‘The relationship between demographic factors and financial literacy among students at a South African university’

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DECLARATION

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ABSTRACT

In recent times, financial literacy has become increasingly important. This is true for a number of reasons including the increased number and complexity of financial products available to the consumer. The problem however is that people around the world appear to have low levels of financial literacy. Furthermore, existing research finds a number of variables to be associated with financial literacy however the results are contradictory. Thus, the objective of this study was to assess financial literacy levels of South African university students and furthermore identify which variables are associated with financial literacy of university students. This study surveys 373 students from a single South African university. Results show that students have moderate basic financial literacy. While students are found to have low levels of sophisticated financial literacy, overall, students are considered moderately financially literate. Self-assessed financial literacy is also found to be a proxy for financial literacy. A univariate analysis reveals that a number of factors were found to significantly influence the overall financial literacy of students. In summary, the variables found to be significantly associated with basic financial literacy scores of students were gender, race, previous finance course, faculty of study, perceived socio-economic status and money management. The variables significantly associated with sophisticated financial literacy score are gender, race, previous finance course, faculty of study, mother's education and father's occupation. Lastly, the variables significantly associated with total financial literacy score were gender, race, previous finance course, faculty of study, father's occupation and perceived socio-economic status. Logistic regression was used to analyse variables in a multivariate context. The purposeful method was used to select variables for the logistic regression. The variables race, faculty of study and previous participation in a finance course were found to be significant determinates in overall financial literacy of students in a multivariate model. This study contributes to the existing research that finds students to have overall moderate levels of financial literacy. Furthermore, this study adds to the existing research that finds a number of demographic variables to be associated with financial literacy in a multivariate context.

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CHAPTER 1 - INTRODUCTION

1.1 Background

According to Greenspan (2002) one of the main problems with the generation and the economy of today is a lack of financial literacy. Across the world, studies have been carried out to measure financial literacy (Atkinson & Messy, 2011). This includes studies conducted in developed and developing nations that make use of adult and student populations. The general consensus is that individuals are not financially literate. This is of particular concern for a number of reasons. The most important of these reasons is the increased number and complexity of financial products. This becomes a pressing issue when coupled with the changes in retirement provision in the workplace, specifically the shift in responsibility that results in employees having to choose the assets in which they wish their accumulation to be invested in (Broadbent, Palumbo, & Woodman, 2006). This issue becomes especially worrying when considering low financial literacy levels in student populations (Oseifuah & Gyekye, 2014), most of which are likely to enter the workforce and assume financial responsibilities in the near future. The potential problem arises as a result of the combination of poor financial literacy of the youth, together with a shift in responsibility for making sound investment choices, which potentially leaves future employees with an uncertain financial future.

Financial literacy, although widely researched, does not have an exact definition (Hung, Parker, & Yoong, 2009). There are varying definitions, some of these more complex than others. For example, one study defines financial literacy simply as one's basic financial knowledge (Hilgert, Hogarth, & Beverly, 2003). However, more recently the definition has been expanded upon. An example of this is seen in a recent study that defined financial literacy as a combination of knowledge, awareness, skill, attitude and behaviour necessary to make sound financial decisions (Atkinson & Messy, 2012).

The varying definitions of financial literacy have resulted in different measurement tools used by researchers (Hung *et al*., 2009). Some studies claim to measure all domains of financial literacy, while others measure financial literacy by assessing financial knowledge,

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both basic (Lusardi & Mitchell, 2006) and sophisticated (Lusardi & Mitchell, 2007b). These researchers justify their measurement by providing evidence that supports the notion that improved financial knowledge leads to better financial decision-making and thus financial wellbeing. Additional research shows that enhanced financial knowledge leads to informed decision-making and behaviour. In this regard, it can be argued that measuring financial knowledge captures one's financial literacy.

The results from some existing research shows that globally, people generally have low levels of financial literacy (Atkinson & Messy, 2012). In addition to this fact, a number of variables have been shown to be associated with financial literacy (Lusardi, Mitchell, & Curto, 2010; Mckenzie, 2010; Widdowson & Hailwood, 2007). These include age, race, gender, education, parental and other influences as well as socio-economic status. The results of some studies differ in terms of the impact that these variables have upon financial literacy.

Of particular interest are the financial literacy levels and factors related to financial literacy, when considering an educated sample, such as that of students. Some research has shown that people with higher levels of education are more financially literate (Chen & Volpe, 2002; Mandell & Klein, 2009). Those who have a university qualification or higher are more likely to be financially literate than others. That being said, the literature also shows that people at university are not necessarily financially literate (Chen & Volpe, 1998). Limited research has been undertaken to measure financial literacy in South Africa, especially that of student populations. Of the South African student specific-studies, the results confirm the findings of studies conducted worldwide, showing that financial literacy is generally low (Oseifuah, 2010; Oseifuah & Gyekye, 2014).

1.2 Problem statement

Many studies have been conducted to assess financial literacy levels among different groups of people. These studies have identified various demographic variables as being associated with financial illiteracy. However, the results are contradictory. The problem, therefore, emerges that there is lack of consensus regarding the significance of various demographic variables relating to financial literacy, and this is particularly true for student

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populations. Furthermore, most studies have focused upon adults in developed world countries, with very few considering financial literacy of students in a developing world context, specifically in South Africa.

The problem statement thus follows:
What is the relationship between demographic factors and financial literacy among students at a South African university?

1.3 Research objectives

This study is guided by the following research objectives:

- To assess the financial literacy levels among South African university students.
- To identify whether age, race, gender, education, parental and other influences, as well as socio-economic status, are associated with financial literacy levels of university students.

1.4 Importance and benefits of the proposed study

Improving financial literacy is essential for financial stability (Hung *et al*., 2009). Perry and Morris (2005) found that financial literacy improves one's inclination towards saving, budgeting and planning for the future. This was supported by a study by Hilgert *et al*. (2003) that showed that financial knowledge can be statistically linked to financial practices related to cash-flow management, credit management, saving and investment.

Research shows that financial literacy levels around the world are generally low (Atkinson & Messy, 2012). In addition, even those considered to be educated are not necessarily financially literate (Shambare & Rugimbana, 2012). To add to these findings, previous research has also identified many other factors to be associated with financial illiteracy (Almenberg & Säve-Söderbergh, 2011; Lusardi *et al*., 2010; Mckenzie, 2010). There are, however, conflicting findings as to which of these factors are most significant (Oseifuah, 2010). It is thus necessary for studies to be conducted to better understand the factors

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most significantly associated with financial literacy and thus to understand why there are generally low levels of financial literacy among people globally.

Financial literacy in developing world nations such as South Africa, particularly considering student-specific populations, has not been widely researched. The few studies that have been conducted have found students to have low to moderate financial literacy. Additionally, these studies display conflicting results as to which factors are related to financial literacy (Oseifuah, 2010; Shambare & Rugimbana, 2012; Struwig, Roberts, & Gordon, 2013).

In conclusion, existing research globally has shown generally low to moderate levels of financial literacy among adults as well as students. Moreover, there is contradictory evidence as to the factors found to be related to financial literacy. The present study will thus add to the existing research that has been conducted, making use of student populations in a South African context. This should allow for an improved understanding of financial literacy levels and the factors related to students' financial literacy.

1.5 Delimitations and limitations

The literature reviewed includes studies carried out internationally and in South Africa. However, the empirical part of this study considers only students at a South African university. The literature also includes studies carried out across different life stages such as high school, university and adulthood. However, the empirical part of this study considers only students enrolled at the University of Pretoria.

This study makes use of a narrow sample of university students from a single South African university. Given that data was collected from students at a single South African university, generalizations cannot be made regarding all students attending South African universities. The sampling process used was that of convenience sampling and thus generalizations can also not be made about the entire University of Pretoria student population. Therefore caution should be exercised when making generalizations from this study.

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1.6 Chapter overviews

Chapter 2 of this research study is a review of the existing literature. Section 2.2 includes the definitions of financial literacy considered in the existing literature. Section 2.3 includes the various measurement tools previously used to measure financial literacy. Given a better understanding of the definition of financial literacy and existing measurement strategies, section 2.4 considers the importance of financial literacy. This is followed by section 2.5, which is a review of worldwide financial literacy levels. In addition to literacy levels the factors found to be associated with financial literacy are discussed in section 2.6.

Chapter 3 provides an overview of the research design and methods. In the research design and methods chapter, the research instrument considered for the present study is discussed, specifically the reliability and validity of the chosen financial literacy tool is discussed. Additionally the questions used to capture the socio-economic variables for this study are also discussed. Section 3.3.3 explains the statistical tests used in the present study, that is both the univariate and multivariate analysis. Sections 3.4 and 3.5 include an overview of the limitations of this study, as well as research ethics.

Chapter 4 provides the analysis and interpretation of the research results. This chapter is divided into four broad sections. The first section includes a descriptive analysis of each demographic variable tested in the present study. This is followed by section B, which includes a descriptive analysis of the financial literacy scores. The third section of this chapter includes an in-depth statistical analysis of the univariate tests chosen for this study. The fourth and final section of chapter 4 includes the statistical analysis from the logistic regression.

Chapter 5 provides a discussion of the findings, comparing the results of the conducted research with those from existing research that was presented in the literature review chapter. The financial literacy scores as found in the present study are discussed as well as the significance of each variable on financial literacy as found by the univariate and multivariate analysis.

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This research study concludes with a final chapter, chapter 6, which provides a summary of the findings, as well as a conclusion, summary of contributions and suggestions for further research.

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CHAPTER 2 – LITERATURE REVIEW

2.1 Introduction

In order to better understand what is meant by financial literacy, this chapter considers some of the existing definitions of financial literacy. Given a better understanding of financial literacy, the next section in this chapter considers the existing measurement tools used to measure financial literacy. This is then followed by a description of the importance and benefits of financial literacy. Next the chapter explores the findings from existing research on financial literacy levels around the world, specifically comparing those in developing and developed nations as well as adult and student populations. Many of these studies that consider financial literacy levels also reveal that numerous factors are related to financial literacy. Each factor is discussed in detail in the section that follows. The chapter concludes with a summary of the findings that have emerged from past studies.

2.2 Defining financial literacy

There is debate as to an appropriate definition for financial literacy (Fernandes, Lynch Jr, & Netemeyer, 2014; Remund, 2010). This is compounded by the fact that many studies fail to define what is meant by financial literacy (Hung *et al*., 2009). The conceptual definitions, as contained in a number of existing studies, are summarized in Table 2.1 in order to illustrate the many different views of the term 'financial literacy'.

Table 2.1: Conceptual definitions of financial literacy

Source	Conceptual Definition
Hilgert et al. (2003)	Financial knowledge.
FINRA (2003, p. 2)	"The understanding ordinary investors have of market principles, instruments, organizations and regulations"

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Moore (2003, p. 29)	"Individuals are considered financially literate if they are competent and can demonstrate they have used knowledge they have learned. Financial literacy cannot be measured directly so proxies must be used. Literacy is obtained through practical experience and active integration of knowledge. As people become more literate they become increasingly more financially sophisticated and it is conjectured that this may also mean that an individual may be more competent"
Beal and Delpachitra (2003, p. 1)	"the ability to make informed judgements and to take effective decisions regarding the use and management of money"
Markow and Bagnaschi (2005, p. 3) using a survey for the National Council on Economic Education (NCEE)	"Familiarity with basic economic principles, knowledge about the U.S. economy, and understanding of some key economic terms"
Mandell (2008, pp. 163-164)	"The ability to evaluate the new and complex financial instruments and make informed judgments in both choice of instruments and extent of use that would be in their own best long-run interests"
Lusardi and Mitchell (2007c, p. 36)	[Familiarity] with "the most basic economic concepts needed to make sensible saving and investment decisions"
Lusardi and Tufano (2009, p. 1)	Focus upon debt literacy, a component of financial literacy, defining it as the ability to make simple decisions regarding debt contracts, in particular how one applies basic knowledge regarding interest compounding and how it is measured in the context of everyday financial choices
ANZ Bank (2008), drawn from Schagen (2007; p. 1)	"The ability to make informed judgements and to take effective decisions regarding the use and management of money"
Lusardi and Mitchell (2008, p. 3)	"Knowledge of basic financial concepts, such as the working of interest compounding, the difference between nominal and real values, and the basics of risk diversification"
Huston (2010, p. 306)	"Measuring how well an individual can understand and use personal finance-related information"
Buckland (2010, p. 4)	"…having the appropriate knowledge, skills and attitude about daily and longer-term finances to maintain or promote one's financial wellbeing"

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Remund (2010, p. 279)	"...conceptual definitions of financial literacy fall into five categories: (1) knowledge of financial concepts , (2) ability to communicate about financial concepts, (3) aptitude in managing personal finances, (4) skill in making appropriate financial decisions and (5) confidence in planning effectively for future financial needs"
Fornero and Monticone (2011, p. 3)	"…the level of their financial knowledge, their ability to deal with financial decisions…"
Atkinson and Messy (2011, p. 4); (2012, p. 14)	"Financial literacy is a combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing"
Fernandes et al. (2014, p. 83)	"…the knowledge of basic concepts of personal finance with respect to borrowing/debt, and saving/investments that leads to better lifetime financial decision-making."

Source: Adapted from Hung et al. (2009).

Hilgert et al. (2003) define financial literacy as financial knowledge. Although this is a basic definition, they further elaborate upon this definition by suggesting that increased financial knowledge leads to changes in financial behaviour. Their research shows that financial knowledge is statistically linked to financial practices. In the same year, Beal and Delpachitra (2003) discussed a number of earlier definitions relating to financial literacy. In their research, they use the following definition "the ability to make informed judgements and to make effective decisions regarding the use and management of money". This is a more elaborate definition than that of Hilgert et al. (2003) and it is more widely used, as is evident in similar research by Moore (2003). The point made by Moore (2003), which is in line with that of Beal and Delpachitra (2003), is that financial literacy is a combination of knowledge and the application of this knowledge.

Markow and Bagnaschi (2005), using a survey designed for the The National Council of Economic Education (NCEE), consider financial literacy to be "familiarity with basic economic principles, knowledge about the U.S. economy, and understanding of some key economic terms". This more inclusive definition is in line with the proposal of Mandell (2008) whose definition includes the ability to use financial knowledge as well as making informed judgements with respect to different existing financial instruments. This is also similar to the conceptual definition as reported by ANZ Bank (2008) and Fornero and

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Monticone (2011) which states that financial literacy is financial knowledge and the ability to make informed decisions based upon this knowledge.

More recent research has included factors such as skill, attitude and behaviour in the definition of financial literacy. Buckland (2010) focused upon knowledge, skills and attitude. When defining financial literacy, Atkinson and Messy (2012) added behaviour to this definition. Remund (2010) proposed that the conceptual definition of financial literacy falls into five categories. These categories include knowledge, ability, skill, aptitude and confidence in planning effectively for future financial needs.

Although Remund (2010) proposed that five categories should be required in order to define financial literacy, not all subsequent studies have made use of this definition. Some of the most recent studies have utilised a more simplified definition of financial literacy, this being merely a combination of knowledge of various financial topics that would ensure a better future financial wellbeing (Fernandes *et al*., 2014).

The debate as to the most accurate definition of financial literacy is on-going. In order to measure financial literacy, it is necessary to establish exactly what is meant by 'financial literacy'. Hung et al. (2009) explain that in order for a measurement tool to be reliable, the definition must be lucid. Thus the debate as to a correct definition of financial literacy is aimed at helping to establish how to accurately measure financial literacy. An in-depth analysis of the existing surveys used in financial literacy measurement is discussed in the following section.

2.3 Evaluation of financial literacy surveys

As explained in the previous section, a great deal of variation exists as to how previous studies have defined financial literacy. As a consequence of the variety of definitions, the measurement of financial literacy varies substantially across studies (Hung *et al*., 2009).

Hung et al. (2009) compared previous studies based upon the financial literacy measurement tool used in each study. In the present study, their findings have been updated to include more recent literature and these are presented in Table 2.2. The table

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clearly shows the measurement strategy used. That is whether financial literacy has been measured by means of a performance test (financial knowledge based) or a self-assessment test (perceived financial literacy). Specifically a performance test measures financial literacy by means of a set of questions asked as a 'test'. While self-assessed financial literacy is a measure of financial literacy as perceived by the respondent. It has been shown that testing for perceived financial literacy differs from testing financial literacy by means of a performance test (Agnew & Szykman, 2005). Thus perceived financial literacy should not be used as a substitute for actual financial literacy, given the large differences in results found between these two concepts (Agnew & Szykman, 2005). Research on financial literacy often differs in content domain, with some studies testing for saving, investment and debt, while some test for a combination of the these three domains (Hung *et al*., 2009).

Lusardi and Mitchell (2006) designed a survey for the 2004 Health and Retirement Study (HRS) to test for basic financial literacy. The survey consisted of three questions. These three questions measure what is considered 'basic' financial literacy. These questions test for knowledge on computation of interest rates, effect of inflation and the concept of risk diversification. Although this tool has been widely used, it is not sufficiently sophisticated to asses saving and investment decisions. Such an additional survey was designed to test for understanding of the risk-return relationship - how bonds, stocks and mutual funds (unit trusts) and basic asset pricing function. These additional questions measure what is considered sophisticated financial literacy (Alessie, Lusardi, & Van Rooij, 2007; Lusardi, 2008; Lusardi & Mitchell, 2007b).

The basic financial literacy test of Lusardi and Mitchell (2006) is widely used, as can be seen in Table 2.2. Some studies add to these basic questions in order to assess other concepts concerning financial literacy. These concepts include, but are not limited to, understanding debt, saving, investment and retirement preparation. Some recent studies have used both the basic financial literacy test (Lusardi & Mitchell, 2006) and the more sophisticated test developed by Lusardi and Mitchell (2007b). The questions, basic and sophisticated, as developed by Lusardi and Mitchell (2007b) represent one of the most widely used and accepted measurement tools in terms of evaluating financial literacy.

