviour Model. *Golden Ratio of Finance Management*, 1(2), 114–122. <https://doi.org/10.52970/grfm.v1i2.69>

Kempson, E. (2009). Framework for the Development of Financial Literacy Baseline Surveys: A First International Comparative Analysis. OECD, Directorate for Financial and Enterprise Affairs, OECD Working Papers on Finance, Insurance and Private Pensions.

Kimberly Gartner & Richard M. Todd (2005). "Effectiveness of online early intervention financial education programs for credit-card holders," Proceedings 962, Federal Reserve Bank of Chicago.

Kirsten M. Rosacker & Robert E. Rosacker (2016). An exploratory study of financial literacy training for accounting and business majors, *The International Journal of Management Education*, Volume 14, Issue 1, 2016, Pages 1–7, ISSN 1472-8117, <https://doi.org/10.1016/j.ijme.2015.11.002>.

Klapper, L., Lusardi, A. & Panos, G.A. (2012). "Financial literacy and the financial crisis," NETSPAR Discussion Papers No. 03/2012-007, pp. 1–52.

Klepfer, K., Fernandez, C., Fletcher, C., & Jeff, W. (2015). Informed or Overwhelmed? A legislative history of student loan counselling with a literature review on the efficacy of loan counselling. TG Research. Retrieved from: <http://www.tgslc.org/research/>.

Kofoed, J. (2004). “Can students improve performance by clicking more? Engaging students through online delivery?” *Studies in Learning, Evaluation Innovation and Development*, 1(2).

Koto, Murviana. (2023). Analysis of factors influencing digital financial literacy levels: a case study on gen Y and gen Z spending behaviour

Kozina, F.L., & Ponikvar, N. (2015). Financial literacy of first-year university students: the role of education. *International Journal of Management, Knowledge and Learning*, 4, 241-255.

Lerman, R.I. (2006). *Financial Literacy Strategies: Where Do We Go from Here? Employee Benefits*.

Liaqat, F., Mahmood, K., & Ali, F. H. (2020). Demographic and socio-economic differences in financial information literacy among university students. *Information Development*, 37(3), 376–388. <https://doi.org/10.1177/0266666920939601> (Original work published 2021)

Loewenthal, K. M. (2004). *An introduction to psychological tests and scales* (2nd ed.). Hove, UK: Psychology Press.

Loibl, C., & Hira, T. K. (2005). Self-directed financial learning and financial satisfaction. *Financial Counselling and Planning*, 16(1), 11–21. <https://files.eric.ed.gov/fulltext/EJ1185313.pdf>

Looney, A., & Yannelis, C. (2015). A Crisis in Student Loans? How Changes in the Characteristics of Borrowers and in the Institutions, They Attended Contributed to Rising Loan Defaults. *Brookings Papers on Economic Activity*, 1–68. <http://www.jstor.org/stable/43752167>

Lusardi, A., & Mitchell, O.S. (2007). Financial literacy and retirement planning: New evidence from the RAND American Life Panel. MRRC Working Paper No. 2007-157.

Lusardi, Annamaria. (2008). Financial Literacy: An Essential Tool for Informed Consumer Choice? NBER Working Paper 14084. <http://www.nber.org/papers/w14084> (retrieved July 30, 2008).

Lusardi, A. and Mitchell, O.S. (2008). Planning and financial literacy: how do women fare? *American Economic Review*, 98(2), 413–417.

Lusardi, A. (2010). Americans' financial capability. Retrieved from <http://fcic.gov/hearings/pdfs/2010-0226-Lusardi.pdf>

Lusardi, Annamaria and Mitchell, Olivia S., (2011). "Financial literacy around the world: an overview," *Journal of Pension Economics and Finance*, Cambridge University Press, vol. 10(04), pages 497–508, October.

Lusardi, Annamaria, Pierre-Carl Michaud, & Olivia S. Mitchell. (2013). "Optimal Financial Knowledge and Wealth Inequality." National Bureau of Economic Research Working Paper 18669.

Lusardi, Annamaria & Mitchell, Olivia S. (2014). "The Economic Importance of Financial Literacy: Theory and Evidence." *Journal of Economic Literature*. 52(1): 5–44.

Lyons, A. (2004). A profile of financially at-risk college students. *Journal of Consumer Affairs*, 38(1), 56–80.

Lyons, A. C., Palmer, L., Jayaratne, K. S. U., & Scherpf, E. (2006). Are We Making the Grade? A National Overview of Financial Education and Program Evaluation. *Journal of Consumer Affairs*, 40(2), 208–235. <https://doi.org/10.1111/j.1745-6606.2006.00056.x>

Lyons, A., Chang, Y., & Scherpf, E. (2013). Translating Financial Education into Behaviour Change for Low-Income Populations. ERN: Other Microeconomics: Intertemporal Consumer Choice & Savings (Topic).