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Table 2.2: Strategies for measuring financial literacy

Publication	Measurement tool	Measurement strategy (a)		Content domain (b)		
		SA	PT	S	I	D
Volpe, Chen, and Pavlicko (1996)	Percent correct on 10 multiple-choice items.		X		X	
Chen and Volpe (1998)	Percent correct on 36 multiple-choice items.		X	X	X	X
Volpe, Kotel, and Chen (2002)	Percent correct on 10 multiple-choice items.		X		X	
Chen and Volpe (2002)	Extensive questionnaire – questions used from related literature, tested by experts and improved through pilot studies.		X	X	X	X
Hilgert et al. (2003)	Percent correct on a knowledge test (Credit, cash flow management, investing and saving index).		X	X	X	X
Moore (2003)	Financial knowledge: 12 items Financial experiences: 14 items Financial behaviour: 15 items Debt confidence: 1 subjective question.	X	X	X	X	X
Mandell (2004)	Percent correct on a 31-item knowledge test.	X	X		X	
Markow and Bagnaschi (2005)	Percent correct on a 24-item knowledge test.		X	X	X	X
Worthington (2006)	Eighty questions aimed at measuring adult financial literacy.		X	X	X	X
Lusardi and Mitchell (2006)	Correct responses to 3 multiple-choice and true/false items (Compound interest/inflation, risk diversification).		X	X	X	
Lusardi and Mitchell (2007a)	Correct responses to 3 computational items (Lottery division, compound interest, percent calculation).		X	X	X	
(Alessie et al., 2007)	Two weighted averages of correct/incorrect responses (based upon factor analyses) (a) 5 multiple-choice basic financial literacy items (Lusardi & Mitchell, 2007a) (b) 11 multiple-choice sophisticated financial literacy items.	X	X	X	X	
Lusardi and Mitchell (2007b)	A single weighted average of (a) 5 multiple-choice basic financial literacy items (b) 8 multiple-choice sophisticated financial literacy items.	X	X	X	X	
Mandell (2008)	Percent correct on a knowledge test (31 items).		X	X	X	X
Lusardi and	Correct responses to 3 multiple-choice and		X	X	X	

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Mitchell (2008)	true/false items Compound interest/inflation, risk diversification (Lusardi & Mitchell, 2006).					
Lusardi and Tufano (2009)	Correct responses to 3 individual multiple-choice items (financial knowledge related to debt).	X	X			X
Widdowson and Hailwood (2007)	Mean score, based upon target responses to 26 questions derived from an operational framework.	X	X	X	X	X
Mandell and Klein (2009)	2004 Jumpstart questionnaire.					
Hung et al. (2009)	(a) 5 multi-choice on basic financial literacy, (b) 8 multi-choice on sophisticated financial literacy (Lusardi & Mitchell, 2007b) (c) 9-10 are from FINRA Investor Survey (d) 11 from Agnew and Utkus, *et al*., (2005) (e) 12 from Survey of Financial Literacy in WA State; (f) 13-14 from Kimball and Willis.	X	X	X	X	
Lusardi and Mitchell (2010)	A single weighted average of (a) 5 multiple-choice basic financial literacy items (b) 8 multiple-choice sophisticated financial literacy items (Lusardi & Mitchell, 2007b).	X	X		X	
Oseifuah and Gyekye (2014)	Mean score, based upon target responses to 26 questions derived from an operational framework (Widdowson & Hailwood, 2007).	X	X	X	X	X
Mckenzie (2010)	31 item Jumpstart Survey (Mandell, 1998).		X	X	X	X
Lusardi et al. (2010)	Correct responses to 3 multiple-choice and true/false items (Lusardi & Mitchell, 2006).		X	X	X	
Lusardi and Mitchell (2011a)	Correct responses to 3 multiple-choice and true/false items (Lusardi & Mitchell, 2006).		X	X	X	
Fornero and Monticone (2011)	Compound interest & inflation (Lusardi & Mitchell, 2006) Additional question on stocks versus mutual funds.		X		X	
Brown and Graf (2013)	Correct responses to 3 multiple-choice and true/false items Compound interest, inflation & risk diversification (Lusardi & Mitchell, 2006).		X		X	
Agnew, Bateman, and Thorp (2013)	Correct responses to 3 multiple-choice and true/false items Compound interest/inflation, risk diversification (Lusardi & Mitchell, 2006).		X	X	X	
Shambare and Rugimbana (2012)	Correct responses to 3 computational items Compound interest/inflation, risk. diversification (Lusardi & Mitchell, 2006)		X		X	

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	(adapted for South Africa).					
Fernandes et al. (2014)	13 item survey with questions taken from the following existing instruments: (a) 1 and 2: (Lusardi & Mitchell, 2006) (b) 3, 4, 5, 10, 11, 12: Alessie et al. (2007); Lusardi and Mitchell (2007b) (c) Agnew and Utkus (2005) (d) 7 and 8: Hung, Meijer, Mihaly, Yoong (2009) (e) Lusardi (2010) (f) Lusardi and Tufano (2009).		X		X	X

a Measurement Strategy: SA = Self-Assessment, PT = Performance Test
b Content domain (what the measurement strategy aimed to test) S = Savings, I = Investment, D = Debt

Source: Adapted from Hung et al. (2009, pp. 9-10).

The above review provides an in-depth analysis of the existing tools used to measure financial literacy. The survey used by Lusardi and Mitchell (2007b) is widely used among researchers to assess financial literacy of students and adult populations. Their survey tests for basic and sophisticated financial literacy.

Given a better understanding of the definition and measurement of financial literacy, strategies to improve financial literacy can be implemented. The published literature provides some evidence to suggest that financial literacy is important for a number of reasons, including wealth accumulation, savings and retirement provision (Behrman, Mitchell, Soo, & Bravo, 2010; Lusardi & Mitchell, 2007a). The following section elaborates upon the importance of financial literacy.

2.4 Importance of financial literacy

There has been a large growth in number and complexity of financial products in recent years. These products include, but are not limited to, student loans, credit cards, savings and pension accounts. A problem that arises from this fact is that many of these products, which aim to aid and support in financial wellbeing, have proven to be inordinately complex for the financially inexperienced to make effective use of them (Lusardi & Mitchell, 2006). While these products aim to assist the consumer, they also place greater responsibility on the consumer to effectively borrow, save and invest with the help of specially designed

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financial contracts. In this regard, it is of concern that most people do not appear to be sufficiently equipped to make complex financial decisions (Lusardi & Mitchell, 2013).

In the context of retirement savings, the shift from defined benefit to defined contribution plans has resulted in greater responsibility being placed on the employee. What is implied here is that the employee becomes responsible for the decision as to how his/her pension contribution is invested, as opposed to this decision being made by the employer, as was the case for defined benefit plans (Bodie, Marcus, & Merton, 1988). This problem, paired with the increasing number and complexity of financial instruments, results in increased risk being borne by the employee (Broadbent et al., 2006).

Research has shown that financial literacy is related to investment decisions, retirement planning and savings behaviour (Lusardi, 2008). Similar research conducted in the Netherlands has revealed that those people who have greater levels of financial knowledge are more likely to think about retirement (Alessie, Van Rooij, & Lusardi, 2011). As many as 70% of Germans that came from a household where there had been planning for retirement, were able to answer all the questions to a financial literacy survey correctly (Bucher-Koenen & Lusardi, 2011). This shows that those who are financially literate are more likely and able to plan for retirement. Financial literacy was found to be positively related to financial planning, as well as making use of private pension plans in Russia (Klapper & Panos, 2011), Japan (Sekita, 2011) and Romania (Beckmann, 2013). Beckmann (2013) also found that those people who were financially literate were more likely to save, specifically making use of multiple interest bearing accounts.

It is evident that financial literacy plays a key role in most peoples' lives. This is more so now than ever before. It is consequently of concern that research shows that many people around the world have low financial literacy levels (Atkinson & Messy, 2012). Thus, people fail to make use of modern financial instruments, which are implemented to aid in financial wellbeing and retirement provisions.

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2.5 Financial literacy levels

From the previous section, it is clear that financial literacy plays a role in future financial wellbeing. The following section examines financial literacy levels around the world. Firstly, general worldwide financial literacy levels are considered. This is followed by a consideration of literacy levels found in developed and developing world nations, specifically using the basic financial literacy measurement tool developed by Lusardi and Mitchell (2006). Research considering student-specific samples using a number of research instruments is subsequently interrogated. Lastly, research conducted in South Africa using student-specific samples is considered.

Financial literacy in most parts of the world is low. Table 2.3 summarizes the findings from a recent study conducted in 14 countries. The table shows that respondents in Armenia, South African and Poland were found to have the lowest average financial literacy scores. While those in Malaysia, Hungary, Germany and the British Virgin Islands had the highest average financial literacy score (Atkinson & Messy, 2012). In addition to their findings, an overview of financial literacy across New Zealand, Japan, Sweden, Italy and the US also concluded that financial literacy is low in those countries and that there is a need for improved financial education (Lusardi & Mitchell, 2011c). In contrast, studies done on the general populations in the Netherlands (Alessie *et al*., 2011) and Switzerland (Brown & Graf, 2013) showed relatively high levels of financial literacy in comparison to the rest of the world.

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Table 2.3 Country groupings by average overall financial literacy scores

Country	Lower average overall score						Higher average overall score
Armenia							
South Africa							
Poland							
Estonia							
Albania							
Norway							
Czech Republic							
Peru							
United Kingdom							
Ireland							
Malaysia							
Hungary							
Germany							
British Virgin Islands							

Source: Atkinson and Messy (2012, p. 41).

Using their three-question survey, Lusardi and Mitchell (2011b) found that the general adult population in the United States of America lacks understanding of key financial concepts. Specifically knowledge of interest, inflation and risk-return concepts. A study on a sample representative of the Italian population found similar results (Fornero & Monticone, 2011). It was shown that Italians lack an understanding of basic financial concepts, although their knowledge of inflation and stocks was somewhat better than that of interest-compounding. Similarly, in Japan, only 49% of respondents were able to correctly answer a question on inflation and interest (Sekita, 2011). This was also consistent with the results emerging from a survey conducted in Thailand (Grohmann, Kouwenberg, & Menkhoff, 2014). However, only 17.6% of those people surveyed in Thailand were able to answer all three of the survey questions correctly. Research conducted in Sweden found as few as 27% of the respondents were able to answer two of the three questions regarding interest and inflation accurately, and only 21% were able to answer all three questions correctly (Almenberg & Säve-Söderbergh, 2011). In Mexico,

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only 32% of the respondents were able to correctly answer the questions on interest and inflation, while 23% of the respondents had some knowledge on investment returns (Hastings & Tejeda-Ashton, 2008). In Russia, the results were similar for the interest and inflation question, however only 3.1% of the respondents were able to answer all three questions correctly.

Studies conducted in developed world nations appear to score higher on financially literate questions than those in developing world nations. However, neither are considered financially literate. Germans appear to have the best understanding of inflation and interest when applying the Lusardi and Mitchell (2006) survey. The results show that 72% of the respondents were able to answer the interest and inflation questions correctly. That being said, only half of the respondents were able to answer all three questions correctly. In many instances, financial literacy levels of people living in developing countries, measured using the basic measurement tool used by Lusardi and Mitchell (2006), were found to be even lower than those in developed countries (Beckmann, 2013; Cole, Sampson, & Zia, 2011; Hastings & Tejeda-Ashton, 2008; Klapper & Panos, 2011). In India and Indonesia, respondents' average score for a financial literacy test was 38% and 55% respectively (Cole *et al*., 2011). Similar results emerged from a study conducted in Romania, where fewer than 5% of the respondents were able to answer all questions on financial literacy correctly (Beckmann, 2013).

Some studies make use of other instruments to test for financial literacy. One such study was conducted in South Africa by Struwig et al. (2013). These researchers used a sample that was not student-specific but that tested a diverse range of South Africans. They found that South Africans scored an average of 54% in this financial literacy test. This instrument, although not identical to that of Lusardi and Mitchell (2006), is similar in that it also tests the financial literacy concepts including interest, inflation and risk. The findings of Struwig et al. (2013) are similar to those of Atkinson and Messy (2012) who considered a large sample that included a group of South Africans of all ages. These findings highlight that South Africans are not considered to be financially literate.

Some studies make use of student-specific populations. The following studies make use of surveys other than that of the three-question test by Lusardi and Mitchell (2006), to asses

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financial literacy levels. In one of these studies, it was found that Malaysian university students had poor levels of financial literacy (Sabri, Macdonald, Hira, & Masud, 2010). In this case, many university students across Malaysia took part in a study where it was concluded that financial literacy is a problem for university students across all levels of academic ability and financial background. Mckenzie (2010) also found that, on average, American university students had high levels of financial literacy. In contrast, this was not found to be true for students at one particular American university (Avard, Manton, English, & Walker, 2005).

Only a few studies have been conducted in South Africa that are specifically focused upon students. One such study was conducted by Shambare and Rugimbana (2012) who found moderate financial literacy levels among university students when using the survey of Lusardi and Mitchell (2006). Similar results were found among youth entrepreneurs in Limpopo, although a different survey instrument was used to measure financial literacy (Oseifuah, 2010). This is in contrast to a survey administered to students in Venda that found respondents to have low financial literacy (Oseifuah & Gyekye, 2014).

As an overall finding, research has shown that people in developed and developing nations have moderate to low levels of financial literacy. Limited research has considered student-specific populations and this is particularly true in terms of South African students. While limited, current research on South African students has given rise to contradictory results regarding financial literacy. In terms of studies conducted in other parts of the world, that also consider student populations, results have shown that students have generally moderate to low financial literacy levels. Further research using South African student populations should help to resolve this disparity. Furthermore, to better understand the problem of generally low to moderate financial literacy levels more clearly, it would be necessary to identify more closely the key factors/variables that are associated with financial literacy.

2.6 Factors influencing financial literacy

While it is clear that financial literacy is important and that it is generally low around the world, there is extensive literature showing that many different factors can influence

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financial literacy (Hung *et al*., 2009). These factors include age, race, gender, education, parental and other influences, as well as income/socio-economic status. Each of these factors is addressed in more detail below.

2.6.1 Age

Existing research has shown that age is related to financial literacy. With time, many people learn more about financial instruments and money management. This was illustrated in a study conducted in Australia. These authors found that younger individuals had lower financial literacy (Agnew *et al*., 2013). This was further supported by studies on American university students (Chen & Volpe, 1998) and high school students in New Zealand (Cameron, Calderwood, Cox, Lim, & Yamaoka, 2013). Similarly, Worthington (2006) found that people aged between 50 and 60 are most financially literate.

In Russia, the relationship between financial literacy and age was found to be negative. When comparing younger with older respondents, it was found that those younger than 35 years of age were more likely to answer one or more of the three financial literacy questions correctly (Klapper & Panos, 2011). These results were supported by a study conducted in Romania (Beckmann, 2013).

The relationship between age and financial literacy is not absolute. Alessie et al. (2011) for example, found that financial literacy levels among the Dutch population does not differ significantly with age. Their study was conducted across a wide age group. Other authors including Murphy (2005) and Oseifuah and Gyekye (2014) have also concluded that age is not significantly related to financial literacy. However, these researchers studied student populations, which usually consist of young adults. Thus, these results might not be representative of all age groups.

Lusardi and Mitchell (2011c) found that people who are in the middle age group have the highest financial literacy. They hypothesized that financial literacy increases with experience and then declines with age (Lusardi & Mitchell, 2011c). Additionally, studies conducted on households in Italy (Fornero & Monticone, 2011) and Switzerland (Brown & Graf, 2013) supported these findings. Fornero and Monticone (2011) as well as Bucher-

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Koenen and Lusardi (2011) found that people aged 36 to 50 are most financially literate. Bucher-Koenen and Lusardi (2011) also found that people younger than 35 years of age were more likely to answer a question on interest calculation correctly than one considering inflation. The results of a Japanese study partially supported this relationship, where financial literacy initially increases and then decreases with age. These researchers found that there is a 'humped-shape' relationship between age and financial literacy, but only when considering a question on interest and inflation. They further found that a question on risk diversification was more likely to be answered correctly by older respondents, although this was with the exception of those over the age of 50 (Sekita, 2011).

A study conducted in South Africa measured financial literacy in terms of various financial domains, for example knowledge, behaviour and skill (Struwig *et al*., 2013). These researchers found that, although overall financial literacy is higher among the older age groups, the younger age groups had generally high financial knowledge. They, however, lacked knowledge in other domains of financial literacy such as behaviour and skills. The researchers conducting this study attributed the low levels of financial literacy amongst younger people to a lack of income and exposure to financial markets.

There is clearly no absolute relationship between age and financial literacy. Some studies have found that age is positively related to financial literacy, while others have shown those in the middle age groups to be most financially literate. A few studies found no relationship between age and financial literacy, however, in some of these instances researchers made use of student populations, which could skew the data.

2.6.2 Race

Race has been reported to be a variable associated with financial literacy. Chen and Volpe (1998) found that financial literacy differs significantly, based upon univariate analysis between racial groups (White, African American, Hispanic and American Indian). This, however, was not found to be true when using multivariate analysis, which controls for other variables. A subsequent study by Chen and Volpe (2002) and Worthington (2006) supported the finding that financial literacy does not differ across racial groups. In South

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Africa, the difference between financial literacy scores of Black respondents and Coloured respondents was not found to be significantly different. However, for both of these racial groups, scores were significantly lower than that of White and Indian respondents (Struwig *et al*., 2013).

In America, Lusardi and Mitchell (2007a) found that Black people and Hispanic people have lower financial literacy scores than those from other race groups. This finding was supported by Murphy (2005) when using a multivariate approach; specifically a logistic regression. However, Murphy (2005) found that other racial groups were not more knowledgeable than their Black counterparts when analysing the data by means of univariate analysis, particularly ANOVA tests. A study by Lusardi et al. (2010) did not find a significant difference in financial literacy levels among racial groups.

The relationship between race and financial literacy is not absolute, but studies have shown that financial literacy differs across racial groups (Lusardi & Mitchell, 2007a; Struwig *et al*., 2013). This was found to be the case even when controlling for other variables (Murphy, 2005). These researchers' investigations included studies involving respondents that were White, Black, Hispanic, American Indian, Indian and Coloured.

2.6.3 Gender

There is an on-going debate as to whether there is a gender bias in financial literacy (Chen & Volpe, 2002). There is some evidence showing that women are less financially literate than men (Almenberg & Säve-Söderbergh, 2011). However, in some circumstances, there is no significant gender bias (Atkinson & Messy, 2012).

In line with other studies that make use of the Lusardi and Mitchell (2006) survey, in the Netherlands (Alessie *et al*., 2011), Japan (Sekita, 2011), United States (Lusardi & Mitchell, 2006), Romania (Beckmann, 2013) and Germany (Bucher-Koenen & Lusardi, 2011) it was found that women know less than men when it comes to basic financial literacy. That being said, women do not necessarily tender greater numbers of incorrect answers than men;

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they do however state 'do not know' more often (Beckmann, 2013; Bucher-Koenen & Lusardi, 2011; Klapper & Panos, 2011; Sekita, 2011).

When finance professionals were surveyed, it was found that financial knowledge and behaviour of males tends to be higher for subjective and objective knowledge than that of females (Weber, Blais, & Betz, 2002). This shows that men not only have a more substantial knowledge base than women, but they also believe that they know more regarding the subject. Another study showed that in some countries, variation exists in overall financial literacy scores by gender. Only in one case in Estonia, did men and women have exactly the same financial literacy score. Women also never scored higher than men in financial literacy tests in the countries considered (Atkinson & Messy, 2012).

Among university students in the USA, women tended to have lower levels of financial literacy than men (Chen & Volpe, 1998). Similar results were found in a subsequent study by these researchers, which included personal financial literacy (Chen & Volpe, 2002). Another study focused upon undergraduate university students and their financial behaviour problems and found that women experience almost 30% more financial behaviour problems than men (Worthy, Jonkman, & Blinn-Pike, 2010). Similarly, a study of American youth found that women are less financially literate than men (Lusardi *et al*., 2010). Furthermore, Power, Hobbs, and Ober (2011) found that regardless of the university course studied, women are generally less familiar with financial concepts, while in a developing nation such as South Africa, it was found that there is a gender bias among university students, with men having almost twice the financial knowledge of women (Shambare & Rugimbana, 2012).

A study that considered financial literacy as a combination of various domains was conducted on the literacy levels of the South African population. When considering planning (budgeting), it was found that women were more likely to budget than men. This was not the case for attitude towards money management, where there was no significant difference in the attitudes of South African men and women to money management. There was also no significant difference in women's and men's attitudes towards spending or ability to make financial plans. It was found that men are not more knowledgeable than women, but women held fewer financial products than men (Struwig *et al*., 2013).