Macy, A. (2010). Student-Managed Investment Funds: A Framework for Regional Schools. *The Academy of Educational Leadership Journal*, 14, 47.

Mandell, L. (2006). Financial literacy: If it is so important, why isn't it improving? Networks Financial Institute Policy Brief 2006-PB-08. Retrieved June 18, 2008, from http://www.networksfinancialinstitute.org/Lists/Publication%20Library/Attachments/30/2006-PB-08_Mandell.pdf

Mandell, L. (2007). Financial literacy of high school students. In J. Xiao (Ed.), *Handbook of consumer finance research* (pp. 163–184). NY: Springer Publishing.

Mandell, L. (2008). The financial literacy of young American Adults. Results of the 2008 National Jump\$tart Coalition survey of high school seniors and college students. Washington, D.C.: The Jump\$tart Coalition for Personal Financial Literacy.

Mandell, L., & Klein, L. S. (2009). The impact of financial literacy education on subsequent financial behaviour. *Journal of Financial Counseling and Planning*, 20(1), 10. Retrieved from http://www.usc.edu/dept/chepa/IDApay/publications/Impact_Financial_Literacy.pdf

Mason, C. L. J., & Wilson, R. M. S. (2000). Conceptualising financial literacy (Business School Research Series Paper 2000/7). Loughborough University, Business School.

McCormick, M. H. (2009). The effectiveness of youth financial education: A review of the literature. *Journal of Financial Counseling and Planning*, 20(1), 70-83

McGregor, S. L., & Goldsmith, E. B. (1998). Expanding our understanding of the quality of life, the standard of living, and well-being. *Journal of Family and Consumer Sciences*, 90(2), 2.

McGee, D. (2017). The Various Impacts & Returns of Comprehensive Value-Based Financial Literacy Programming: Re-Evaluation of the Family Stabilization Plan. Retrieved from the University of Minnesota Digital Conservancy, <https://hdl.handle.net/11299/184790>.

McKenna, Judy & Nickols, Sharon. (2009). Planning for Retirement Security: What Helps or Hinders Women in the Middle Years? *Home Economics Research Journal*. 17. 153–164. 10.1177/1077727X8801700204.

Mishra, D. (2019). Financial Literacy and Education for Improving Financial Skills. *DecisionSciRN: Financial Decision-Making (Topic)*.

Mitchell, M. L., Jolley, J. M., & O’Shea, R. P. (2013). *Writing for psychology* (4th ed.). Pacific Grove, CA: Wadsworth.

Mokhtar, N., Husniyah, A. R., Sabri, M. F., & Talib, M. A. (2015). Financial well-being among public employees in Malaysia: A preliminary study. *Asian Social Science*, 11(18), 49–54. <https://doi.org/10.5539/ass.v11n18p49>

Monetary Authority of Singapore (2005). *National Financial Literacy 2005, Findings and Recommendations*. <Http://www.mas.gov.sg/news-and-publications/press-releases/2005/first-national-financial-literacy-survey-2005.aspx>.

Moore, D. (2003). Survey of financial literacy in Washington State: knowledge, behaviour, attitudes, and experiences. Washington State University Social and Economic Sciences Research Centre Technical Report 03–39.

Morse, J. M. (1991). Approaches to qualitative-quantitative methodological triangulation. *Nursing Research*, pp. 40, 120–123.

Mueangpud, A., Khlaisang, J., & Koraneekij, P. (2019). Mobile Learning Application Design to Promote Youth Financial Management Competency in Thailand. *Int. J. Interact. Mob. Technol.*, 13, 19-38.

Mugenda, O. M., Hira, T. K., & Fanslow, A. M. (1990). Assessing the causal relationship among communication, money management practices, satisfaction with financial status, and satisfaction with quality of life. *Lifestyles: Family and Economic Issues*, pp. 11, 343–360.

Munro, J., & Joan Hirt. (1998). Credit Cards and College Students: Who Pays, Who Benefits? *Journal of College Student Development*, p. 39, 1:51-57.

National Council of Teachers of Mathematics. (2011). 2011 NCTM legislative platform, Reston, VA.

NEFE (National Endowment for Financial Education). (2010). Your spending, your savings, your future. A beginners' guide to financial readiness. National Endowment for Financial Education, 1-53.

Novitasari, Dewiana & Juliana, Juliana & Asbari, Masduki & Purwanto, Agus. (2021). The Effect of Financial Literacy, Parents' Social Economic and Student Lifestyle on Students Personal Financial Management Article History. *Economic Education Analysis Journal*. 10. 522-531. 10.15294/eeaj.v10i3.50721.

SFC (2013). *Financial Knowledge and Capability in Hong Kong: A Foundation Study*.

Shefrin, H., & Statman, M. (1985). The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence. *The Journal of Finance*, 40(3), 777–790. <https://doi.org/10.2307/2327802>

Smythe, T. (2020). Improving Collegiate Financial Literacy via Financial Education Seminars. *Social Sciences Education eJournal*.

Noctor, M., Stoney, S. & Stradling, R. (1992). “Financial Literacy,” a report prepared for the National Westminster Bank, London.

O’Connell (2007). Measuring the Effectiveness of Financial Education, Retirement Commission, Wellington

O’Connell, A. (2009). Financial Literacy in New Zealand for the Capital Market Development Taskforce

OECD (2005). Recommendation on Principles and Good Practices for Financial Education and Awareness.

OECD (2010a). A framework for evaluating financial education programmes in Proceedings: OECD-Bank of Italy International Symposium on Financial Literacy. Paris: OECD

OECD (2010b). Detailed guide to evaluating financial education programmes

OECD (2011a). Improving Financial Education Efficiency, OECD-Bank of Italy Symposium on Financial Literacy.

OECD (2011b). Measuring Financial Literacy: Core Questionnaire in Measuring Financial Literacy: Questionnaire and Guidance Notes for conducting an Internationally Comparable Survey of Financial Literacy. Paris: OECD.

OECD (2012). High-level principles for the evaluation of financial education programs.

OECD (2013). Evaluating financial education programs: OECD-INFE Survey, evidence, policy instruments, and guidance.

OECD. (2014). PISA 2012 Results: Students and Money: Financial Literacy Skills for the 21st Century (Volume VI). OECD Publishing, Paris. <https://doi.org/10.1787/9789264208094-en>

OECD (2015). National Strategies for Financial Education: OECD/INFE Policy Handbook.

OECD (2016). “OECD/INFE International Survey of Adult Financial Literacy Competencies,” OECD, Paris, www.oecd.org/finance/OECD-INFE-International-Survey-of-Adult-Financial-Literacy-Competencies.pdf

OECD (2021), Digital Delivery of Financial Education: Design and Practice, OECD Publishing, Paris, <https://doi.org/10.1787/d02549e7-en>.

OECD/INFE (2013). OECD/INFE Toolkit to measure financial literacy and inclusion. Guidance, core questionnaire, and supplementary questions.

Okamoto S, Kobayashi E, Murayama H, Liang J, Fukaya T, Shinkai S. (2021). Decomposition of gender differences in cognitive functioning: National Survey of the Japanese elderly. *BMC Geriatr.* 2021 Jan 10;21(1):38. doi: 10.1186/s12877-020-01990-1. PMID: 33423660; PMCID: PMC7798327.

O'Neill, B., & Hensley, B.J. (2016). Building the Financial Education Capacity of Teachers: Does It Make a Difference?

Pang, M.F. (2010). Boosting financial literacy: benefits from learning study. *Instr Sci* 38, 659–677 (2010). <https://doi.org/10.1007/s11251-009-9094-9>

Parker, A. M., Bruin, W. B., Yoong, J., & Willis, R. (2012). Inappropriate confidence and retirement planning: Four studies with a national sample. *Journal of Behavioural Decision Making*, 25(4), 382–389.

Peng, T.-C. M., Bartholomae, S., Fox, J. J., & Cravener, G. (2007). The impact of personal finance education delivered in high school and college courses. *Journal of Family and Economic Issues*, 28, 20. Retrieved from <http://ezproxy.upm.edu.my:2073/content/p212n15t59041117/fulltext.pdf>

Pinto, M. B., Parente, D. H., & Mansfield, P. M. (2005). Information Learned From Socialisation Agents: Its Relationship to Credit Card Use. *Family and Consumer Sciences Research Journal*, 33(4), 357–367. <https://doi.org/10.1177/1077727X04274113>

Polit, D. F., & Beck, C. T. (2004). *Nursing research: Principles and methods* (7th ed.). Philadelphia, PA: Lippincott, Williams & Wilkins.

PACFL (2008). 2008 Annual Report to the President.

https://www.treasury.gov/about/organizational-structure/offices/DomesticFinance/Documents/PACFL_Draft-AR-0109.pdf

Potrich, Ani Caroline Grigion, Vieira, Kelmara Mendes, & Kirch, Guilherme. (2015). Determinants of Financial Literacy: Analysis of the Influence of Socioeconomic and Demographic Variables. *Revista Contabilidade & Finanças*, 26(69), 362-377.