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Considering a different aspect to the studies discussed above, Danes and Hira (1987) found that women know more about overall financial management than do men. In contrast, men tend to know more about insurance and personal loans. In Texas and Malaysia, university students took part in a survey that concluded that both women and men have low, but not differing, levels of financial literacy (Avard *et al*., 2005; Sabri *et al*., 2010). Similarly, Jorgensen and Savla (2010) found that gender is not a significant variable in explaining financial attitudes and behaviour of university students. Results of such studies that use student populations, may actually highlight the influence of other variables such as academic education levels on financial literacy.

In many instances, the research has shown that women are less financially literate than men. In some cases, this could be explained by other variables. For example, research on some student populations found men and women to have low but not differing financial literacy levels.

2.6.4 Education

In order to understand whether there is a relationship between education and financial literacy, it is necessary to clearly define what is meant by "education". There are three broad categories that are covered in this section, namely academic education, finance-specific education (finance education offered at school, university or elsewhere) and lastly finance-specific interventions.

Some studies have sought to determine whether academic education levels are significant in improving financial literacy (Agnew *et al*., 2013; Lusardi & Mitchell, 2007a). Academic education levels are usually described as high school, undergraduate university and postgraduate university education. However, other studies have considered more specifically the impact of financial education offered at various life stages (school, university and workplace) on one's financial literacy (Power *et al*., 2011; Volpe *et al*., 1996). The last category of education is that of financial interventions. These include specific courses aimed at improving financial literacy (Clark, D'ambrosio, Mcdermed, &

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Sawant, 2003; Fernandes et al., 2014). Each of these categories of education is discussed in detail in the following sections.

2.6.4.1 Academic education

Studies have shown that education levels (high school, undergraduate university and postgraduate university) are directly associated with financial literacy. Broadly, higher levels of education are associated with improved financial literacy (Chen & Volpe, 1998, 2002; Hung *et al*., 2009; Lusardi *et al*., 2010). Being a university graduate was found to be significantly associated with better financial literacy (Chen & Volpe, 2002; Mandell & Klein, 2009) .

One study confirmed that higher levels of education are linked to better financial literacy (Mckenzie, 2010). Considering specific countries, Widdowson and Hailwood (2007) found that New Zealanders with higher levels of education have better financial knowledge. This was also found to be the case in America, where financial literacy was lowest among those with less than high school education (Lusardi & Mitchell, 2006). In South Africa, a study showed that being a matriculant or having tertiary education was positively related to financial literacy (Struwig *et al*., 2013). Similar results emerged from a study conducted in Russia by Klapper and Panos (2011), who also found that educated people were more financially literate (Klapper & Panos, 2011). In the Netherlands, as many as 70% of the respondents with a university degree were able to answer all questions on a financial literacy survey correctly (Alessie *et al*., 2011). Using the measurement tool of Lusardi and Mitchell (2006), 62% of people in Japan with a master's degree or higher were able to answer all the questions correctly (Sekita, 2011). A study conducted in Romania found that those people with postgraduate education were the most financially literate. However, their findings showed high school scholars to have slightly higher scores than college graduates. These researchers were unable to explain this result (Beckmann, 2013).

In conclusion, most studies have shown that academic education level is related to financial literacy. Financial education is lowest among those people with less than high school education, while those with a graduate or post graduate degree were found to be more financially literate.

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2.6.4.2 Financial education

Some studies relating to financial literacy evaluate education as that of financial education. In this context, financial education refers to a finance course offered at school, university or elsewhere. The following section discusses the findings of the studies that have focussed on financial education and its association with financial literacy.

A study based upon finance students found that studying finance at university improved their financial literacy (Beal & Delpachitra, 2003; Chen & Volpe, 1998, 2002). Supporting research showed that when comparing business finance students to non-business finance students, the former group were more knowledgeable and better prepared to plan and save for retirement than those in the latter group (Power *et al*., 2011).

In contrast to the above findings, Kalin and Schnusenberg (2011) observed that university students were not educated in financial matters, and this was even true for those students who were finance majors. Research conducted at a Texas university found that studying business, as opposed to economics, did not have a significant impact upon students' knowledge of financial concepts (Avard *et al*., 2005). This suggests that being a finance or business student might help, but does not ensure financial literacy.

Financial education may have an impact upon financial literacy level. However, to improve financial literacy levels significantly, it may be necessary to implement a more effective means of teaching with emphasis on real-world matters (Hira, 2012). Additionally, the appropriate tools need to be provided to individuals to help them change their overall financial behaviour (Lusardi & Mitchell, 2007a).

Most of the existing research has shown that finance students are more financially literate than those who are not finance students. A limited number of studies have, however, suggested that being a finance student is not a guarantee of being financially literate (Avard *et al*., 2005). Some researchers, such as Kezar and Yang (2010), have suggested that more effective means of teaching are needed to ensure financial literacy among individuals. It may be that financial education intervention is necessary to effectively improve financial literacy of students. This is discussed in detail in the following section.

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2.6.4.3 Financial education intervention

There is a difference between providing information and providing specific education. Financial education is not only about providing knowledge, but also about providing financial information and skills so as to change behaviour regarding financial choices (Hilgert *et al*., 2003). This is summarized in the definition described by the Organization of Economic Corporation and Development (2005) as follows:

"The process by which financial consumers/investors improve their understanding of financial products and concepts 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." (p.11).

Thus the importance of financial literacy programs should not be left unmentioned. In some countries, including South Africa (Cole, Shapiro, & Shastry, 2010), Tanzania (Honohan & King, 2009), India and Indonesia (Cole *et al*., 2011) respondents believe they would benefit from interventions in financial education. An educational event such as a seminar on financial matters was found to alter financial behaviour or goals (Clark *et al*., 2003; Lusardi, 2004). Similarly, Lusardi and Mitchell (2007b) found that those people who had participated in company-based financial education programs were more financially literate. However, in another study researchers provided evidence that financial education interventions do not improve financial literacy in the long term (Fernandes *et al*., 2014).

One of the more extensive studies on high school student education intervention is that by Bruhn, De Souza Leao, Legovini, Marchetti, and Zia (2013). These researchers found that finance-specific education has a positive effect upon student financial knowledge and attitude, as well as saving and spending behaviour. At a university in Venda, research showed that a finance-specific course improved financial literacy levels (Oseifuah & Gyekye, 2014). These researchers found that students who had previously taken a money management course had higher financial literacy scores than those who had no past

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money management exposure. These studies highlight the importance of starting financial education early by introducing this topic as part of the regular education curriculum.

The case for interventions in financial education resulting in improved financial literacy is widely debated. Some researchers have found that financial education does not help improve financial literacy. For example, a recent and extensive study by Fernandes et al. (2014) showed that education intervention explains as little as 0.1% of the variance in downstream financial behaviours studied. These researchers also noted that, although financial education may improve financial literacy in the short term, over time it could be difficult to retrieve and thus make use of this knowledge to aid in financial decisions. Research such as that conducted by Willis (2008) has shown that enhanced education intervention programs are needed to truly improve financial literacy for the consumer.

It can be seen from many studies that financial education interventions improve financial literacy. However, recent research has also shown that over the course of time, financial knowledge declines and financial education intervention does not effectively improve financial literacy. In addition, research suggests that enhanced financial education is required to truly improve financial literacy.

2.6.5 Parental and other influences

In the case of students, it is accepted that parents have a significant influence in the upbringing of their offspring. In particular, parental education and occupation has an effect upon students' knowledge, attitude and behaviour in terms of financial issues. Other influences include parental socialization, which encompasses how often students discuss financial issues with their parents, and how often they partake in family financial decisions. These variables, namely parental education, occupation and other influences are discussed in detail below.

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2.6.5.1 Parental education and occupation

The impact of financial education and education intervention on financial literacy is a point of debate. Some researchers have added another dimension to the education debate by assessing whether level of parental education and occupation are related to their dependants' financial literacy level.

Parental education level was found to be related to financial literacy level among students in America (Murphy, 2005). University students who had parents with higher levels of education were found to be more financially literate. Similarly, Tennyson and Nguyen (2001) found that students' financial literacy scores were positively related to their parents education level. More specifically, they found that students whose parents had not completed high school scored significantly more poorly in a financial literacy test. Having said this, on average, university students' literacy levels are generally low (Murphy, 2005).

Some researchers partially support the above findings in that respondents were more likely to answer financial literacy questions correctly if their mother had a higher academic level of education (Lusardi *et al*., 2010). These researchers collected data on education level, but they relied on the mother's education as a proxy of parental education, due to missing observations from father's education level (Lusardi *et al*., 2010). In Japan, researchers also found mother's academic education level to be associated with financial literacy. However, they did not find the same to be true for father's academic education level (Sekita, 2011).

Almost all the available literature has shown that those students who have educated parents, especially an educated mother, have higher levels of financial literacy. However, the variable of parental education has not been widely researched and deserves greater attention. The occupation of parents does not appear to have been considered but may form part of parental influence, which is discussed below.

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2.6.5.2 Other parental influence

The previous section considered parental education, and the findings from previous research found that parental education is related to the financial literacy of students. In other words, those students with educated parents have been found to be most financially literate.

Another factor found to be significantly related to financial literacy is that of parental financial discussion (Jorgensen & Savla, 2010). These researchers found that students who discuss financial issues with their parents are more financially literate. This is supported by Tennyson and Nguyen (2001) who suggest that students from more affluent households have higher financial literacy levels, due to an increased likelihood of being exposed to investment and savings information. In contrast, some research suggests that students who are born to wealthy parents do not have to take as much financial responsibility and thus have lower levels of financial literacy (Mandell, 1999).

Young adults learn as much as 70% of their financial literacy knowledge from their parents (Chen & Volpe, 2002). Similar results were reported from a study on young adults in Ghana (Chowa & Despard, 2013). In South Africa, research has shown that students who partake in family financial decisions are more likely to be financially literate (Oseifuah & Gyekye, 2014). Research that supports this view suggests that parents could help increase their children's financial literacy levels by guiding them on financial matters (Lusardi *et al*., 2010).

A study of parental influence on financial literacy (a combination of knowledge, attitude and behaviour) of university students found that general education influences only financial knowledge of students (Shim, Barber, Card, Xiao, & Serido, 2010). These researchers found that parental influence on financial attitude and behaviour is greater than the effect of education on financial attitude and behaviour.

Most of the available research appears to support, or at least partially support, the fact that parental socialization is a significant factor in financial literacy of young adults/students. However, there is evidence from a study conducted in Japan that there is no significant

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difference in the financial literacy score of those who discussed finances with their parents as opposed to those who did not (Sekita, 2011).

2.6.5.3 Summary of parental and other influences

Limited studies have been conducted to measure parental influence on financial literacy of their dependants. However, the general consensus is that parental education, especially the education of the mother, and parental socialization are positively related to the financial literacy level of their dependants. The influence of parental occupation does not appear to be explicitly included in previous studies and could add to better understanding parental influence on university students.

2.6.6 Socio-economic status and income

Most studies have shown that individuals in America that had a higher income also had higher levels of financial literacy (Chen & Volpe, 1998; Hung *et al*., 2009; Lusardi & Mitchell, 2007a). A similar study found that Australian students (the majority aged 18 to 24) who have higher income are more financially literate (Beal & Delpachitra, 2003). This view is supported by a study conducted in New Zealand on consumers by Widdowson and Hailwood (2007) and in Mexico by Hastings and Tejeda-Ashton (2008), who both found that higher income is related to higher financial literacy. Almenberg and Säve-Söderbergh (2011) found that in Sweden, people with lower incomes had lower levels of financial literacy. Most recently Brown and Graf (2013) considered people aged 20-74 in Switzerland and their results also supported the relationship between income and financial literacy.

Despite the fact that most studies have shown income to be related to financial literacy, Worthington (2006) found income to be unrelated to improved financial literacy. Similarly Chen and Volpe (2002) found income to be statistically insignificant as a predictor in financial literacy level of students. To add to this argument, Buckland (2010) provided evidence that low-income Canadians are financially literate and thus, income is not the variable responsible for explaining financial literacy.

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Arguably, income is a measure of socio-economic status; those who earn more are able to purchase more and thus live more comfortably. Lusardi and Mitchell (2007c) found a strong positive correlation between financial literacy and socio-economic status.

With the exception of some researchers that showed income not to be related to financial literacy such as Chen and Volpe (2002); Worthington (2006), for the most part the studies have supported the view that income is positively related to financial literacy. Those who earn more tend to be more financially literate. Given the correlation between income and socio-economic status, it can be concluded that income, a proxy for socio-economic status, is related to financial literacy.

2.7 Conclusions

Financial literacy can be defined as the "the knowledge of basic concepts of personal finance with respect to borrowing/debt, and saving/investments that leads to better lifetime financial decision-making" (Fernandes *et al*., 2014). Financial literacy is becoming increasingly important as financial instruments become more easily available, but also more complex in design. These products are aimed at providing better financial wellbeing to people. Herein lies a problem. In order to make effective use of these products, one needs to be financially literate/informed. It is evident from the literature that this is not the case for most people around the world; financial literacy on average is low.

The literature provides evidence that a number of variables are related to financial literacy. These variables include age, race, gender, education, parental and other influences and socio-economic status. The following paragraphs summarize the findings from the literature.

There is no absolute relationship between age and financial literacy. However, there appears to be differences in financial literacy levels between different age groups. In the case of racial groups, many studies have shown that financial literacy differs across racial groups, however the relationship is not absolute. These findings may highlight that race is not the underlying factor, but rather socio-economic status. Furthermore, the variable income is found to be positively related to financial literacy in most instances.

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Personal education, when considering the influence of academic education on financial literacy, is found to positively influence financial literacy. Overall, research has shown that those more educated in the academic sense are more financially literate. In addition to academic education, financial education has also been found to be related to financial literacy, in that students who had majored in some form of finance or business related degrees were also found to be more financially literate. Another form of personal education considered in the literature review is that of financial interventions. Interventions relating to financial education are widely debated with regard to their value. Here studies have shown that specific finance courses contribute to an improved financial literacy. Lastly, parental influence, a combination of parental education and parental socialization, has been found to be positively related to students' financial literacy level in most cases.

There are a limited number of studies that have considered financial literacy of students enrolled at universities in South Africa. The research findings emanating from these studies are also contradictory. To add to the existing body of research on this topic, it would be necessary to conduct studies to assess financial literacy, specifically using South African students. Thus students' financial literacy level, as well as variables that might play a key role in their financial literacy, would need to be considered.

To fill the gap in the literature regarding the financial literacy of students, the following chapter considers the research design and methods that will be used to evaluate the general financial literacy and factors related to financial literacy of South African students.

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CHAPTER 3 – RESEARCH DESIGN AND METHODS

3.1 Introduction

The purpose of this study is to understand whether students are financially literate. In particular, this study aims to establish whether age, race, gender, education, parental and other influences and socio-economic status are significantly associated with financial literacy of students at the University of Pretoria. This chapter describes the methods used to collect the data necessary to understand whether the abovementioned variables are significantly associated with financial literacy. The two-part instrument used to collect data is justified and explained in detail. This is followed by a detailed explanation of the methods used to analyse the data collected, by means of the instrument utilised in this study. Lastly, the limitations associated with this study are highlighted and it is shown how the necessary research ethics requirements for this study have been adhered to.

3.2 Research design

This study is classified as survey research and makes use of primary data. The primary data collected is used to assess financial literacy of university students. The data was collected by means of self-administered questionnaires.

The use of survey research has both strengths and weaknesses. The popularity of survey research is that it is possible to collect sufficient relevant data and that this data can then be statistically analysed (Hopkins & Mitchell, 1974). On the other hand, surveys can be time consuming and one cannot prove that respondents' responses are honest or reliable (Fink, Bourque, & Fielder, 2003; Saunders, Saunders, Lewis, & Thornhill, 2011).

Huston (2010) reviewed the existing literature on financial literacy measures over the last 10 years and found that more than 70% of the studies made use of self-administered surveys. The use of survey research is widely used in studies conducted to identify the factors associated with financial literacy (Avard et al., 2005; Mckenzie, 2010; Volpe et al., 1996). Self-administered surveys of financial literacy are extensively used and have been shown to be reliable through a variety of tests. This comprises exhibiting stability in the

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measuring of financial literacy across items, time and the approach used for measurement (Hung *et al*., 2009). This approach is thus considered to be the method of choice to measure financial literacy and the variables associated with financial literacy.

3.3 Method

Section 3.3.1 provides an overview of the research instrument used in this study. The research instrument is then discussed in detail. Section 3.3.2 describes the data collected and the procedure followed to collect the data in detail. This is followed by a detailed description of the methods used to analyse the data in this study in section 3.3.3.

3.3.1 Research instrument

The research instrument, which comprises two parts, is discussed in detail in the following sections which includes a discussion justifying why this research instrument is valid and reliable, and justifying its application in this study.

3.3.1.1 Overview

The questionnaire is divided into two parts (A and B), which includes 32 questions in total. Part A of the questionnaire is used to test for financial literacy of students and is based upon a previously validated and published questionnaire that tests for financial literacy by Lusardi and Mitchell (2007b). The test portion of the questionnaire used in the present study will remain in its original format, with some wording adapted for the South African context (e.g. unit trust versus mutual fund). However, the demographic section will be enhanced to reflect the university student population. The instrument designed by Lusardi and Mitchell (2007b) was selected for this study because it is a widely used measure of financial literacy and has been shown to demonstrate reliability and validity. These aspects are discussed in depth in Section 3.3.1.3. In line with the approach of these researchers, the present study includes a question on self-assessed financial literacy of students, by asking respondents to rate their financial knowledge from very good to very bad. Part B of the questionnaire deals with socio-economic and demographic background, which is

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explained in more detail in Section 3.3.1.4. The complete questionnaire is included in Appendix A.

3.3.1.2 Financial literacy survey

As a consequence of the variety of definitions for financial literacy, the measure of financial literacy varies substantially across studies (Hung *et al*., 2009). One of the first surveys of financial literacy was conceptualized by the Jump$tart Coalition for Personal Financial Literacy in 1997 (Mandell, 2004). Since 1997, a variety of other surveys have been used to assess financial literacy. See for example Chen and Volpe (1998), Chen and Volpe (2002), Hilgert et al. (2003) and Worthington (2006).

While there are a number of surveys that measure financial literacy, more recently Lusardi and Mitchell (2006) designed a survey for use in the Health and Retirement Study (HRS) to test for basic financial literacy. The survey consisted of three financial literacy questions, also known as the 'Big Three'. These questions test knowledge on computation of interest rates, effect of inflation and the concept of risk diversification. Although this tool has been most widely used around the world (Brown & Graf, 2013; Fornero & Monticone, 2011; Lusardi & Mitchell, 2011a; Lusardi *et al*., 2010) it is criticized for not being sufficiently sophisticated to asses saving and investment decisions, which are concepts that form part of financial literacy (Lusardi & Mitchell, 2007b). In response to these criticisms, these same researchers designed an additional set of survey questions to test for understanding of risk-return relationships, how bonds, stocks and mutual funds (unit trusts) and basic asset pricing function (Alessie et al., 2007; Lusardi, 2008; Lusardi & Mitchell, 2007b). The questions used in the present survey for basic and sophisticated financial literacy have been used by many researchers to assess financial literacy (Agnew *et al*., 2013; Cole *et al*., 2011; Fernandes *et al*., 2014; Fornero & Monticone, 2011; Hung *et al*., 2009; Lusardi & Mitchell, 2008; Lusardi *et al*., 2010; Mandell & Klein, 2009; Van Rooij, Kool, & Prast, 2007).