Putri, Gianina & Rahadi, Raden & Tiara, Adhya. (2020). A Conceptual Study on The Impact of Parental Influence in Improving Financial Literacy of University Students. *Asia Pacific Journal of Social Science Research*. 5. 10.37263/apjssr.v5i1.61.

Rai K, Dua S, Yadav M. (2019). Association of Financial Attitude, Financial Behaviour and Financial Knowledge Towards Financial Literacy: A Structural Equation Modeling Approach. *FIIB Business Review*. 2019;8(1):51-60. doi:10.1177/2319714519826651

Rajna, A. (2019). Effects of a financial capability intervention program on the financial well-being of medical practitioners in Selangor, Malaysia. 10.13140/RG.2.2.22971.36646. ROBERTS, J. A., & JONES, E. (2001). Money Attitudes, Credit Card Use, and Compulsive Buying among

American College Students. *The Journal of Consumer Affairs*, 35(2), 213–240.
<http://www.jstor.org/stable/23860573>

Rauber, T., & Rüniger, G. (2007). Mixed task and data parallel executions in general linear methods. *Sci. Program*, 15, 137-155.

Respati, D. K., Widyastuti, U., Nuryati, T., Musyaffi, A. M., Handayani, B. D., & Ali, N. R. (2023). How do students' digital financial literacy and financial confidence influence their financial behavior and financial well-being?. *Nurture*, 17(2), 40–50.
<https://doi.org/10.55951/nurture.v17i2.154>

Runeson P., Höst M. (2009). Guidelines for Conducting and Reporting Case Study Research in Software Engineering. *Journal of Empirical Software Engineering*, 14(2):131-164.

Roberts, James & Jones, Eli. (2001). Money Attitudes, Credit Card Use, and Compulsive Buying Among American College Students. *Journal of Consumer Affairs*. 35. 213–240. 10.1111/j.1745-6606.2001.tb00111.x.

Sabri, Mohamad Fazli & Macdonald, Maurice & Hira, Tahira & Masud, Jariah. (2010). Childhood Consumer Experience and the Financial Literacy of College Students in Malaysia. *Family and Consumer Sciences Research Journal*. 38. 455–467. 10.1111/j.1552-3934.2010.00038.x.

Sabri, M. F., & Falahati, L. (2003). Predictors of financial well-being among Malaysian employees: Examining the mediate effect of financial stress. *Journal of Emerging Economies and Islamic Research*, 1(3), 1-16.

Schagen, S (1997). *The Evaluation of NatWest Face 2 Face with Finance*, NFER

Schmidt, M.C., J.M. Kolodinsky, C. Flint, & B. Whitney. (2006). “The impact of microenterprise development training on low-income clients,” *Journal of Extension* 44(2): Article 2FEA1.
<http://www.joe.org/joe/2006april/a1.php>.

Scott, C. H. (1990). National Survey, The Status of Consumer Education in United States Schools, Grades K-12

Sergio Camisón-Haba (2019). Global Corporate Social Responsibility Initiatives for Reluctant Businesses. *Financial Education*. <https://doi.org/10.1002/9781119610038.ch13>

Shaun Mundy (2008). Financial Education Programmes in Schools: Analysis of Selected Current Programmes and Literature, Draft Recommendations for Best Practices (OECD)

Sheeran, P. (2002). Intention—behaviour relations: A conceptual and empirical review. *European review of social psychology*, 12(1), 1–36. <https://doi.org/10.1080/14792772143000003>

Shim, S., Xiao, J. J., Barber, B. L., & Lyons, A. C. (2009). Pathways to life success: A conceptual model of financial well-being for young adults. *Journal of Applied Developmental Psychology*, 30(6), 708–723. <https://doi.org/10.1016/j.appdev.2009.02.003>

Shim, S., Bonnie L. Barber, N. A. Card, Jing Jian Xiao, & Joyce Serido. (2010). “Financial Socialization of First-Year College Students: The Roles of Parents, Work, and Education.” *Journal of Youth and Adolescence* 39 (12): 1457–70.

Shim, S. & Serido, J. (2011). Arizona pathways to life success for university students: Cultivating positive financial attitudes and behaviours for healthy adulthood. Tucson, AZ: University of Arizona. Retrieved on March 20, 2012, from <http://aplus.arizona.edu/Wave2-Report.pdf>

Shockey, S. S. (2002). Low-wealth adults' financial literacy, money management behaviours, and associated factors, including critical thinking / [Doctoral dissertation, Ohio State University]. OhioLINK Electronic Theses and Dissertations Centre.

Smith, L. (2004). Evaluation of the PFEG Excellence and Access programme. Commissioned from Brunel University and published by Peg.

Solis, O.J. (2018). Exploring Innovative Pedagogy To Deliver Financial Education: A Peer-To-Peer Event With Students. *American Journal of Business Education (AJBE)*.

Soroshian, S., & Teck, T.S. (2013). Spending Behaviour of a Case of Asian University Students. *Asian Social Science*, pp. 10, 64.

Spielhofer T., Kerr D., and Gardiner C. (2009). Evaluation of Learning Money Matters.

Stefan Angel (2018). Smart tools? A randomized controlled trial on the impact of three different media tools on personal finance, *Journal of Behavioural and Experimental Economics*, Volume 74.

Stevens, S.S. (1946). On the theory of scales of measurement. *Science*, 103, 677–680.

Stevens, S.S. (1951). Mathematics, measurement and psychophysics. In S.S. Stevens (Ed.), *Handbook of experimental psychology*, (pp. 1–49). New York: Wiley.

Stinson S, Wilkinson C. (2004). Creating a successful clinical extern program using a program planning logic model. *Journal for Nurses in Staff Development*. 2004:140 144.

Subarna Bir, J. (2016). Knowledge, Attitude and their Effect on the Recently Graduated Employees' Financial Management Practices and Satisfaction. *Economic Literature*, 12, 69–81. <https://doi.org/10.3126/el.v12i0.14889>

Suhuan, M. (2015). On Diversified Teaching of Finance Course in Information Era. *Journal of Tianjin Radio and Television University*.

Sunderaraman, P., Ho, S., Chapman, S., Joyce, J.L., Colvin, L.E., Omollo, S., Pleshkevich, M., & Cosentino, S. (2019). Technology Use in Everyday Financial Activities: Evidence from Online and Offline Survey Data. *Archives of clinical neuropsychology: the official journal of the National Academy of Neuropsychologists*.

Suchman, E. (1967). *Evaluative research: Principles and practice in public service and social action programs*. New York: Russell Sage Foundation.

Taft, M.K., Hosein, Z.Z., & Mehrizi, S.M. (2013). The Relation between Financial Literacy, Financial Well-being and Financial Concerns. *International Journal of Biometrics*, 8, 63.

Tang, Ning & Baker, Andrew & Peter, Paula. (2015). Investigating the Disconnect between Financial Knowledge and Behaviour: The Role of Parental Influence and Psychological Characteristics in Responsible Financial Behaviours among Young Adults. *Journal of Consumer Affairs*. 49. 10.1111/joca . 12069.

Taylor, S. & Wagland, Suzanne (2011). *Financial Literacy: A Review of Government Policy and Initiatives*;

Tennyson, S., & Nguyen, C. (2001). State curriculum mandates and student knowledge of personal finance. *Journal of Consumer Affairs*, 35(2), 241–262

Titus, P. M., Fanslow, A. M., & Hira, T. K. (1989). Net worth and financial satisfaction as a function of household money managers' competencies. *Home Economics Research Journal*, 17, 309–318.

Tschache, C.A. (2009). Importance of financial literacy and financial literacy content in curriculum.

University of Wisconsin Extension. (2002). *Enhancing program performance with logic models*. Retrieved from <http://www.uwex.edu/ces/lmcourse/#>

Van Rooij, Maarten, Lusardi, Annamaria and Alessie, Rob. (2011). Financial literacy and stock market participation, *Journal of Financial Economics*, 101, issue 2, p. 449-472.

Varcoe, K.P., Martin, A., Devitto, Z., & Go, C. (2013). Using a Financial Education Curriculum for Teens. *Financial Literacy eJournal*.

Vieira, Kelmara & Potrich, Ani & Mendes-Da-Silva, Wesley. (2019). A Financial Literacy Model for University Students. 10.1007/978-3-319-91911-9_4.

Volpe, R.P., H. Chen, & J.J. Pavlicko. (1996). "Personal Investment Literacy among College Students: A Survey," *Financial Practice and Education*, 6 (2), 86–94.

W.K. Kellogg Foundation. (2004). *Logic Model Development Guide*.

Wagner, Jamie Frances. (2015). An analysis of the effects of financial education on financial literacy and financial behaviours. *Student Work*. 3292.

Wagner, J., & Walstad, W.B. (2018). The Effects of Financial Education on Short-Term and Long-Term Financial Behaviours. *Journal of Consumer Affairs*.

Wagoner, N.E. & Suriano, J.R. (2008). Borrowing at the precipice. *Academic Physician and Scientist*. Retrieved December 6, 2008 from <http://www.acphysci.com/aps/resources/PDFs/APS%207-8.08%20skipjack%20web.pdf>

Walstad, William & Rebeck, Ken & Macdonald, Richard. (2010). The Effects of Financial Education on the Financial Knowledge of High School Students. *Journal of Consumer Affairs - J CONSUM AFF*. 44. 336–357. 10.1111/j.1745-6606.2010.01172.x.