Lusardi and Mitchell (2006, 2007b) have designed a measurement tool that is widely used as a measure for financial literacy. The basic as well as the sophisticated questionnaire designed by Lusardi and Mitchell (2007b) have been used in a South African context by

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researchers including Shambare and Rugimbana (2012) and Reyers, Van Schalkwyk, and Gouws (2015). In the next section, the reliability, stability and validity of this instrument are considered.

3.3.1.3 Reliability and validity of financial literacy survey

Hung *et al*. (2009) have assessed the validity and reliability of the survey used by Lusardi and Mitchell (2007b), by comparing a number of surveys which are said to measure financial literacy. These researchers found that there are three broad categories to validating a concept and the measurement of that concept. Their findings are discussed in the following paragraph.

The first step is to define the concept being studied by identifying what 'components' it contains. Here, the definition of financial literacy as summarized by Hung et al. (2009) as the "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 wellbeing." The remaining categories needed to ensure suitable use of the chosen survey are to assess reliability and stability. Reliability includes assessing how well the survey measures what it is intended to measure, as set out by the definition. Stability relates to assessing how stable the concept (financial literacy) is across the different measurement strategies. Hung et al. (2009) compared a number of existing research instruments used to test for financial literacy, which included the instrument used by Lusardi and Mitchell (2007b). Hung et al. (2009) found that the different measures of financial literacy, including those of Lusardi and Mitchell (2007b), have good internal consistency. This suggests that the instrument presented by Lusardi and Mitchell (2007b) could be considered sufficiently reliable and stable to be used in the present study. To add to the measure of stability, Pearson's correlation was used and the result of strong correlation between different measurement strategies indicates that there is stability across items, time and measurement strategy.

Grohmann et al. (2014) recently confirmed that the survey designed by Lusardi and Mitchell (2007b) measures financial literacy and not just numeracy. To confirm this fact, these researchers asked four mathematics-based questions adapted from the study

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undertaken by Cole et al. (2011). They found that the scores for numeracy were significantly higher than those for financial literacy. This indicates that the poor financial literacy score was due to poor financial knowledge and not a lack of mathematical ability.

In order to determine the underlying concepts of the measurement tool, a factor analysis was performed by (Alessie et al., 2007) and Lusardi and Mitchell (2009). The analysis of the completed 13-question questionnaire indicated that there are two main factors with different loadings on the basic and sophisticated literacy questions. These researchers thus chose to split the basic literacy questions (first five questions) and sophisticated literacy questions (remaining eight questions) and to perform a further factor analysis on these questions. This allowed these researchers to construct two financial literacy indices, namely basic knowledge and knowledge of sophisticated/advanced financial concepts.

The proposed instrument used in the present study as designed by Lusardi and Mitchell (2007b) uses terminology that is specific to the United States of America. For this reason, the instrument is adapted to suit a South Africa sample. These changes do not affect the concepts tested by using this instrument. Examples of modifications that were made include changing the dollar denoted figures to rand amounts. Additionally, the term 'mutual fund' is not commonly used in South Africa and for this reason the term 'unit trust' is used to express the same concept.

In conclusion, the instrument developed by Lusardi and Mitchell (2007b), which measures financial literacy, is not only widely used, but it has also been found by numerous researchers to be a reliable and valid measure of financial literacy. The concept of financial literacy has been clearly defined and the survey used in the present research study should consequently measure this concept reliably. The research instrument chosen for this study is also considered stable. In addition to reliability, stability and validity, the instrument used has been tested, through factor analysis, to measure financial literacy at a basic and sophisticated financial literacy level. Additionally, the modifications made to adapt the instrument to suit a South African sample do not change the concepts tested. This justifies its choice as an appropriate instrument to measure financial literacy in this research study.

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3.3.1.4 Socio-economic and demographic variables

The above section dealt specifically with the financial literacy questions. To add to the research objectives of the present study, it is necessary to capture demographic and socio-economic data from the students sampled. In order to capture this data, Part B of the questionnaire includes 18 questions on socio-economic and demographic background. These questions are broadly spilt between age, race, gender, education, parental and other influences and lastly, some questions concerning the student's socio-economic background.

The demographics section includes questions on gender, age and population group. The section on personal education includes questions on the respondents' academic year, faculty of study and degree program. These questions have been used in a number of studies to assess the demographic variables that are associated with financial literacy (Chen & Volpe, 1998; Mckenzie, 2010). In addition, a question to assess whether students had previously been involved in a finance course/module (at school, university or other) was asked. This is consistent with the research of Mckenzie (2010) who showed that previous exposure to financial concepts is important.

In order to assess parental influence, a number of questions were asked. These included parental education and occupation of primary caregiver(s). This is similar to the questions asked by Lusardi et al. (2010). Parental influence was measured by asking students where they learnt most about managing their finances. A similar question was used in the study of Alessie et al. (2007).

The remaining questions in this study addressed socio-economic background. The first of these questions aimed to assess perceived socio-economic status. Asking students how they felt about their family's ability to afford goods was used to measure this factor. The answers ranged from not being able to make ends meet to affording expensive luxuries such as a house. This question was designed by the World Bank and used in Russia for a financial literacy program in 2008 (Mundell, Markov, & Shulga, 2008). The final question on socio-economic background aimed to assess socio-economic status by measuring number of household goods available to students. The question required students to make

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a selection from 14 items to which they had access in their family home. Some of these objects included a place to study, a computer to work on, an internet connection, a calculator, a dishwasher and some others. This question was also used by Schulz (2005). These researchers found that this list was useful to aid in assessing socio-economic background of students. This was preferable to using parental income, mainly because many students do not know what their parents earn.

Part B of the questionnaire thus covers the demographic and socio-economic questions used in this study. Importantly, all of these questions have been used in previous studies. It was concluded that these questions would provide this study with the necessary variables to address the research objective.

3.3.2 Data

This study aimed to test the financial literacy of university students. To achieve this goal, the study made use of primary data. The data was collected from students on a university campus in South Africa. The sampling took place over the course of two weeks in February of 2015. Students were approached on campus, outside class time. In total, 373 surveys were collected from students on campus. Students were given the option to partake in the survey at their convenience. This sample method for data collection is known as “convenience sampling” and has been used in previous studies testing financial literacy of student populations (Jorgensen & Savla, 2010; Shambare & Rugimbana, 2012). This student sample was evaluated by means of a “paper and pencil questionnaire”, which was self-administered.

A strength of the sample collected was that it can be considered relatively large. This is consistent with the fact that the larger the sample, the greater the statistical power (Field, 2009). A weakness of the sample used is that it may not be an accurate representation of the South African student population and thus, the results are dependent upon the unique characteristics of the sample. This is a result of the study being based upon a sample of convenience (Marshall, 1996).

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3.3.3 Data analysis

This study had a single outcome variable, financial literacy, and a number of predictor variables. Statistical computations and analysis assume variables to have different levels of measurement. It is thus necessary to identify whether the predictor and outcome variables are ordinal, nominal scale or interval. In addition to this, it should be noted that while the size of the sample was greater than 30, there was a violation of the central limit theorem because this sample was not randomly selected. Therefore, unless the distribution of the financial literacy scores are normally distributed, non-parametric tests should be used (Smit, Steyn, Du Toit, & Strasheim, 1994). To test for the underlying distribution of the financial literacy scores, Section 4.1.2 in Chapter 4 presents a series of histograms for the basic, sophisticated and total scores. Each histogram visually illustrates the shape of distributions of the students' financial literacy scores. For further analysis of the distribution of financial literacy scores, an additional statistical measure also tested for normality and was conducted in Section 4.1.2. This assessment of normality makes use of a significance test, namely the Kolmogorov-Smirnov (K-S) test. This test aims to show whether the scores differ significantly from a comparable normal distribution. If the test is significant, that is $p<0.05$, then the distribution is significantly different from a normal distribution (Field, 2009).

The findings emerging from Section 4.1.2 show that scores are not normally distributed and thus the univariate analysis would need to be conducted making use of non-parametric tests (discussed in more detail in Section 3.3.3.1). A second stage in the analysis was to carry out a multivariate analysis so that variables are considered in a model. This allows for better understanding of the relationship while all variables are controlled for. This is discussed in more detail in Section 3.3.3.2.

The appropriate non-parametric statistical tests chosen for each variable are presented in Table 3.1. The level of measurement is placed in parenthesis alongside the predictor variable. The appropriate non-parametric test is then selected using a statistical decision tree (Field, 2009).

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Table 3.1: Statistical test for data analysis

Predictor Variable	**Outcome Variable**	
Variable & Category Type	**Step 1: Financial literacy (scale variable)**	**Step 2: Financial literacy (binary variable)**
Gender (dichotomous)	Mann-Whitney test	Logistic Regression
Age (ratio)	Spearman's correlation	
Race (nominal)	Kruskal-Wallis test	
Academic Year/level (ordinal)	Kruskal-Wallis test	
Previous Finance Course (dichotomous)	Mann-Whitney test	
Faculty of Study (nominal)	Kruskal-Wallis test	
Parental Education: Mother/Father (ordinal)	Kruskal-Wallis test	
Parental Occupation: Mother/Father (ordinal)	Kruskal-Wallis test	
Perceived Socio-economic Level (ordinal)	Kruskal-Wallis test	
Calculated Socio-economic Status (dichotomous)	Mann Whitney test	
Other Parental Influence (origin of money management skills) (nominal)	Kruskal-Wallis test	
Self-Assessed Financial Literacy (ordinal)	Kruskal-Wallis test	

Source: Field (2009, p. 916).

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3.3.3.1 Univariate analysis

As seen in the Table 3.1, to assess the strength of the relationship between continuous predictor variables and the continuous outcome variable, financial literacy score, it is necessary to use Spearman's correlation. Spearman's correlation (r_s) is a non-parametric measure of the strength of the association between the two ranked quantitative, continuous variables. The Spearman's correlation, which is represented by 'r_s', is calculated by first ranking the data and then applying the same formula that is used for the Pearson correlation co-efficient to calculate 'r'. The formula for this calculation is as follows (Field, 2009):

$$r = \frac{cov_{xy}}{s_x s_y} = \frac{\sum(xi - \bar{x})\,(yi - \bar{y})}{(N-1)s_x s_y}$$

Where:
s = standard deviation
cov = covariance

There are some assumptions that need to be met when making use of Spearman's correlation. The predictor and outcome variables must be either interval/ratio (continuous). A second assumption is that there is a monotonic relationship between the variables. This means that either (1) as one variable increases, so does the other, or (2) as one variable increases the other variable decreases (Field, 2009).

Once these assumptions have been met, then the calculated 'r_s' value can be interpreted. Spearman's 'r_s' has a range of values between +1 and -1. A value greater than 0 indicates a positive association between the predictor and outcome variables, while a value less than 0 indicates a negative association between the variables. If the value of 'r_s' is precisely 0, then there is no linear association between the two variables (Mayers, 2013).

As can be seen in Table 3.1, the Mann-Whitney test was used to compare differences between the dichotomous predictor variable and the outcome variable, financial literacy score. For this study, the dichotomous predictor variables include gender, previous finance course and calculated socio-economic status. In order to use the Mann-Whitney test, four

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assumptions needed to be met. The outcome variable should be measured at an ordinal or continuous level, while the predictor variable should be dichotomous (two categories). Lastly, the observations should be independent.

The steps are as follows (Field, 2009):
Step 1: Rank the scores of the two groups
Step 2: Sum the ranks of each group
Step 3: Use the following formula to calculate U

$$U = n_1 \times n_2 + \frac{n_1(n_1 + 1)}{2} - R_1$$

Where:
n1 = number of respondents in Group 1 (e.g.: male)
n2 = number respondents in Group 2 (e.g.: female)
R1 = the sum of the ranks for Group 1

To analyse this data, the table of critical U values was used. This table provides critical values of U for different group sizes. There are a number of tables depending upon the significance value used. To be statistically significant, the U value computed using the formula above needs to be less than or equal to the critical value provided by the table of critical U values.

Once the Mann-Whitney U score has been determined, it is necessary to calculate the effect size. The effect size is a standardized measure of the size of the effect observed in the univariate analysis. The formula used to calculate the effect size is as follows (Field, 2009):

$$r = \frac{z}{\sqrt{N}}$$

The ‘z’ represents the z-score from the SPSS output from the Mann-Whitney test which was discussed above. The ‘N’ is the size of the sample. The ‘r’, which represents the effect

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size, can range from small to large. That is a small effect would yield a result below 0.3, while a large effect size would be above 0.5 (Field, 2009).

For the predictor variables that consist of two or more categories (i.e. race, faculty, academic year, parental education, parental occupation, perceived socio-economic status and money management), it will be necessary to make use of the Kruskal-Wallis non-parametric statistical test. The Kruskal-Wallis test is used to determine whether there are statistically significant differences between the categories of the predictor variable. The Kruskal-Wallis test, like the Mann-Whitney test, also compares ranks between the categories. In order to make use of the Kruskal-Wallis statistical test, there are a few assumptions that need to be met. The outcome variable must be measured at an ordinal or continuous level. Additionally, the predictor variable must consist of two or more categorical groups. Lastly, the observations must be independent (Field, 2009).

To calculate the Kruskal-Wallis H value, the following formula is used (Field, 2009):

$$H = \left(\frac{12}{N(N+1)} \sum_{i=1}^{k} \frac{{R_i}^2}{n} \right) - 3(N+1)$$

Where:
H = Kruskal-Wallis test statistic
N = total sample size
n = sample size of a particular group
R_i = sum of the ranks assigned for each group

To interpret H, the test statistic, it is necessary to use the Chi-square table. The appropriate Chi-square critical value is selected based upon degrees of freedom and the significance level. A Kruskal-Wallis test statistic is statistically significant if it is greater than or equal to the critical value of Chi-square, based upon the degrees of freedom. The degrees of freedom (df) is equal to number of groups of predictor variable less one.

Much the same as was the case for the Mann-Whitney U test, given that the Kruskal-Wallis test is found to be significant, it is once again necessary to calculate the effect size.

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This is required in order to establish the size of the findings observed. The effect size can be calculated by using the following formula (Field, 2009):

$$r = \frac{z}{\sqrt{N}}$$

The 'z' represents the z-score from the SPSS output from the Kruskal-Wallis test, as was discussed above. The 'N' is the size of the sample. The 'r' represents the effect size and can range from small to large. Thus a small effect would yield a result below 0.3, while a large effect size would be above 0.5. A result between 0.3 and 0.5 would be interpreted as a medium effect size (Field, 2009).

The Kruskal-Wallis test will show whether there are differences between the groups. A potential problem is that the Kruskal-Wallis test does not indicate which groups differ. For this reason, it is necessary to run a *post-hoc* test on the variables that are ordinal, as indicated in Table 3.1. The Jonckheere-Terpstra *post-hoc* test is used to establish whether the order of the groups analysed is meaningful, given that there was a significance found in the Kruskal-Wallis test. Using SPSS, it is possible to calculate the significance, p-value, based upon the test statistic represented by 'J'. Given that the outcome of this test is found to be significant, it can be concluded that there is a trend in the data (Field, 2009).

3.3.3.2 Multivariate analysis

The above analysis considers each variable's association with financial literacy in isolation. To establish the association of each variable, while controlling for these variables, this research applied a regression analysis. A linear regression assumes a linear relationship between all variables. This assumption is violated as a result of having both continuous and categorical predictor variables in this study. To mitigate this problem, this study made use of a logistic regression. The logistic regression expresses the linear regression equation in logarithmic terms also called the logit (Field, 2009). Specifically, this research assesses the financial literacy score (as the outcome variable) given a number of categorical/continuous predictor variables (age, race, gender, education, parental and other influences, as well as socio-economic status). In order to perform a logistic regression, it is necessary to group the outcome variable, financial literacy, into two

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categories, thus creating a dichotomous outcome variable. For this study, the mean score was used to group the scores of students. Those equal or below the mean were classified as relatively less financially literate, and those above the mean score were classified as relatively more financially literate. The dichotomous variable was then used in a logistic regression as the outcome variable, which is explained by a number of predictor variables. A similar method has been used in previous studies (Beal & Delpachitra, 2003; Chen & Volpe, 1998, 2002).

Another necessary requirement of a logistic regression is that the model should have little to no multi-collinearity. That is a logistic regression requires that the independent variables are independent from each other, specifically each observation should be independent.

The predictor variables in this research were not all categorical, but rather consisted of a combination of categorical and continuous variables. The linearity assumption in a logistic regression assumes that there is a linear relationship between the continuous predictor variables and the logit of the outcome variable. Making use of SPSS, it is possible to test this assumption by assessing the significance of the predictor variable and its log transformation (Field, 2009).

The Wald statistic was used to assess whether the 'b' co-efficient for each predictor variable in a logistic regression is significantly different from zero. More specifically, this determined whether each predictor variable made a considerable contribution in predicting the outcome, financial literacy level. The probability distribution of the Wald statistic is that of the Chi-squared distribution. Results from the Wald test significance values of $p<.05$ are considered statistically significant (Field, 2009).

A linear regression finds the multiple correlation co-efficient R and R^2 good measures for how well the model fits the data. However, when conducting a logistic regression, an equivalent R and R^2 statistic does not exist. Thus, a number of pseudo R^2 values are calculated. The pseudo R^2 values of Mc Fadden, Cox and Snell and Nagelkerke provide a measure of practical significance for the logistic regression model. The following equations are used to calculate the three abovementioned pseudo R^2 values (Field, 2009):

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R^2_{MF} (Mc Fadden) = $\frac{(-2LL(baseline))-(-2LL(new)}{-2LL\ (baseline)}$

R^2_{CS} (Cox & Snell) = 1 -exp $\left(\frac{(-2LL(baseline))-(-2LL(new)}{n}\right)$

R^2_{N} (Nagelkerke) = $\frac{\mathrm{R2CS}}{1-\exp\left(\frac{-2LL(baseline)}{n}\right)}$

In order to ascertain how well the data fits the model, the Hosmer Lemeshow test was used. The p-value is based upon a Chi-squared distribution. If the p-value is greater than 0.05, the null hypothesis is not rejected which indicates the model is a good fit.

For the purpose of this research, the purposeful selection method was used to determine which variables are to be used in the logistic regression (Hosmer Jr, Lemeshow, & Sturdivant, 2013). The purposeful method begins with a bivariate analysis of each predictor variable against the dichotomous outcome variable, financial literacy. Variables found to be significant based upon the Wald test statistic from logistic regression at a 20% significance level are then added to the logistic regression. The reason for the high significance level of 20% is that using a 5% significance potentially fails to identify variables known to be important. Following this process, the variables found to be significant were used in the logistic regression model.

3.4 Limitations

This study makes use of convenience sampling of students who are enrolled at the University of Pretoria. Thus, a narrow sample of students from a single university in South Africa is used. In addition to this, the sample consists mostly of first year students. This was not intended but is the result of the sampling technique used. Caution should consequently be exercised in making generalizations from the findings of this study.

An additional limiting factor is that the data used to assess parental and other influences was collected from students only. In order to accurately measure the impact of parents and external influences, it may be necessary to collect data from each student as well as their

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parents and other members of their social group. Nevertheless, for this study only data from students was collected.

A final limitation of this study was that it was only administered in one language, English. Thus, given the technical terms used in the questionnaire, it is possible that some respondents were not familiar with the terms used and were unable to respond in the same manner as they may have done otherwise.

3.5 Research ethics

Approval was obtained from the Faculty Ethics Committee before this study was undertaken. In addition, permission to survey University of Pretoria students was obtained. The responses of the questionnaire are confidential and respondents are anonymous. No incentives were used in this study.

3.6 Conclusion

In this section the research design, method and survey instrument were discussed in detail. The instrument used consisted of two parts, namely financial literacy questions and the demographics/socio-economic questions. The wide use of the chosen financial literacy questions supports the use of these questions. Furthermore, past researchers have found these questions to be valid and reliable. The demographic and socio-economic questions have also been used in past studies similar to this one. The data collected from the questions was analysed by means of a suitable non-parametric univariate analysis, as well as a multivariate analysis. There are a number of limitations of this research, including the fact that it makes use of a narrow sample from a single university. The necessary ethics requirements have been met and approved by the Ethics Committee and permission to survey students at the University of Pretoria was granted.

Given the detailed description of the research design, research instrument and method of data analysis in this chapter, Chapter 4 follows with descriptive results from the data collection, as well as detailed statistical analysis of the collected data.

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CHAPTER 4 - ANALYSIS AND INTERPRETATION OF RESEARCH RESULTS

4.1 Introduction

In the previous chapter, the research method was outlined. In addition, the instrument used to measure financial literacy was discussed in detail. The proposed method of statistical analysis of data captured using said instrument was explained. This chapter makes use of statistical analysis to analyse the captured data obtained from this empirical study.

The focal point of this study is the financial literacy scores and more specifically which factors are related to financial literacy of students within a university context. These factors include age, race, gender, education, parental and other influences and socio-economic status.

The variables and results of the financial literacy questions, as well as the statistical tests, are presented in the following section. The first section identifies the categories used and the frequency distributions of each of the variables. This is followed by an analysis of the data to examine the financial literacy scores at both a basic and a sophisticated level. Lastly, statistical tests are used to determine whether the variables discussed are related to financial literacy scores of students. The statistical analysis includes univariate and multivariate analysis.

4.1.1 Section A: Descriptive analysis of demographic variables

In order to understand the demographic profile of the student sample used in this study, Part B of the questionnaire consisted of 32 questions. These demographic questions aimed to capture students' age, race, gender, education, parental and other influences and socio-economic status.

To assist in the univariate and multivariate analysis, which follows in Sections 4.1.3 and 4.1.5, the response categories of some variables have been condensed. That is, in

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instances where there were minimal responses to a specific category; categories were combined to facilitate statistical analysis. The original and combined categories are presented in the following descriptive section. The results to these questions, which are descriptive in nature, are presented by means of frequency tables and graphs. The sample consists of 373 students. This number varies per variable due to refusals to answer some of the questions. A case wise removal of missing variables is used in the analysis.

4.1.1.1 Age

Table 4.1 shows that the student's average age was 19,99 with a standard deviation of 2.041. The age range of this sample is narrow. However, this was to be expected as the sample emerged from a student population.

Table 4.1: Mean and standard deviation of student's age

	N	**Mean**	**Std. Deviation**
Age	366	19.99	2.04

Source: SPSS.

Figure 1 is a histogram displaying student ages. The majority, 24,9%, of the students were 18 years of age, while 19,4% of the students were 21 years of age, 18,6% of students were 19 years of age and 16,9% were 20 years of age. The remaining 2.5% were 17 and younger, while 17,8% were 22 years and older.

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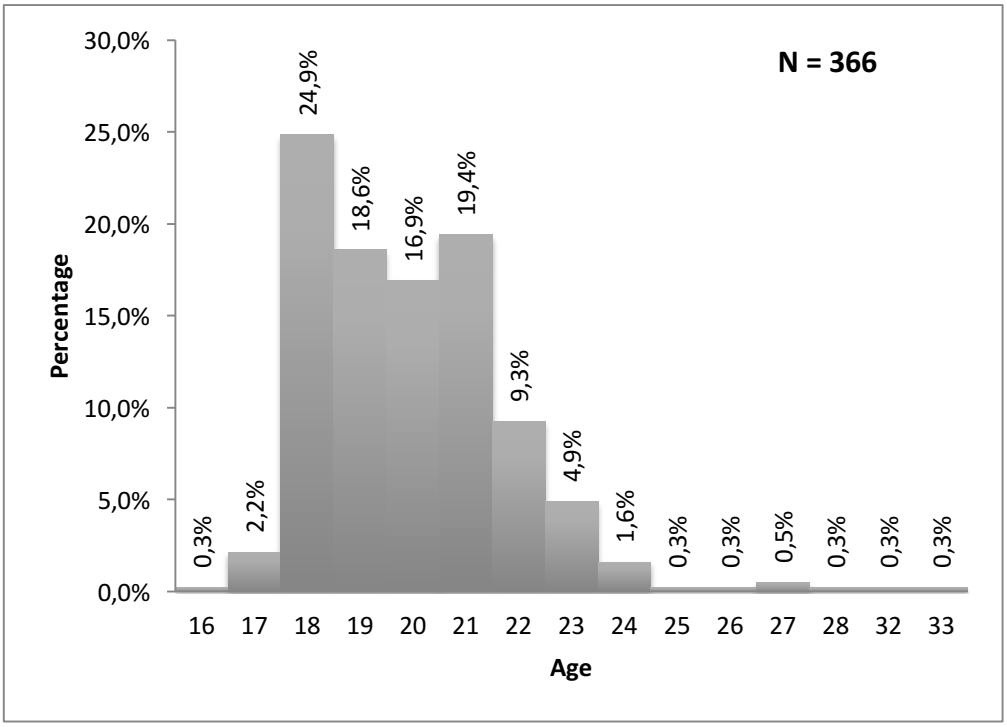
Figure 1: Histogram of student ages



Source: SPSS.

4.1.1.2 Race

The original responses to race, as per the questionnaire, have been condensed into three categories. As can be seen in Table 4.2 these are namely White, Black African and Other. The condensed category 'Other' is a combination of Coloured, Indian, Asian and Other. It can be seen from Table 4.2 that the majority, 66,94%, of the respondents were White, while 27,64% of the students classified themselves as 'Black African' and the remaining 5,42% consisted of Coloured (2,44%), Asian (0,54%), Indian (2,17%) and Other (0,27%).

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Table 4.2: Frequency of racial groups for the original and condensed variable

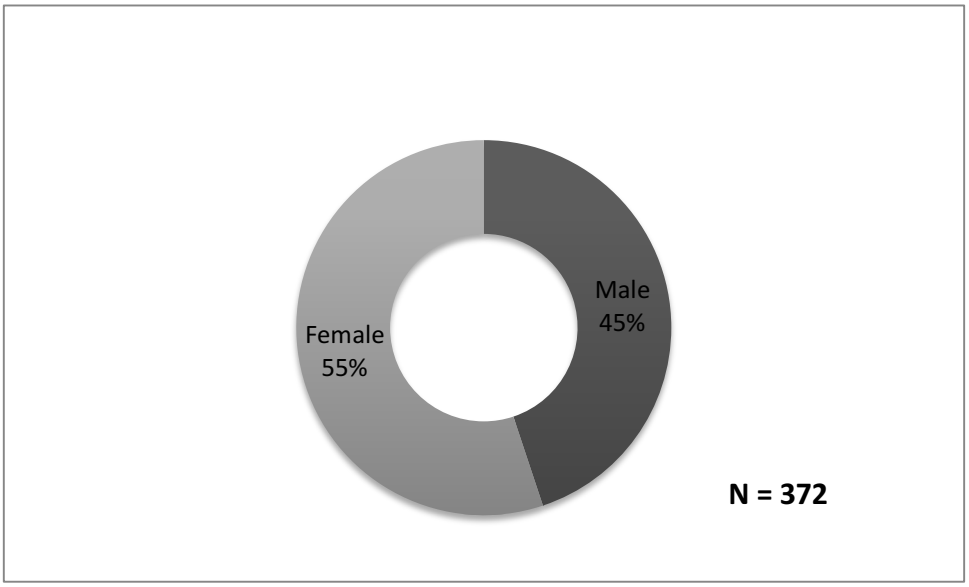
Original Variable (N= 369)		**Condensed Variable**	
Race	**Frequency (%)**	**Race**	**Frequency (%)**
1. White	66,94	1. White	66,94
2. Black African	27,64	2. Black African	27,64
3. Coloured	2,44	3. Other	5,42
4. Indian	2,17		
5. Asian	0,54		
6. Other	0,27		

Source: SPSS.

4.1.1.3 Gender

Of the 372 responses, 205 (55%) were female students and 167 (45%) were male students. This is presented graphically in Figure 2.

Figure 2: Gender distribution of sampled university students



Source: SPSS.

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4.1.1.4 Education

This section includes the descriptive information for three variables that fall under the category education. The first variable was academic year, which is considered academic education. The second and third variables were considered as financial education. The former variable considered whether students had previously participated in a finance course, while the latter reflected the faculty in which the students were enrolled.

- **Academic year**

The variable 'Academic Year' was condensed into 5 categories namely 'first year', 'second year', 'third year', 'fourth year' and 'postgraduate'. The category labelled 'postgraduate' included 'honours', 'masters' and 'PhD' students. From Table 4.3, it can be seen that the sample of university students consisted of 96,24% undergraduate students and 3,76% postgraduate students. Of the undergraduate students, the majority were first year students, that is 45,43% were 1st year students. The remaining undergraduate students consisted of 18,01% in their 2nd year of studies, 18,01% in their 3rd year of studies and 14,78% in their 4th year of studies. The 3,77% of students enrolled in postgraduate studies consisted of honours (2,42%), masters (1,08%) and PhD students (0,27%).

Table 4.3: Frequency of students per academic year for the original and condensed variable

Original variable (N = 372)		**Condensed variable**	
Academic year	Frequency (%)	Academic year	Frequency (%)
1. First Year	45,43	1. First Year	45,43
2. Second Year	18,01	2. Second Year	18,01
3. Third Year	18,01	3. Third Year	18,01
4. Fourth Year	14,78	4. Fourth Year	14,78
5. Honours	2,42	5. Postgraduate	3,77
6. Masters	1,08		
7. PhD	0,27		

Source: SPSS.

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- **Faculty of study**

Table 4.4 presents the frequency of students per faculty. Due to minimal responses of students in the Theology Faculty, this category has been combined with the Humanities Faculty. Some faculties, including Veterinary Sciences and GIBS Business School, are not represented at all, due to an absence of responses from students in these faculties. It should be noted that these two faculties are not located on the main campus of the University of Pretoria, which is where the data collection took place. From Table 4.4 it can be seen that the sample consists mostly of Engineering/Built Environment/IT (24,46%) and Economic & Management Sciences (23,92%) students, followed closely by students studying Law (20,97%). The remaining students were from the Natural and Agricultural Sciences, Education, Health Sciences and Humanities Faculties.

Table 4.4: Frequency of students per faculty of study for the original and condensed variable

Original variable (N=372)	**Frequency (%)**	**Condensed Variable**	**Frequency (%)**
1. Economic & Management Sciences	23,92	1. Economic & Management Sciences	23,92
2. Education	3,76	2. Education	3,76
3. Engineering/Built Environment/IT	24,46	3. Engineering/Built Environment/IT	24,46
4. Health Sciences	3,76	4. Health Sciences	3,76
5. Law	20,97	5. Law	20,97
6. Natural And Agricultural Sciences	14,79	6. Natural And Agricultural Sciences	14,79
7. Humanities	8,07	7. Humanities/Theology	8,34
8. Theology	0,27		

Source: SPSS.

- **Previous finance course**

To assess students' previous participation in a finance course, the students could respond to one of four options, namely 'yes, a course offered at university', 'yes, a course offered at

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school', 'yes, a course offered elsewhere' or 'no' they have not participated in a previous finance course. The responses 'yes, at university, school or elsewhere', were condensed into a single response namely 'yes'. The responses, presented in Table 4.5, show students' participation in a previous finance course, using the original and condensed 'yes' and 'no' responses. Table 4.5 shows that 43,70% of students had previously participated in a finance course of which 19,57% included a course offered at university, 22,79% included a course offered at school and 1,34% included a course offered 'elsewhere'. The remaining 56,30% of students had not previously participated in any finance course.

Table 4.5: Frequency of students' participation in a previous finance course for original and condensed variable

Original variable (N= 373)	**Frequency (%)**	**Condensed variable**	**Frequency (%)**
1. Yes, offered at university	19,57	1. Yes	43,70
2. Yes, offered at school	22,79		
3. Yes, offered elsewhere	1,34		
4. No	56,30	2. No	56,30

Source: SPSS.

4.1.1.5 Parental and other influence

This section includes the descriptive information for the variables parental education and parental occupation. Additionally, a variable entitled 'origin of money management skills' considers where students learnt most about managing their money and is linked to the concept of parental influence and socialization addressed in chapter 2.

- **Parental education**

For the variable 'parental education', some of the categories have been condensed due to a receipt of a minimal number of responses. The original variable consisted of 10 levels of education. The categories 'no school', 'some primary school', 'primary school completed', 'some high school' and 'Grade 12/matric' have been condensed into one category namely 'Grade 12 or less'. The categories 'diploma' and 'undergraduate' remain unchanged. The

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categories 'honours', 'masters' and 'doctorate/PhD' were combined to make a single category, namely 'postgraduate degree'. Table 4.6 presents this in tabular format.

Table 4.6: Frequency of parental education for the original and condensed variable

Original Variable			**Condensed Variable**		
Education	**Frequency (%)**		**Education**	**Frequency (%)**	
	Mother (N=364)	**Father (N=326)**		**Mother (N=364)**	**Father (N=326)**
1. No school	0,82	1,33	1. Grade 12 or less	28,57	20,00
2. Some primary school	1,37	0,53			
3. Primary school completed	0,55	0,27			
4. Some high school	4,40	4,27			
5. Grade 12/Matric	21,43	13,60			
6. Diploma	24,45	22,40	2. Diploma	24,45	22,40
7. Undergraduate	20,60	17,87	3. Undergraduate	20,60	17,87
8. Honours	15,93	16,27	4. Postgraduate	26,38	39,73
9. Masters	8,25	20,53			
10. Doctorate/ PhD	2,20	2,93			

Source: SPSS.

Table 4.6 also provides the frequencies for the original and condensed categories. It can be seen that 28,57% of mothers had Grade 12 or less, compared with 20% of fathers, while 24,45% of mothers and 22,40% of fathers had a diploma. Table 4.6 shows that 17,87% of the students' fathers had at least an undergraduate degree and 39,73% had a postgraduate degree, while 20,60% of mothers had an undergraduate degree and 26,38% had a postgraduate degree.

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- **Parental occupation**

The variable 'parental occupation' consists of mother's occupation and father's occupation. Students were asked to classify their mother and father into 1 of 9 categories. Table 4.7 presents the original and condensed variable responses. The original 9 categories have been condensed into 4 categories of occupation, namely Category 1, Category 2, Category 3 and Category 4. Category 1 includes parents who are legislators, senior officials and managers. This is followed by Category 2 that includes parents who are professionals. Category 3 includes all technical and associated professionals, as well as administrators. Lastly, Category 4 includes service workers, shop and market sales workers, skilled agricultural and fishery workers, plant and machine operators and assemblers, domestic workers and other. Students who responded with 'other' were required to provide further information as to their parents' occupation. These responses were assigned to 1 of the 9 suitable categories. Some responses to 'other' were not appropriately fitting to any of the 9 given categories. For example, "housewives/husbands", in this case remained unchanged and thus remained in the category 'other'.

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Table 4.7: Categories of parental occupation of students for original and condensed variable

Original variables			**Condensed variable**		
Occupation	**Frequency (%)**		**Occupation**	**Frequency (%)**	
	Mother (N=358)	**Father (N=322)**		**Mother**	**Father**
1. Legislators, senior officials and managers	19,55	37,30	1. Category 1	19,55	37,30
2. Professionals	26,26	29,20	2. Category 2	26,26	29,20
3. Technical and associate professionals	6,70	10,20	3. Category 3	25,14	13,00
4. Administration	18,44	2,80			
5. Service workers, shop and market sales workers	5,31	5,00	4. Category 4	29,05	20,50
6. Skilled agricultural and fishery workers	0.56	3,10			
7. Plant and machine operators and assemblers	1,12	2,80			
8. Domestic workers	2,79	0,30			
9. Other	19,27	9,30			

Source: SPSS.

The frequencies of parental occupation are also presented in Table 4.7. It can be seen from looking at the condensed variable that 37,30% of the students' fathers were in 'Category 1' compared with only 19,55% of mothers. Fathers were also more likely to be in 'Category 2' (29,2%) than mothers (26,26%). However, students' mothers were more likely to be in 'Category 3' (25,14%) than fathers (13%). Table 4.7 also shows that 29,05% of mothers compared with 20,50% of fathers were categorized as 'Category 4'.

- **Origin of money management skills**

Table 4.8 shows the original and condensed categories of where students learnt most of their money management skills. The original categories have been condensed due to minimal responses to some categories. The categories 'from talking with friends', 'from magazines, books, TV and radio', 'in my residence hall' as well as 'other i.e.: Bank' have

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been condensed to make one category, namely Category 3. The remaining categories were unchanged in terms of grouping. They were, however, renamed for ease of analysis and discussion purposes.

Table 4.8: Original and condensed categories of where students learn their money management skills

Original Variable (N=364)	Frequency (%)	Condensed Variable	Frequency (%)
1. At home from my family	60,99	1. Category 1	60,99
2. At school/ university in class	12,64	2. Category 2	12,64
3. From talking with my friends	2,75	3. Category 3	9,07
4. From magazines, books, TV and radio	4,67		
5. In my residence hall	0,55		
6. Other, i.e.: Bank	1,10		
7. From experience in managing my own funds	17,30	4. Category 4	17,30

Source: SPSS.

Using the condensed variable, it can be seen in Table 4.8 that 60,99% of the students learnt most of their money management skills at home from their family (Category 1). The second highest response was students who said that they learnt most of their skills from experience in managing their own money (Category 4), represented by 17,30%. The remaining two categories include 12,64% of students who learnt most of their money management skills in the classroom at school and university (Category 2) and 9,07% of students who learnt most of their money management skills from talking with friends, from books, TV, radio and in their residence hall (Category 3).

4.1.1.6 Socio-economic status

This section includes two variables that aim to test for students' socio-economic status. The first variable considered students' perceived socio-economic status, while the second variable is a measure of how many household items the students have available to them.

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- **Perceived socio-economic status**

Perceived socio-economic status was measured by assessing the ability of students' families to afford a number of goods/items. These goods included the ability to purchase clothing, food, durable goods and cars/luxuries. The condensed category 'Low socio-economic status' represents all respondents who hardly make ends meet up to and including those who are easily able to purchase food and clothing. The category including those who are able to easily purchase durable goods is represented by 'Medium socio-economic status'. Those able to purchase luxuries, are represented by the category 'High socio-economic status'. This can be seen in Table 4.9.