Walstad, W.B., Urban, C., J. Asarta, C., Breitbach, E., Bosshardt, W.D., Heath, J., O'Neill, B., Wagner, J., & Xiao, J.J. (2017). Perspectives on evaluation in financial education: Landscape, issues, and studies. *The Journal of Economic Education*, 48, 112 - 93.

Wells, B., Epermanis, K., & Gibson, J. (2015). The Effect of Insurance Education on Consumer Attitudes: A Study of the Property and Casualty Industry.

Weiss, C.H. (1972). *Evaluation research*. Englewood Cliffs, NJ: Prentice-Hall

Wolla, Scott. (2017). Evaluating the effectiveness of an online module for increasing financial literacy. *Social Studies Research and Practice*, 12, 154–167. [10.1108/SSRP-04-2017-0014](https://doi.org/10.1108/SSRP-04-2017-0014).

Worthington, A.C. (2002). The Impact of Student Perceptions and Characteristics on Teaching Evaluations: A case study in finance education. *Assessment & Evaluation in Higher Education*, 27, 49–64.

Worthington, Andrew. (2006). Predicting Financial Literacy in Australia. *Financial Services Review*, 15.

Xiao, J. J., Chatterjee, S., & Kim, J. (2014). Factors associated with financial independence of young adults. *International Journal of Consumer Studies*, 38(4), 394–403. <https://doi.org/10.1111/ijcs.12106>

Xiao, J.J. & Porto, N. (2018). Geneva Pap Risk Insur Issues Pract (2018). <https://doi.org/10.1057/s41288-018-0108-1>

Xiao, J. J., Serido, J. & Shim, S. (2011a). Financial education, financial knowledge, and risky credit behaviour of college students. In *Financial decisions across the lifespan: Problems, programs, and prospects* (ed. by D. Lamdin), pp.113–128. Springer: New York.

Xiao, J. J., Tang, C., Serido, J., & Shim, S. (2011b). Antecedents and consequences of risky credit behaviour among college students: Application and extension of the theory of planned behaviour. *Journal of Public Policy & Marketing*, 30(2), 239–245. <https://doi.org/10.1509/jppm.30.2.239>

Yaghmale, F. (2003). Content Validity and Its Estimation. *Journal of Medical Education*, pp. 3, 25–27.

Yanchang Zhang, Yule Zhang. (2023). Exploration on the Reform of Accounting Practice Curriculum in Higher Vocational Education under the Background of Financial Shared Service Centre. *International Journal of New Developments in Education* (2023) Vol. 5, Issue 22: 72–79. <https://doi.org/10.25236/IJNDE.2023.052212>.

Yin Yin, K., Yusof, R., & Abe, Y. (2022). Integrating financial literacy into economics courses through digital tools: the Finlite app. *Journal of International Education in Business*.

Yu, C., & Law, E. (Research Team). (2015). Hong Kong financial competency framework. Hong Kong: Investment Education Centre.

Yuan, Haowen. (2015). How Financial Literacy Affects Budgeting Behaviours. Student Scholarship - College of Business. 4. https://digitalcommons.georgefox.edu/gfsb_student/4

Zeng, Hui-ping. (2011). The Application of Multimedia in the Teaching of Financial and Economic Laws and Regulations. *Journal of Chongqing Electric Power College*.

Zhu, Alex Yue Feng & Chou, Kee-Lee. (2018). Financial Literacy Among Hong Kong's Chinese Adolescents: Testing the Validity of a Scale and Evaluating Two Conceptual Models. *Youth & Society*. 52. 0044118X1775381. 10.1177/0044118X17753813.

Zhu, Youfeng. (2010). On Financial Accounting Teaching with Multimedia. *Journal of Zhejiang Shuren University*.

Appendix 1. Pre-survey

Pre-survey - Financial Education Program

The purpose of this survey is to study the impact of the financial education program. You are invited to participate in this survey because you are the student in this financial education program. This survey is anonymous and your participation is voluntary. The survey will be stored in a safe and locked location, the data will be encrypted with password protection in the files at the laptop. The data will be used for the research only and the result will be published in the thesis. By completing the survey, you agree to take part in this research. As this survey is anonymous, you cannot withdraw once you have completed and sent this survey to us.

Part one

Please indicate your choice for each statement below. Please mark a “✓” in the corresponding box to indicate your answer.