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Table 4.9: Original and condensed categories and frequencies for perceived socio-economic status

Original variable (N=365)	**Frequency (%)**	**Condensed variable**	**Frequency (%)**
We hardly make ends meet. We do not have enough money even for food.	1,37	1. Low socio-economic status	23,83
We have enough money to buy food, but buying clothes causes financial difficulties.	6,84		
We have enough money to buy food and clothes, but purchases of durable goods (a TV-set, refrigerator) is problematic.	15,62		
We have no trouble buying durable goods, but purchases of a really expensive item (i.e.: a car) is a financial burden.	42,47	2. Medium socio-economic status	42,47
We can afford luxuries i.e.: a house.	33,7	3. High socio-economic status	33,7

Source: SPSS.

From the condensed three-category variable it can be seen from Table 4.9 that most of the students, 42,47%, perceived their family socio-economic status to be that of 'Medium socio-economic status'. Almost a quarter of the students perceived their socio-economic status to be that of 'Low socio-economic status' and 33,7% of the students perceived their socio-economic status to be classified as 'High socio-economic status'.

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- **Calculated socio-economic status**

A second measure of socio-economic status was calculated by assessing the number of items available to student per family household. The list of items in the questionnaire included 14 household items. Table 4.10 provides the frequency from lowest to highest frequency of students per item. Table 4.10 shows that as many as 95,98% of students have access to a calculator and 93,83% of students have access to a dictionary. This was followed by 91,69% of the students who have their own room and 89,27% of students who have a computer available to them for university work, as well as 88,47% of the students who had a desk for study purposes. The items that the students had least of were books of poetry and works of art.

Table 4.10: Selection of items used to calculate socio-economic status and respective frequency of students per item

Item	Frequency (%)
Books of poetry	44,44
Works of art	49,32
Classic literature (e.g.: Shakespeare)	51,74
More than 100 books	51,76
A dishwasher	62,60
Educational software	67,56
A quiet place to study	78,60
Books to help with your studies	82,57
A link to the internet	83,11
Desk for study	88,47
A computer available for university work	89,27
A room of your own	91,69
A dictionary	93,83
Your own calculator	95,98

Source: SPSS.

Table 4.11 shows that the average number of items in each student's household is 10.4 items and the standard deviation is 3,070. Thus approximately 68% of the students have between 7 and 13 items.

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Table 4.11: Mean and standard deviation of items in student's household (socio-economic status)

	N	Mean	Standard Deviation
Socio-economic status (Number of items)	369	10.4	3.070

Source: SPSS.

Table 4.12 presents the total number of items available for use by students. For statistical purposes, the variable responses are condensed into two categories, based upon the mean number of items (Table 4.11). These two categories are students with '9 items or less' and students with 'more than 10 items'. It can be seen that the majority, 21,68%, of the students had access to all 14 items in their family household. As many as 64,50%% of the students had 10 or more items available to them, while 35,50% of the students had 9 items or less.

Table 4.12: Frequency of items in student's household for original and condensed variable

Original Variable (N=369)		Condensed Variable	
Number of Item	Frequency (%)	Items	Frequency (%)
1 item	0,54	1. 9 items or less	35,50
2 items	1,36		
3 items	1,9		
4 items	1,08		
5 items	2,71		
6 items	3,25		
7 items	5,7		
8 items	7,05		
9 items	11,92		
10 items	13,55	2. More than 10 items	64,50
11 items	9,76		
12 items	10,03		
13 items	9,49		
14 items	21,68		

Source: SPSS.

4.1.1.7 Summary of descriptives

To summarize, the sample consisted of 55% male and 45% females. The students were on average 20 years of age. The sample consisted mainly of White students, that is 67%

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of the sample were 'White', 27,64% of the sample were 'Black' and the remaining 5,42% of the sample were classified as other. The majority, 45,43%, of the sample were first year students. Three faculties, namely the Faculty of Economic & Management Sciences, the Faculty of the Built Environment/Engineering/IT and the Faculty of Law made up 70% of the sample. Of the sample, 46,3% had not previously participated in a finance course. With respect to parental education, mothers were more likely to have a lower education level than fathers. When considering parental occupation, fathers were more likely to be in senior professions than mothers. Socio-economic status was measured as perceived by students, as well as calculated by number of items available to each student. Most students perceived themselves to have medium socio-economic standing. Furthermore, 64,5% of students had more than 10 household items as listed on the questionnaire.

4.1.2 Section B: Descriptive analysis of financial literacy score

This section provides the findings, by way of tables and graphs, of students' financial literacy score. As previously mentioned, the measurement tool, as designed by Lusardi and Mitchell (2007b), measures financial literacy at a basic and a sophisticated level. For this reason, the overall financial literacy scores are presented using two main tables. The first table shows percentage 'correct', 'incorrect' and 'do not know' answers for each question of these two sections. The first section is a basic financial literacy score measured by five questions, as can be seen in Table 4.13. The second is sophisticated financial literacy score, which is measured by eight questions, as can be seen in Table 4.14.

Table 4.13: Percentage questions correct for basic literacy questions

Basic Financial Literacy Questions	Correct (%)	Incorrect (%)	Do not know (%)
Q1. Numeracy	88	8	4
Q2. Compound interest	56	41	3
Q3. Inflation	70	14	16
Q4. Time value of money	60	36	4
Q5. Money Illusion	83	15	2

Source: SPSS.

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From Table 4.13 it can be seen that the first question had the highest score and was correctly answered by 88% of the students. This is followed by Question 5, which was answered correctly by 83% of the students. The third question was answered correctly by 70% of the students, making this question the third best-answered question of the basic financial literacy question set. The most poorly answered question was Question 2, which was answered correctly by as few as 56% of the students. Question 4 was the second most poorly answered question with 60% of the students answering correctly.

Table 4.14: Percentage questions correct for sophisticated literacy question

Sophisticated Financial Literacy Questions	Correct (%)	Incorrect (%)	Do not know (%)
Q6. Main function of the stock market	64	23	13
Q7. Knowledge of units trusts	20	28	52
Q8. Relation between interest rate and bond prices	27	56	17
Q9. What is safer: shares vs. unit trusts	56	18	26
Q10. Which is riskier: shares vs. bonds	74	15	12
Q11. Highest return over long period: savings accounts, bonds or shares	41	45	13
Q12. Highest fluctuations: savings accounts, bonds, shares	69	18	14
Q13. Risk diversification	71	24	5

Source: SPSS.

Table 4.14 shows the percentage of students who answered the sophisticated questions correctly, incorrectly or with a 'do not know' response. Question 10 was correctly answered by 74% of the students, while Question 13 had the second highest correct responses by students, with 71%. The question that was most poorly answered was Question 7, for

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which only 20% of the students answered the question correctly. This was closely followed by Question 8, where only 27% of the students answered the question correctly.

Table 4.15: Mean and standard deviation of financial literacy scores

	N	Mean	Median	Std. Deviation
Basic financial literacy	373	71.2	80	22.72
Sophisticated financial literacy	373	52.72	50	20.39
Total financial literacy	373	59.83	61.54	17.30

Source: SPSS.

The mean scores for basic, sophisticated and total financial literacy are presented in Table 4.15. The average score for basic financial literacy was 71.2%, and a median of 80. For sophisticated financial literacy, the average score was 52.72% and a median of 50. The average total financial literacy score, for all 13 questions, was 59.83% with a median of 61.54.

For statistical purposes, a number of methods were used to establish the shape of the distribution. For this study, these methods included visual and statistical assessment. The former is a histogram used to determine the shape of the distribution. Figure 3 presents a histogram of the basic financial literacy. It can be seen that the data is skewed to the left and thus is not normally distributed. Figure 4 shows a histogram of the sophisticated financial literacy scores. It can be seen that these scores are not normally distributed. Lastly, the scores for total financial literacy are presented in the form of a histogram in Figure 5. Once again it can be seen that the total scores are slightly skewed to the left and thus are not normally distributed.

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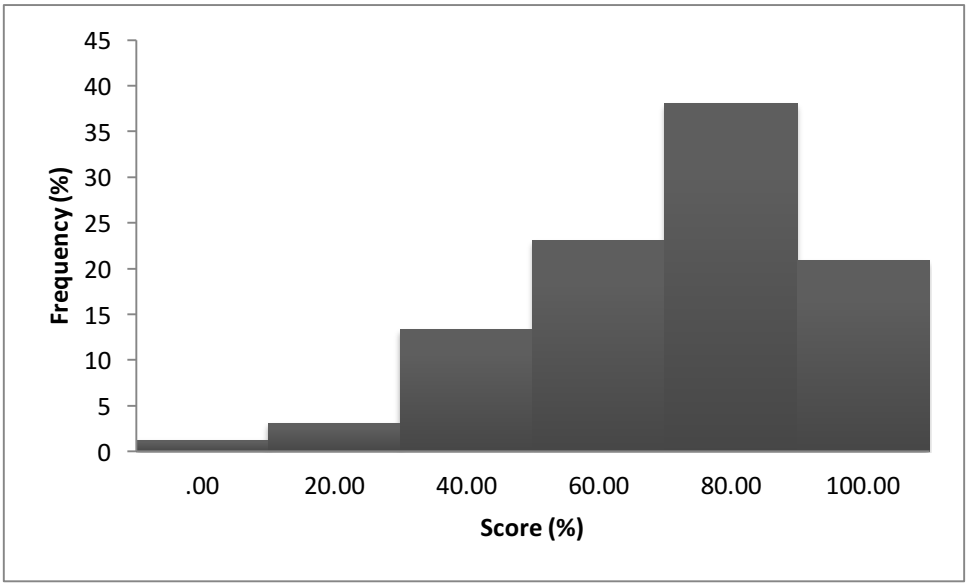
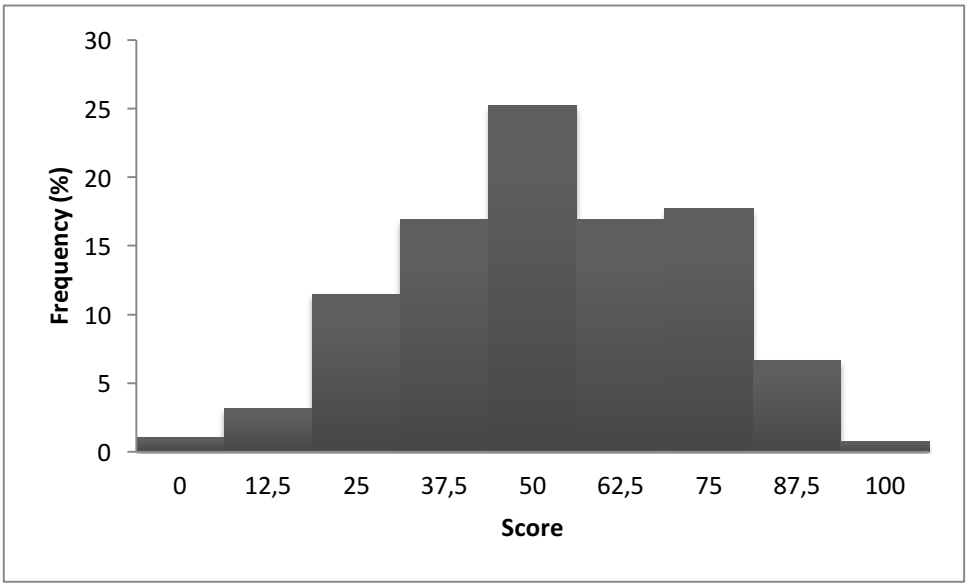
Figure 3: Histogram of students' basic financial literacy scores



Source: SPSS.

Figure 4: Histogram of students' sophisticated financial literacy scores



Source: SPSS.

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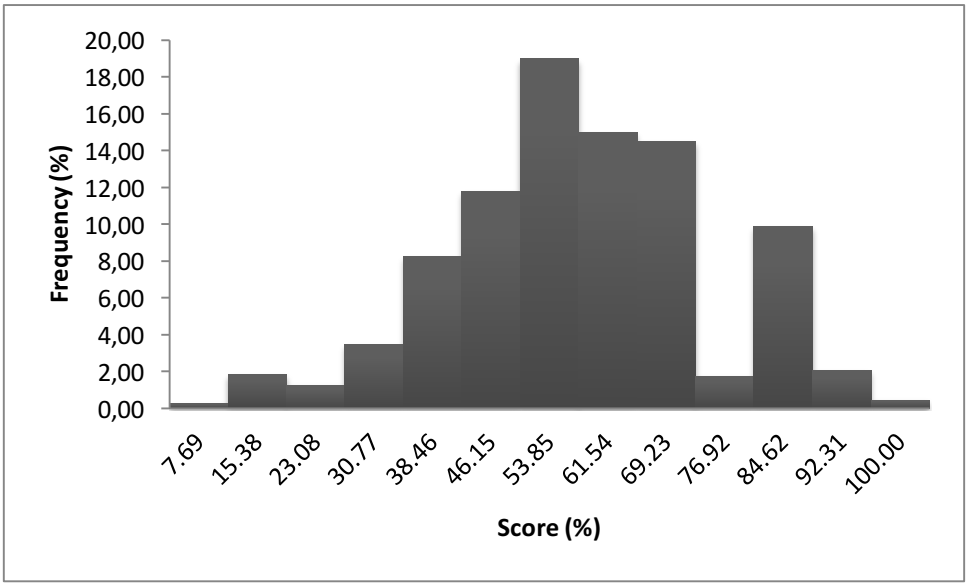
Figure 5: Histogram of students' total financial literacy scores



Source: SPSS.

The second assessment of normality made use of a significance test, namely the Kolmogorov-Smirnov (K-S) test. This test aims to understand whether the scores differ significantly from a comparable normal distribution. If the test is significant, that is $p<0.05$, then the distribution is significantly different from a normal distribution. Table 4.16 illustrates the results of the K-S test (Field, 2009).

Table 4.16: Kolmogorov-Smirnov test of normality for financial literacy scores

	Statistic	df	Significance
Basic financial literacy score	0.24	373	0.001
Sophisticated financial literacy score	0.132	373	0.001
Total financial literacy score	0.096	373	0.001

Source: SPSS.

Table 4.16 shows that basic financial literacy, D(373) = 0.24, p=.001, sophisticated financial literacy, D(373) = .132, p=.001 and total financial literacy, D(373)=0.096, p=0.001, scores are significantly non-normal.

To conclude, through means of histograms and statistical tests, it could be seen that for all levels of financial literacy, the distribution of scores was significantly different from a

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normal distribution. Thus, appropriate non-parametric tests were used in the univariate analysis.

4.1.2.1 Self-assessed financial literacy

In the section above, the scores for actual basic, sophisticated and total financial literacy are presented in detail. The results of those scores are a measure of actual/tested financial literacy. The following section describes the results of self-assessed financial literacy, which is a measure of what the students perceive their financial literacy to be.

Self-assessed financial literacy was measured on a Likert scale of very good to very bad. The original five categories of the self-assessed financial literacy question, which can be seen in Table 4.17, have been condensed into three categories, namely good/very good, satisfactory and bad/very bad. Table 4.17 shows that when the variable is condensed into three categories most, of the students, 41,35%, viewed their financial literacy to be good/very good, while 46,49% perceived their financial literacy to be satisfactory. The minority, 12,16%, of students viewed themselves to have bad/very bad financial literacy.

Table 4.17: Self-assessed financial literacy frequency by students for original and condensed variable

Original Variable (N=370)		**Condensed Variable**	
Self-Assessment	Frequency (%)	Self-Assessment	Frequency (%)
Very Good	5,41	Good/Very good	41,35
Good	35, 5		
Satisfactory	46,49	Satisfactory	46,49
Bad	10,81	Bad/Very Bad	12,16
Very Bad	1,35		

Source: SPSS.

4.1.2.2 Summary of descriptive analysis

The detailed descriptive analysis of each variable presents the data as it was originally captured, and the means in which minimal response categories have been condensed. Furthermore, the average scores for the basic, sophisticated and total financial literacy

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score were evaluated, as was the shape of the distribution of these scores, the condensed variables as presented above, and non-parametric tests are thus used for the univariate analysis, which follows in Section 4.1.3.

4.1.3 Section C: Univariate analysis

Section, 4.1.3, makes use of univariate analysis to determine the role that each variable has in the financial literacy of students. Suitable non-parametric tests were used to assess the significance, at a 5% significance level, of each predictor variable against the continuous outcome variable, financial literacy. The hypotheses are stated as directional, where it is clear from previous research, as discussed in Chapter 2, that the majority of findings confirm that a clear direction exists.

4.1.3.1 Age

The hypothesis for this test is as follows:
H0: Financial literacy scores do not differ by age.
Hα: Those who are older have higher financial literacy scores.

Table 4.18: Spearman's correlation co-efficient of age and financial literacy scores

		Basic Financial Literacy	Sophisticated Financial Literacy	Total Financial Literacy
Age	Spearman's correlation (r_s)	-.031	-.028	-.031
	Sig. (2-tailed)	.558	.594	.550

Source: SPSS.

Table 4.18 shows results of Spearman's correlation co-efficient. This test is used to determine the correlation of the continuous variable, age, and financial literacy scores. It was found that age is not significantly correlated with the basic financial literacy score, r_s = -.031 and p = .558. The same was found to be the case for sophisticated financial literacy

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score, r_s = -.028 and p= .594, as well as total financial literacy score, r_s = -.031 and p = .550.

Therefore, the null hypothesis is not rejected at a 5% significance level. To conclude, in this sample, basic, sophisticated and total financial literacy scores do not have a relationship with age.

4.1.3.2 Race

The hypothesis test is as follows:
H0: There is no difference between financial literacy scores across racial groups.
Hα: There is difference between financial literacy scores across racial groups.

Table 4.19: Kruskal-Wallis mean rank scores for race and financial literacy score

Race	N	Basic	Sophisticated	Total
White	247	197.34	196.38	199.90
Black African	102	158.88	157.64	151.83
Other	20	165.85	183.95	170.18
Total	369			

Source: SPSS.

Table 4.20: Kruskal-Wallis test statistic values for race and financial literacy score

	Basic	Sophisticated	Total
Chi-square	10.939	9.853	15.347
df	2	2	2
Asymp. Sig.	.004	.007	.000

Source: SPSS.

The Kruskal-Wallis test showed that there were significant differences between race and basic financial literacy score, H(2) = 10.939, p = .004. The same was found to be true for sophisticated financial literacy score, H(2) = 9.853, p =.007. When combining the basic and sophisticated score to create a total score, a significant difference was found between race and financial literacy score, H(2) = 15.347, p <.001.

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To conclude, the null hypothesis is rejected at a 5% significance level. Therefore, for this sample, there is a significant difference between basic, sophisticated and total financial literacy scores across different racial groups.

4.1.3.3 Gender

The hypothesis for this test is:

H0: Financial literacy scores do not differ between female and male students.

Hα: Female students have lower financial literacy scores than male students.

Table 4.21: Mann-Whitney U test mean rank scores for gender and financial literacy score

Gender	N	Basic	Sophisticated	Total
Male	167	203.43	205.54	207.91
Female	205	172.71	170.99	169.06

Source: SPSS.

Table 4.22: Mann-Whitney U test statistic for variable gender

	Financial Literacy		
	Basic	Sophisticated	Total
Mann-Whitney U	14291.000	13938.500	13542.500
Z	-2.855	-3.134	-3.498
Asymp. Sig. (2-tailed)	.004	.002	.000

Source: SPSS.

The Mann-Whitney U test is used to compare the predictor variable gender and the outcome variable financial literacy score at a basic, sophisticated and total level. The results show that female students' basic financial literacy scores are significantly lower than male students' scores, Mann-Whitney U = 14291, z-score = -2.855, p-value= 0.004 and r = -0.148 which represents a small effect size. In addition to basic financial literacy score, the results show that female students' sophisticated financial literacy score is significantly lower than male students, Mann-Whitney U = 13938.5, z –score = -3.134, p-value = 0.002 and r = -0.162 which represents a small effect size. When combining the

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basic and sophisticated financial literacy score to calculate a total financial literacy score, it was found that female students' overall financial literacy score is also significantly lower than that of male students, U = 13542.5, z = -3.498, p= 0.001 and r = -0.181 which represents a small effect size.

To conclude, the null hypothesis is rejected at a 5% significance level for basic, sophisticated and total financial literacy. Therefore, in this sample, female students displayed significantly lower basic, sophisticated and total financial literacy scores than that of male students.

4.1.3.4 Education

This section includes the statistical tests of three variables. The first variable is academic education, that is first, second, third, fourth year or postgraduate studies. The second variable aims to capture financial education. In particular, this variable considered students' previous participation in a finance course. Lastly, area of study was considered by evaluating the faculty in which the students sampled are enrolled.

- **Academic level**

The hypothesis test is as follows:
H0: Financial literacy scores do not differ based on academic education level.
Hα: Students with a higher academic education level achieve higher financial literacy scores.

Table 4.23: Kruskal-Wallis mean rank scores for academic education and financial literacy score

Academic Year	N	Basic	Sophisticated	Total
First Year	169	181.56	182.59	81.86
Second Year	67	195.09	197.90	198.01
Third Year	67	197.63	196.34	199.00
Fourth Year	55	187.06	168.46	174.58
Postgraduate	14	149.57	202.89	174.36
Total	372			

Source: SPSS.

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Table 4.24: Kruskal-Wallis test statistic values for academic education and financial literacy score

	Basic	Sophisticated	Total
Chi-square	3.427	3.527	2.895
df	4	4	4
Asymp. Sig.	.489	.474	.576

Source: SPSS.

The Kruskal-Wallis test, Table 4.24, shows that students' financial literacy does not differ significantly by education. That is students' basic financial literacy score is not significantly related to education, H(4) = 3.427, p= .489. The same was found to be true for sophisticated financial literacy score, H(4) = 3.527, p = .474 and total financial literacy score, H(4) = 2.895, p = .576.

Therefore, the null hypothesis is not rejected at a 5% significance level. In conclusion, basic, sophisticated and total financial literacy scores do not differ significantly by students' education, as measured by academic level.

- **Financial education**

The hypothesis test is as follows:
H0: Financial literacy scores do not differ based on prior financial education.
Hα: Financial literacy scores are higher for those who have prior financial education.

Table 4.25: Mann-Whitney U test mean rank scores for financial education and financial literacy score

Finance Course	N	Basic	Sophisticated	Total
Yes	163	201.4	206.35	207.03
No	210	175.79	171.98	171.45
Total	373			

Source: SPSS.

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Table 4.26: Mann-Whitney U test statistic for financial education and financial literacy score

	Basic	Sophisticated	Total
Mann-Whitney U	14760.000	13960.500	13850.000
Z	-2.376	-3.106	-3.190
Asymp. Sig. (2-tailed)	.018	.002	.001

Source: SPSS.

The Mann-Whitney U test is used to compare financial education and financial literacy score at a basic, sophisticated and overall level. The results show that those students who have previously participated in a finance course scored significantly higher in basic financial literacy questions than those who had not previously participated in a finance course, U = 14760, z = -2.376, p= .018 and r = -0.123 which represents a small effect size. In addition to basic financial literacy score, the results showed that students who previously participated in a finance course scored significantly higher than those who had not participated in a finance course, when answering the sophisticated financial literacy questions, U = 13960.05, z = -3.106, p = .002 and r = -0.16 which represents a small effect size. From the total financial literacy score, it was found that previous participation in a finance course results in a significantly higher financial literacy score, U = 13850, z = -3.190, p = .001 and r = -0.165 which represents a small effect size.

To conclude, the null hypothesis is rejected at a 5% significance level. Therefore, for this sample, students with financial education, as measured by previous participation in a finance course, displayed higher levels of financial literacy scores at a basic, sophisticated and total level.

- **Faculty of study**

The hypothesis test is as follows:
H0: Financial literacy scores do not differ across faculty of study.
Hα: Financial literacy scores differ across faculty of study.

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Table 4.27: Kruskal-Wallis mean rank scores of faculty of study and financial literacy scores

Faculty	N	Basic	Sophisticated	Total
Economic & Management Sciences	89	197.40	212.87	209.80
Education	14	157.11	155.25	146.43
Engineering/Built Environment/IT	91	204.05	191.58	198.58
Health Sciences	14	178.96	168.29	173.32
Law	78	156.85	164.47	155.25
Natural and Agricultural Sciences	55	215.05	194.72	207.83
Humanities/Theology	31	144.31	159.06	149.00
Total	372			

Source: SPSS.

Table 4.28: Kruskal-Wallis test statistic for faculty of study and financial literacy scores

	Basic	Sophisticated	Total
Chi-square	20.670	13.187	20.374
df	6	6	6
Asymp. Sig.	.002	.040	.002

Source: SPSS.

The Kruskal-Wallis test showed that there is significant difference between faculty of study and basic financial literacy score, $H(6) = 20.670$, $p = .002$, and sophisticated financial literacy score, $H(6) = 13.187$, $p = .04$. Significant difference was also found between faculty of study and total financial literacy score, $H(6) = 20.374$, $p = .002$.

To conclude, the null hypothesis is rejected at a 5% significance level. Therefore, for this sample, financial literacy scores differ across faculty of study at a basic, sophisticated and total level.

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4.1.3.5 Parental and other influence

This section (parental and other influences) includes statistical tests for parental education, parental occupation as well as the variable that considers 'other influences', which was measured by reflecting where students learnt most of their money management skills.

- **Parental education**

Mother's education level:

The hypothesis test is as follows:

H0: Financial literacy scores do not differ based on education level of mother.

Hα: Financial literacy scores are positively related to mother's education level.

Table 4.29: Kruskal-Wallis mean rank scores of mother's education level and financial literacy scores

Mother's Education	N	Basic	Sophisticated	Total
Matric or less	104	10.80	162.20	168.61
Diploma	89	175.08	204.38	194.25
Undergraduate	75	191.21	186.47	189.25
Postgraduate	96	184.41	181.10	181.38
Total	364			

Source: SPSS.

Table 4.30: Kruskal-Wallis test statistic for mother's education level and financial literacy scores

	Basic	Sophisticated	Total
Chi-square	1.101	8.112	3.303
df	3	3	3
Asymp. Sig.	.777	.044	.347

Source: SPSS

The Kruskal-Wallis test showed that there is no significant difference between mother's education level and basic financial literacy score, H(3) =1.101, p = .777. This was also found to be true for total financial literacy score, H(3) = 3.303, p = .347. This was not true

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for sophisticated financial literacy scores. Sophisticated financial literacy score and mother's education level differed significantly, H(3) = 8.112, p= .044.

Table 4.31: Jonckheere-Terpstra test results for mother's education level and financial literacy score

	Sophisticated
Observed J-T Statistic	25891.000
Std. J-T Statistic	1.054
Asymp. Sig. (2-tailed)	.292

Source: SPSS.

Further analysis, using the Jonckheere-Terpstra test, showed that there is no significant trend in the data. Thus, sophisticated financial literacy does not necessarily increase as mother's education level increases, J = 25891.000, z= 1.054, p= .292.

Therefore, at a basic and total financial literacy level, the null hypothesis is not rejected at a 5% significance level. However, at a sophisticated financial literacy level, the null hypothesis could be rejected at a 5% significance level. In conclusion, for this sample, basic and total financial literacy do not differ significantly by mother's education. Sophisticated financial literacy was found to differ significantly by mother's education level, however with no significant trend.

<u>Father's education level:</u>

The hypothesis test is as follows:

H0: Financial literacy scores do not differ based on education level of father.

Hα: Financial literacy scores are positively related to father's education level.

Table 4.32: Kruskal-Wallis mean rank scores of father's education level and financial literacy scores

Father's Education	N	Basic	Sophisticated	Total
Matric or less	70	152.15	140.48	144.06
Diploma	74	166.30	170.60	168.57
Undergraduate	59	177.02	154.64	162.39
Postgraduate	123	161.79	176.58	172.04
Total	326			

Source: SPSS.

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Table 4.33: Kruskal-Wallis test statistic for father's education level and financial literacy scores

	Basic	Sophisticated	Total
Chi-square	2.537	7.756	4.294
df	3	3	3
Asymp. Sig.	.469	.051	.231

Source: SPSS.

The Kruskal-Wallis test showed that basic financial literacy does not differ significantly based upon father's education, H(3) = 2.537, p= .469. The same was found to be true for sophisticated financial literacy, H(3) = 7.756, p= .051. Lastly, when assessing the total financial literacy score, it was also found that there was no significant difference father's education and total financial literacy of students, H(3) = 4.294, p = .231.

Therefore, the null hypothesis is not rejected at a 5% significance level. For this sample of students, financial literacy score does not differ significantly by education level of fathers at a basic, sophisticated and total financial literacy level.

- **Parental occupation**

The categories used in this section were reclassified as Category 1 to Category 4. Category 1 included professionals and they were thus considered to be a senior occupation, while Category 4 included service workers, shop and market sales workers, skilled agricultural and fishery workers, plant and machine operators and assemblers, domestic workers and other, and were considered less senior occupations.

<u>Mother's occupation:</u>

The hypothesis test is as follows:

H0: Financial literacy scores do not differ based on mother's occupation.

Hα: Financial literacy scores are higher for students with mothers in senior occupations.

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Table 4.34: Kruskal-Wallis test mean rank of mother's occupation and financial literacy scores

Occupation	N	Basic	Sophisticated	Total
Category 1	70	181.24	180.98	180.81
Category 2	94	176.92	201.68	195.01
Category 3	90	185.44	180.81	183.49
Category 4	104	175.52	157.33	161.15
Total	358			

Source: SPSS.

Table 4.35: Kruskal-Wallis test statistic mother's occupation and financial literacy scores

	Basic	Sophisticated	Total
Chi-square	.572	9.437	5.629
df	3	3	3
Asymp. Sig.	.903	.024	.131

Source: SPSS.

Table 4.35 presents the Kruskal-Wallis test statistic. The findings display mixed results. For the case of basic financial literacy, it was found that financial literacy does not differ significantly across mother's occupation, H(3) = .572, p = .903. This was also true for total financial literacy, H(3) = 5.629, p= .131. The result for sophisticated financial literacy differed from that of basic and total financial literacy, in that it was found to significantly differ across mother's occupation, H(3) = 9.437, p= .024.

Table 4.36: Jonckheere-Terpstra test results for mother's occupation and financial literacy scores

	Sophisticated
Observed J-T Statistic	21427.000
Std. J-T Statistic	-2.282
Asymp. Sig. (2-tailed)	.022

Source: SPSS.

Upon further analysis, it was seen from the Jonckheere-Terpstra test results, presented in Table 4.36, that there is a significant trend in the data. That is, at a sophisticated financial literacy level, the more senior the mother's occupation, the higher the financial literacy score of the student, J = 21427.000, z= -2.282, p = .022, and there was a small effect size (r = -.121).

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To conclude: for basic and total financial literacy, the null hypothesis was not rejected at a 5% significance level. However, at a sophisticated level, the null hypothesis could be rejected. Therefore, for this sample of students, basic and total financial literacy do not differ across mother's occupation. Conversely, students with mothers in senior professions are significantly more financially literate at a sophisticated level.

Father's occupation:

The hypothesis test is as follows:

H0: Financial literacy scores do not differ significantly based on father's occupation.

Hα: Financial literacy scores are higher for students with fathers in senior occupations.

Table 4.37: Kruskal-Wallis mean rank scores for father's occupation and financial literacy scores

Occupation	N	Basic	Sophisticated	Total
Category 1	120	163.84	171.21	169.31
Category 2	94	157.97	174.02	168.50
Category 3	42	164.45	172.38	171.29
Category 4	66	160.39	119.08	131.10
Total	322			

Source: SPSS.

Table 4.38: Kruskal-Wallis test statistic for father's occupation and financial literacy scores

	Basic	Sophisticated	Total
Chi-square	.285	17.879	9.048
df	3	3	3
Asymp. Sig.	.963	.000	.029

Source: SPSS.

The Kruskal-Wallis test showed that basic financial literacy does not significantly differ across father's occupation level, H(3) = .285, p = .963. The same result was not true for sophisticated and total financial literacy. It was shown that there is significant difference in financial literacy across occupation of fathers at a sophisticated financial literacy level, H(3) = 17.879, p = .001, and total financial literacy level, H(3) = 9.048, p = .029.

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Table 4.39: Jonckheere-Terpstra test results for father's occupation and financial literacy scores

	Sophisticated	Total
Observed J-T Statistic	15847.000	16616.000
Std. J-T Statistic	-3.019	-2.154
Asymp. Sig. (2-tailed)	.003	.031

Source: SPSS.

Jonckheere-Terpstra test results, shown in Table 4.39, revealed that there is a significant trend in the data for sophisticated and total financial literacy. Thus, the more senior the father's occupation, the higher the student's sophisticated financial literacy score, J = 15847.000, z= -3.019, p = .003 and r = -.168 which represents a small effect size. The same was found to be true for total financial literacy score, J = 16616.000, z= -2.154, p = .031 and r = -.120 which represents a small effect size.

To conclude: for basic financial literacy, the null hypothesis could not be not rejected at a 5% significance level. However, in the case of sophisticated and total financial literacy, the null hypothesis was rejected at a 5% significance level. Therefore, for this sample, basic financial literacy did not differ significantly across father's occupation. Conversely, sophisticated and total financial literacy was significantly higher for students with fathers in senior occupations.

- **Origin of money management skills**

The hypothesis test is as follows:

H0: Financial literacy scores do not differ based upon where students learn money management skills.

Hα: Financial literacy scores differ based upon where students learn their money management skills.

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Table 4.40: Kruskal-Wallis mean rank scores for where students learn their money management skills and financial literacy scores

Money Management	N	Basic	Sophisticated	Total
At home from family.	222	191.39	183.45	187.02
At university, school, from friends, reading magazines, watching TV or other.	46	161.15	159.15	155.89
From talking with my friends, reading magazines, books, watching TV. In my residence hall. Other i.e.: Bank.	33	141.94	198.85	174.61
From experience in managing my own funds.	63	188.01	187.63	190.13
Total	364			

Source: SPSS.

Table 4.41: Kruskal-Wallis test statistic for where students learn their money management skills and financial literacy scores

	Financial Literacy		
	Basic	Sophisticated	Total
Chi-square	9.285	3.339	3.941
df	3	3	3
Asymp. Sig.	.026	.342	.268

Source: SPSS.

The Kruskal-Wallis test results showed that there is a significant difference between where students learn their money management skills and basic financial literacy score, H(3) = 9.289, p = .026. The same was not found to be true for sophisticated financial literacy score. The results showed that there is no significant difference between sophisticated financial literacy score and where students learn their money management skills, H(3) = 3.339, p = 0.342. Lastly, no significant difference was found between where students learn their money management skills and total financial literacy score, H(3) = 3.941, p = .268.

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To conclude: For basic financial literacy score the null hypothesis could be rejected at a 5% significance level. However, for sophisticated and total literacy scores the null hypothesis is not rejected. Therefore, for this sample of students, basic financial literacy score differed significantly based upon where students learn their money management skills. In contrast, for the case of sophisticated and total financial literacy score, financial literacy scores did not differ significantly based upon where students learn their money management skills.

4.1.3.6 Socio-economic status

- **Perceived socio-economic status**

The hypothesis test is as follows:
H0: Financial literacy scores do not differ based on perceived socio-economic status.
Hα: Financial literacy scores are positively associated with perceived socio economic status.

Table 4.42: Kruskal-Wallis mean rank scores for perceived socio economic status and financial literacy scores

Perceived socio-economic status	N	Basic	Sophisticated	Total
Low socio-economic status	87	161.43	140.48	144.06
Medium socio-economic status	155	182.40	170.60	168.57
High socio-economic status	123	199.01	169.47	168.91
Total	365			

Source: SPSS.

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Table 4.43: Kruskal-Wallis test statistic for perceived socio-economic status and financial literacy scores

	Basic	Sophisticated	Total
Chi-square	7.046	4.813	7.153
df	2	2	2
Asymp. Sig.	.030	.090	.028

Source: SPSS.

Table 4.43 presents the Kruskal-Wallis test statistic for perceived socio-economic status and financial literacy scores. The findings show that financial literacy is significantly associated with perceived socio-economic status at a basic financial literacy level, H(2) = 7.046, p = .030. This was also found to be the case for total literacy, H(2) = 7.153, p = .028. However, the Kruskal-Wallis test showed that sophisticated financial literacy is not significantly associated with perceived socio-economic status, H(2) = 4.813, p= .09.

Table 4.44: Jonckheere-Terpstra test results for perceived socio-economic status and financial literacy scores

	Basic	Total
Observed J-T Statistic	24375.500	24521.000
Std. J-T Statistic	2.640	2.690
Asymp. Sig. (2-tailed)	.008	.007

Source: SPSS.

The Jonckheere-Terpstra test results, shown in Table 4.44, revealed that there is a significant trend in the data. The higher the perceived socio-economic status, the better the student's basic financial literacy score, J =24375.500, z = 2.640, p = .008, and r = .138 which represents a small effect size. The same was true for total financial literacy score, J = 24521.000, z = -2.690, p = .007 and r = .141 which represents a small effect size.

To conclude: for basic and total financial literacy, the null hypothesis could be rejected at a 5% significance level. However, for sophisticated financial literacy the null hypothesis could not be rejected at a 5% significance level. Therefore, for this sample of students, basic and total financial literacy score was positively associated with perceived socio-

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economic status. Conversely, sophisticated financial literacy score was not significantly associated with perceived socio-economic status.

- **Calculated socio-economic status**

The hypothesis test is as follows:

H0: Financial literacy scores do not differ based on calculated socio-economic status.

Hα: Students with a higher calculated socio-economic status have higher financial literacy scores than those with a lower calculated socio-economic status..

Table 4.45: Mann-Whitney U test mean rank scores for calculated socio-economic score and financial literacy

	N	Basic	Sophisticated	Total
9 items or less	131	173.87	175.32	173.34
More than 10 items	238	191.13	190.33	191.42
Total	369			

Source: SPSS.

Table 4.46: Mann-Whitney U test statistic for variable calculated socio-economic status

	Basic	Sophisticated	Total
Mann-Whitney U	14131.000	14321.000	14061.500
Z	-1.549	-1.315	-1.572
Asymp. Sig. (2-tailed)	.121	.188	.116

Source: SPSS.

The Mann-Whitney U test is used to compare the predictor variable calculated socio-economic status and the outcome variable financial literacy score at a basic, sophisticated and total level. The results showed that students' basic financial literacy scores were not significantly higher for those of a high socio-economic status, Mann-Whitney U = 14131.000, z-score = -1.549, p= .121. In addition to this finding, sophisticated financial literacy score was not significantly higher for those of high socio-economic status, Mann-Whitney U = 14321.000, z –score = -1.315, p = .188. When combining the basic and sophisticated financial literacy score to calculate a total financial literacy score, it was

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found that total financial literacy score is not significantly higher for those of high socio-economic status, U = 14061.500, z = -1.572, p= .116.