	True	False	Don't know
1. The financial charge of credit cards is usually $\geq 30\%$ per annum			
2. The mandatory provident fund is to help the people to save for their retirement protection			
3. Consumers are not able to check the license of insurance intermediaries			
4. Diversification could help to reduce investment risk			
5. Margin stock trading is charged at lower fees			

Part two

Please indicate your choice for each statement below to show how you manage your personal finance. If the statement does not apply to you, please select “NA”. Please mark a “✓” in the corresponding box to indicate your answer.

	Yes	No	N.A.
6. I have tracked my expenses			
7. I have made a financial goal			
8. I have checked the financial statements			
9. I have tried to save money			
10. I have sought for advice before making financial decisions			
11. I have reviewed my investment performance			
12. I have collected and read carefully the information of financial products			

Part three

Do you agree with the following statements? Please mark a “✓” in the box to show your answer.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
13. I should not spend with credit cards if I cannot repay all the debt					
14. Before making student loan application, I should understand the loan details					
15. Bankruptcy affects my job opportunities or credit applications in the future					
16. I should compare the risk and return before buying financial products					
17. I should conduct a rational analysis before investing					
18. I should use insurance to cover my risks					
19. I should make a financial plan to achieve a goal					
20. I should save money for emergency					
21. I should choose the investment products that fit my risk tolerance					

Part four

Please mark a “✓” in the corresponding box to indicate your answer.

22. Gender: Male Female
23. Age: Below 18 18 or above
24. Job status: No Yes, part-time job Yes, full-time job
25. Monthly income: HKD\$3,000 or below HKD\$3,001 – 6,000 HKD\$6,001 or above
26. Education: Higher Diploma or Associate degree Year 1 Year 2
 Bachelor Degree Year 1 Year 2 Year 3 Year 4 or above
27. Study major: Finance-related Business (non-finance) Education Arts
 Social science Science Engineering Health-related Others

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Appendix 2. Post-survey

Post-survey - Financial Education Program

The purpose of this survey is to study the impact of the financial education program. You are invited to participate in this survey because you are the student in this financial education program. This survey is anonymous and your participation is voluntary. The survey will be stored in a safe and locked location, the data will be encrypted with password protection in the files at the laptop. The data will be used for the research only and the result will be published in the thesis. By completing the survey, you agree to take part in this research. As this survey is anonymous, you cannot withdraw once you have completed and sent this survey to us.

Part one

Please indicate your choice for each statement below. Please mark a “✓” in the corresponding box to indicate your answer.

	True	False	Don't know
1. The financial charge of credit cards is usually $\geq 30\%$ per annum			
2. The mandatory provident fund is to help the people to save for their retirement protection			
3. Consumers are not able to check the license of insurance intermediaries			
4. Diversification could help to reduce investment risk			
5. Margin stock trading is charged at lower fees			

Part two

Please indicate your choice for each statement below to show how you manage your personal finance. If the statement does not apply to you, please select “NA”. Please mark a “✓” in the corresponding box to indicate your answer.

	Yes	No	N.A.
6. I have tracked my expenses			
7. I have made a financial goal			
8. I have checked the financial statements			
9. I have tried to save money			
10. I have sought for advice before making financial decisions			
11. I have reviewed my investment performance			
12. I have collected and read carefully the information of financial products			

Part three

Do you agree with the following statements? Please mark a “✓” in the box to show your answer.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
13. I should not spend with credit cards if I cannot repay all the debt					
14. Before making student loan application, I should understand the loan details					
15. Bankruptcy affects my job opportunities or credit applications in the future					
16. I should compare the risk and return before buying financial products					
17. I should conduct a rational analysis before investing					
18. I should use insurance to cover my risks					
19. I should make a financial plan to achieve a goal					
20. I should save money for emergency					
21. I should choose the investment products that fit my risk tolerance					

Part four

Do you agree that the following factors help you learn financial literacy? Please mark a “✓” in the box to show your answer.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
22. Lecturer					
23. PowerPoint					
24. Case study video					
25. Mobile app (Money tracker app)					
26. Budgeting and expense tracking exercise					
27. Booklet					
28. Overall program					

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Appendix 3. Interview Guide

The impact of a financial education program on financial literacy among tertiary students in Hong Kong

Overview of project aims

This project aims to investigate the financial literacy of tertiary students and study the impact of a financial education program on their financial literacy. The researcher is interested in the effectiveness of the financial education program and its influence on participants' financial literacy. The interviews concern the participants' opinions on their financial literacy; what they learn in the financial education program? how the program influences their financial literacy?

About the interview

1. **Ethics.** The researcher provides a consent form for the interviewees to sign. A participant information sheet will be also provided to the interviewees.
2. **Anonymity.** All quotes will be de-identified.
3. **Interview style.** The researcher will ask open-ended questions to interviewees without making any assumptions, interviewees should feel free to express their ideas.

	Questions and Prompts	Focus
1.	<p>These questions ask interviewees about their background</p> <ul style="list-style-type: none"> • Tell me about yourself and your study so far? • Why did you decide to take this financial education program? What were your main motivators? • How well do you manage your personal finance? How good? /How poor? • What does “financial literacy” mean to you before taking this financial education program? 	Background
2.	<p>These questions ask interviewees about their experience before the financial education program</p> <ul style="list-style-type: none"> • Before you took this financial education program, can you tell me about your experience with learning financial literacy? Tell me about the details of that learning activities? Which organization? How long? How do you feel about that learning experience? What had you learnt? Do you feel that that learning activities had any impact on your financial literacy? • Did your institution provide you with any learning activities about financial literacy? If yes, in what ways? • Do you feel that “financial literacy is an important life skill”? If yes, why? If not, why? • How do you evaluate your personal finance knowledge and skills? Money management: How do you do budgeting, tracking expenses and savings? Financial planning: How do you set financial goals and financial plans? Credit management: How do you manage your student loan, credit card or/and personal loan? Insurance: How do you handle life and general insurance? Investment: How do you manage the investment risks and return? • What reasons do you feel contributed to your strengths/weaknesses in personal finance? Personal interests, priority, habits, time or anything else? 	Before the financial education program
3.	<p>These questions ask interviewees about their experience after the financial education program</p> <ul style="list-style-type: none"> • After you had completed this financial education program, can you tell me about your experience with learning financial literacy? Had you participated in all parts of the program? How long and how many times? What factors facilitated and/or obstructed your program completion? • Can you describe the learning activities in the program? 	After the financial education program

	<p>What had you learnt? Do you think that the program had any impact on your financial literacy?</p> <ul style="list-style-type: none"> • Had you changed your attitude towards “financial literacy as an important life skill”? If yes, why? If not, why? • Do you feel that the program had any change on your personal finance knowledge and skills? If yes, in what ways? If no, why? • Do you realize that the program had any effect on your strengths/weaknesses in personal finance? If yes, how? If no, why? 	
4.	<p>These questions ask interviewees about the financial education program they participated</p> <ul style="list-style-type: none"> • How did you know this program? Where/When did you find it? • How do you feel about the current availability of financial education program for tertiary students? Are they sufficient? Why/ why not? • Tell me what format of financial education program would arouse your interest? How do you compare this program with other similar programs? • What is/are the major personal finance issue(s) for you/tertiary students? Do you think this program helped solve the issue(s)? • What are your opinions on the topics taught at the program? Money management? Financial planning? Credit management? Insurance? Investment? Financial responsibility or any others? Do you feel the coverage of the topics were adequate? If yes, why? If no, any topic suggestion? • How would you describe the lecturer? Was the financial literacy well taught by the lecturer? • Do you feel that you were given interaction opportunities during the program? Why/why not? How about the interaction you had with the lecturer? How about the interaction you had with other participants? Did the interaction help learn financial literacy? • How do you describe that the presentation materials had any influence on learning financial literacy? Did the presentation materials helped learning financial literacy? How do you feel about the short video clips? 	Financial education program

	<ul style="list-style-type: none"> • Tell me about your experience of using the booklet? When did you use the booklet? During the program/ After? How do you feel about the content? • Tell me about the experience of doing the budgeting and expense tracking exercise with the mobile app? How do you feel the mobile app? Were you successful the first time? What was the first outcome? How do you describe the learning experience? Was it good? What had you learnt from the exercise? • Tell me about the experience of the case study video discussion? What is your general opinion regarding the lecturer's comments you have received? Do you feel that these comments made your financial literacy better? How? If not, why not? What had you learnt during the discussion? • To what extent do you feel the financial education program plays a role in learning financial literacy? Why? • In your opinion, was the program of high quality? Why/Why not? Are there any improvement suggestions for the program? Any other comments for the program? 	
5.	<p>These questions ask interviewees about their opinions on financial literacy</p> <ul style="list-style-type: none"> • To what extent do you consider the financial literacy to be good? Do you feel your financial literacy is good or poor? If good, why? If poor, why? Would you say that your financial literacy level was similar to that of your peers? • How would you describe the financial literacy of tertiary students in Hong Kong? If good, how good they are? If not, how poor they are? • What would you suggest to improve the financial literacy of tertiary students? What types of interventions could improve the financial literacy of tertiary students? • To what extent do you think the financial education influences the financial literacy? • Would you say that the financial literacy influences the financial well-being? What outcome do you expect for having good financial literacy? 	Financial literacy

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