Therefore, the null hypothesis is not rejected at a 5% significance level. In conclusion, for this sample of students, calculated socio-economic status is not significantly related to financial literacy score at a basic, sophisticated and total level.

4.1.3.7 Self-assessed financial literacy

The hypothesis test is as follows:

Ho: Financial literacy scores do not differ based on self-assessed financial literacy.

Hα: Self-assessed financial literacy is positively related to financial literacy scores.

Table 4.47: Kruskal-Wallis mean rank scores for self-assessed financial literacy and actual financial literacy scores

Self-Assessed Financial Literacy	N	Basic	Sophisticated	Total
Good/Very good	153	203.29	204.26	209.14
Satisfactory	172	180.21	175.21	175.66
Bad/Very Bad	45	145.24	161.06	142.73
Total	370			

Source: SPSS.

Table 4.48: Kruskal-Wallis test statistic for self-assessed financial literacy and actually financial literacy scores

Kruskal Wallis Test Statistics			
	Basic	Sophisticated	Total
Chi-square	11.978	8.943	16.420
df	2	2	2
Asymp. Sig.	.003	.011	.000

Source: SPSS.

The Kruskal-Wallis test results showed that there is significant difference between students' self-assessed financial literacy and basic financial literacy score, H(2) = 11.987, p = .003, as well as sophisticated financial literacy score, H(2) = 8.943, p = .011.

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Significant difference was also found between self-assessed financial literacy and total financial literacy score, H(2) = 16.42, p = .001.

Table 4.49: Jonckheere-Terpstra test results for self-assessed financial literacy and actual financial literacy scores

	Basic	Sophisticated	Total
Observed J-T Statistic	16986.000	17343.500	16161.500
Std. J-T Statistic	-3.362	-2.943	-4.025
Asymp. Sig. (2-tailed)	.001	.003	.001

Source: SPSS.

There was a significant difference between all levels of financial literacy and self-assessed financial literacy. Further analysis using the Jonckheere-Terpstra test revealed that there is in fact a significant trend in the data. Those students who rank themselves as having a good/very good financial literacy, score significantly higher in basic financial literacy than those who rank themselves as having satisfactory or bad/very bad financial literacy, J = 16986.000, z = -3.362, p = .001 and r = -.175 which represents a small effect size. This was also found to be true for sophisticated financial literacy score, J = 17343.500, z = -2.943, p = .003 and r = -.153 which represents a small effect size, as well as total financial literacy score, J = 16161.500, z = -4.025, p = .001 r = -.209 which represents a small effect size.

In conclusion the null hypothesis could be rejected at a 5% significance level for basic, sophisticated and total financial literacy scores. Therefore, for this sample of students, self-assessed financial literacy was significantly positively related to financial literacy. Specifically, those who perceived their financial literacy level to be that of 'good/very good' scored better on actual financial literacy questions.

4.1.3.8 Summary of univariate analysis

In the previous sections, the description of each variable was presented. In addition, the frequency of responses by students was presented by means of a suitable table or graph. This was followed by univariate analysis of each variable against the outcome variable financial literacy score, using the necessary statistical test. This section summarizes the

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results found in the univariate analysis. A summary is presented in Table 4.50, which includes each variable and whether or not it was found to be significant at a basic, sophisticated and total financial literacy level, using a 5% significance level.

Table 4.50: Summary of univariate analysis

Variable	Basic Financial Literacy	Sophisticated Financial Literacy	Total Financial Literacy
Age	N	N	N
Race	Y	Y	Y
Gender	Y	Y	Y
Education:			
Academic Year	N	N	N
Previous Finance Course	Y	Y	Y
Faculty of Study	Y	Y	Y
Parental and Other Influences:			
Mother's Education	N	Y	N
Father's Education	N	N	N
Mother's Occupation	N	Y	N
Father's Occupation	N	Y	Y
Origin of Money Management Skills	Y	N	N
Socio-economic Status:			
Perceived Socio-economic Status	Y	N	Y
Calculated Socio-economic Status	N	N	N
Self-Assessed Financial Literacy	Y	Y	Y

Y = Yes, at a 5% significance

N = Not significant

Source: SPSS.

In summary, the variables found to be significantly associated with basic financial literacy scores of students were gender, race, previous finance course, faculty of study, perceived socio-economic status and money management. The variables significantly associated with sophisticated financial literacy score were gender, race, previous finance course,

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faculty of study, mother's education and father's occupation. Lastly, the variables significantly associated with total financial literacy score were gender, race, previous finance course, faculty of study, father's occupation and perceived socio-economic status. These results, however, do not illustrate whether the variables are significant when placed together in a model. The following section provides further analysis by conducting a logistic regression analysis to better understand whether the variables of interest in this research are significant when placed together in a model. A logistic regression is conducted for each level of financial literacy, basic, sophisticated and total financial literacy.

4.1.4 **Section D: Multivariate analysis**

To conduct the logistic regression, a number assumptions need to be met. These were explained in Section 3.3.3.2. One such assumption is that of linearity of the logit. In order to make use of the continuous predictor variables in the logistic regression, it is necessary to ensure linearity of each variable as related to the logit. The continuous variables used in the bivariate analysis were found to meet the linearity assumption and can thus be used in the logistic regression.

Logistic regression is used to assess the strength of the relationship of the predictor variables and students' financial literacy score at a basic, sophisticated and total level. For the regression analysis, the purposeful selection approach was used (Hosmer Jr *et al*., 2013). As explained in Section 3.3.3.2, the purposeful method starts by conducting a bivariate analysis of each variable against the dichotomous outcome variable financial literacy for all three models (basic, sophisticated and total). Accordingly, the outcome variable, financial literacy, is grouped into two categories, namely students who score 'below average' and 'above average' for basic, sophisticated and total financial literacy. Variables found to be significant ($p<0.20$) are then used in the logistic regression. The reason for the high significance level used is explained in Section 3.3.3.2.

In summary, for basic financial literacy, the variables gender, race, faculty, perceived socio-economic status and calculated socio-economic status were found to be significant in the bivariate analysis ($p<0.2$). In the case of sophisticated financial literacy, the variables

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found to be significant in the bivariate analysis (p<0.2) were gender, race, faculty, previous finance course, mother's and father's education, mother's and father's occupation, perceived socio-economic status, calculated socio-economic status and money management. Lastly, for the case of total financial literacy, the variables gender, race, faculty of study, previous finance course, perceived socio-economic status and calculated socio-economic status were found to be significant in the bivariate analysis of each variable (p<0.2). The outcome of this bivariate analysis as discussed is presented in Table 4.51.

Table 4.51: Bivariate analysis of each variable and financial literacy level

Variable	Basic Financial Literacy (p)		Sophisticated Financial Literacy (p)		Total Financial Literacy (p)	
Gender	.01	Y	.027	Y	.025	Y
Age	.706	N	.387	N	.559	N
Race	.03	Y	.001	Y	.019	Y
Academic Year	.387	N	.472	N	.777	N
Faculty	.028	Y	.090	Y	.010	Y
Previous Finance Course	.214	N	.016	Y	.02	Y
Mother's Education	.867	N	.129	Y	.963	N
Father's Education	.547	N	.024	Y	.645	N
Mother's Occupation	.600	N	.178	Y	.279	N
Father's Occupation	.842	N	.001	Y	.206	N
Perceived SES	.041	Y	.01	Y	.01	Y
Calculated SES	.102	Y	.142	Y	.112	Y
Origin of Money Management Skills	.315	N	.120	Y	.843	N

Y = significant P< .20; N = not significant p>.20

Source: SPSS.

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4.1.4.1 Model 1: Basic financial literacy

A logistic regression analysis was conducted to predict basic financial literacy score using the predictor variables gender, race, faculty, perceived socio-economic status and calculated socio-economic status. These variables were found to be statistically significant in the bivariate analysis of each predictor variable, with the outcome variable basic financial literacy ($p<0.2$) as presented in Table 4.51. A test of the full model against a constant only model was found to be statistically significant. This indicates that the predictors as a whole, reliably distinguish between those of above and below average basic financial literacy, Chi-square = 28,456, $p< .003$ with df = 11. The Hosmer and Lemeshow statistic shows non-significance indicating the model fit is good, H-L = 2.835, p = .944. The pseudo R-squared values are as follows; McFadden is R^2_{MF} =.059, Cox and Snell is R^2_{CS} = .076 and Nagelkerke is R^2_N=0.103.

From the Wald statistic, it is possible to interpret the association between each of the variables and financial literacy. The significance level when considering the Wald test statistic is $p<0.05$. The SPSS output from the regression is presented in Table 4.52, which shows that Black students are less likely to score above average on the basic financial literacy questions than White students. Additionally, students in the Faculty of Law and the Faculty of Humanities/Theology are less likely to score above average for basic financial literacy than students in the Faculty of Economic & Management Sciences.

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Table 4.52: Logistic regression model for basic financial literacy

			95% C.I.for EXP(B)		
Variable	**B (S.E)**	**Sig. (2-tailed)**	**Lower**	**Odds**	**Upper**
Gender	.372 (.236)	.116	.913	1.450	2.304
Race (Reference category = White)		.066			
Black African	**-.638 (.281)***	.023	.305	.528	.916
Other	-.401 (.522)	.443	.241	.670	1.863
Faculty (Reference category = EMS)		.087			
Education	-.644 (.601)	.284	.162	.525	1.705
Engineering/Built Environment/IT	.046 (.338)	.892	.540	1.047	2.032
Health Sciences	-.151 (.616)	.806	.257	.859	2.872
Law	**-.741 (.338)***	.028	.246	.477	.924
Natural and Agricultural	-.062 (.380)	.870	.446	.940	1.979
Humanities/Theology	**-.988 (.449)***	.028	.154	.372	.898
Calculated Socio-economic Status	-.050 (.268)	.852	.563	.951	1.608
Perceived Socio-economic Status	.237 (.163)	.147	.920	1.267	1.746
Constant	.247 (.490)	.615		1.280	

Note. R^2=.059 (McFadden) .076 (Cox & Snell) .103 (Nagelkerke).

Model $\chi^2(12)$ = 28.456, *p < 0.05.

Source: SPSS.

4.1.4.2 Model 2: Sophisticated financial literacy

A second logistic regression analysis was run to assess which of the variables in Table 4.51 are significantly related to sophisticated financial literacy of students. From Table 4.53 it can be seen which of these variables were found to be statistically significant in the logistic regression model for sophisticated financial literacy. A test of the full model against a constant only model was found to be statistically significant. This indicates that the predictors (those described above) are reliably distinguished between those of above and below average sophisticated financial literacy, Chi-square = 58.337, p<0.05 with df = 27. The Hosmer and Lemeshow statistic shows non-significance, indicating the model fit is

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good, H-L = 1.938, p = .983. The pseudo R-squared values of McFadden, Cox and Snell and Nagelkerke are R^2_{MF} =.140; R^2_{CS} = .176 and R^2_N= .235 respectively.

The Wald test statistic, measured using a 5% significance level, shows that Black students are more likely to score below average for the sophisticated financial literacy test than White students. It can also be seen that students in the Faculty of Law are more likely to score below average for the sophisticated financial literacy test than students in the Faculty of Economic & Management Sciences. Students who have taken part in a finance course are more likely to score above average than students who have not previously participated in a finance course. Lastly, students who have a father in a senior profession are more likely to score above average in the sophisticated financial literacy test than students with a father in Category 4 (a less senior profession).

Table 4.53: Logistic regression model for sophisticated financial literacy

			95% C.I.for EXP(B)		
Variable	**B (S.E)**	**Sig. (2-tailed)**	**Lower**	**Odds**	**Upper**
Gender	.270 (.287)	.348	.746	1.309	2.298
Race (Reference category = White)		.059			
Black African	**-.877 (.380)***	.021	.198	.416	.876
Other	-.513 (.678)	.450	.159	.599	2.261
Faculty (Reference category = EMS)		.569			
Education	-.291 (.750)	.698	.172	.748	3.254
Engineering/Built Environment/IT	-.258 (.386)	.503	.363	.772	1.644
Health Sciences	-.348 (.725)	.631	.171	.706	2.921
Law	**-.837 (.425)***	.049	.188	.433	.995
Natural and Agricultural Sciences	-.289 (.432)	.503	.321	.749	1.745
Humanities/Theology	-.810 (.559)	.147	.149	.445	1.330
Previous Finance Course	**.812 (.278)***	.003	1.307	2.252	3.880
Father's Occupation (Reference category = Category 1, Managers)		.031			
Category 2	-.345 (.346)	.318	.360	.708	1.394
Category 3	-.179 (.426)	.674	.363	.836	1.927
Category 4	**-1.220 (.416)***	.003	.131	.295	.667

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Mother's Occupation (Reference category = Category 1, Managers)		.212			
Category 2	.536 (.429)	.211	.738	1.710	3.960
Category 3	-.154 (.400)	.700	.391	.857	1.876
Category 4	.476 (.420)	.258	.706	1.609	3.668
Father's Education (Reference category =, Grade 12 or Less)		.273			
Diploma	.688 (.440)	.118	.840	1.989	4.709
Undergraduate	.229 (.485)	.638	.486	1.257	3.252
Postgraduate	.685 (.461)	.137	.804	1.984	4.896
Mother's Education (Reference category =, Grade 12 or Less)		.227			
Diploma	.619 (.407)	.128	.836	1.857	4.125
Undergraduate	.020 (.441)	.963	.430	1.021	2.420
Postgraduate	-.170 (.455)	.709	.346	.844	2.058
Money Management (Reference category = Category 1)		.269			
Category 2	-.568 (.433)	.190	.242	.567	1.325
Category 3	.694 (.528)	.189	.710	2.001	5.638
Category 4	-.021 (.375)	.956	.470	.980	2.044
Perceived Socio-economic Status	.291 (.194)	.134	.914	1.338	1.959
Calculated Socio-economic Status	.242 (.322)	.452	.678	1.274	2.393
Constant	-1.271 (.755)	.092		.281	

Note. R^2 =.140 (McFadden) .176 (Cox & Snell) .235 (Nagelkerke).

Model $\chi^2(27)$ = 58.337, p<0.05*

Source: SPSS.

4.1.4.3 Model 3: Total financial literacy

A third logistic regression analysis aims to assess which of the variables in Table 4.51 are significantly related to total financial literacy. A test of the full model against a constant only model was found to be statistically significant. This indicates that the variables (those described above) as a whole can be reliably distinguished from those of above and below average total financial literacy, Chi-square = 35,815, p< .001 with df = 12. The Hosmer and Lemeshow statistic shows non-significance indicating the model fit is good, H-L = 4.271, p

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=.832. The pseudo R-squared values of McFadden, Cox and Snell and Nagelkerke are R^2_{MF} =.073; R^2_{CS} = .095 and R^2_N= .127 respectively.

Based upon the Wald statistic, at a 5% significance level, Table 4.54 shows that Black students are more likely to score below average for total financial literacy than White students. Students in the Faculties of Education, Law and Humanities/Theology are more likely to score below average for the total financial literacy test. Lastly, students who have participated in a previous finance course are more likely to score above average for total financial literacy test than students who have not previously participated in a finance course.

Table 4.54: Logistic regression model for total financial literacy

			95% C.I.for EXP(B)		
	B (S.E)	**Sig.**	**Lower**	**Odds**	**Upper**
Gender	.206 (.234)	.379	.776	1.229	1.946
Race (Reference category = White)		.034			
Black African	**-.742 (.286)***	.009	.272	.476	.834
Other	-.239 (.545)	.661	.270	.788	2.293
Faculty (Reference category = EMS)		.021			
Education	**-1.622 (.652)***	.013	.055	.198	.709
Engineering/Built Environment/IT	-.275 (.335)	.412	.394	.760	1.464
Health Sciences	-.689 (.600)	.251	.155	.502	1.627
Law	**-.931 (.342)***	.007	.201	.394	.771
Natural and Agricultural Sciences	-.428 (.376)	.256	.312	.652	1.364
Humanities/Theology	**-1.231 (.463)***	.008	.118	.292	.724
Calculated Socio-economic Status	-.045 (.268)	.868	.566	.956	1.616
Perceived Socio-economic Status	.174 (.163)	.286	.865	1.190	1.639
Previous Finance Course	**.526 (.233)***	.024	1.071	1.692	2.674
Constant	.235 (.501)	.640		1.265	

Note. R^2 = .073 (McFadden), .095 (Cox & Snell) .127 (Nagelkerke). Model $\chi^2(12)$ = 35.815, p<0.05*.

Source: SPSS.

The results for the logistic regression models presented above are summarised in the following section. This is followed by a conclusion regarding the description of each

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variable, financial literacy scores and distributions, as well as the results of the univariate and multivariate analyses that were presented in this chapter.

4.1.4.4 Summary of multivariate analysis

The three logistic regression models have been presented and discussed in detail in the previous section. A summary of the results is presented in Table 4.55. Thus, 'Y' shows that at least one of the categories relative to the reference category is significant in financial literacy scores using the Wald test statistic at a 5% significance level. In contrast, 'N' shows no significance and '-' shows that the variable was not placed in the logistic regression model based upon the bivariate analysis conducted preceding the logistic analysis.

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Table 4.55 Table to show variables significant in each of the logistic regression models

	Model 1: Basic	Model 2: Sophisticated	Model 3: Total
Age	-	-	-
Gender	N	N	N
Race	Y	Y	Y
Education			
Academic level	-	-	-
Previous finance course	-	Y	Y
Faculty	Y	Y	Y
Parental and other influences:			
Mother's Education	-	N	-
Father's Education	-	N	-
Mother's Occupation	-	N	-
Father's Occupation	-	Y	-
Origin of Money Management Skills	-	N	-
Socio-economic status:			
Perceived Socio-economic Status	N	N	N
Calculated Socio-economic Status	N	N	N

Y = Yes, at a 5% significance

N = Not Significant

'-' = Not included in model based upon bivariate analysis at 20% significance

Source: SPSS.

The above table shows that race and faculty are significant factors in basic financial literacy of students, even when there was control for variables. Model 2 shows that when controlling for other variables, those relating to race, previous finance course, faculty of study and father's occupation are significant factors in the sophistication of financial literacy of students. Lastly, the logistic regression for Model 3 shows that the variables race, previous finance course and faculty are significant factors in total financial literacy of students.

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4.1.5 **Conclusion**

Chapter 4 was presented in four parts. The first part, Section A, provided a detailed description of each variable considered, as well as response frequencies for each variable used in this study. Section B assessed financial literacy levels of students at all levels of financial literacy. This was followed by Section C that presented the results of the univariate analysis. In particular, Section C assessed whether each variable is significantly associated with financial literacy at all levels. The final section of this chapter, Section D, provided a further analysis of financial literacy and for the association between the variables when controls have been applied.

The descriptive section made use of graphs and tables, where this was appropriate, to better understand the response frequencies of each variable. Additionally, some of the response categories for these variables were condensed where minimal responses were received. The main variables were age, race, gender, education, parental and other influences, as well as socio-economic status. The variables 'education', 'parental and other influences' as well as 'socio-economic status' were assessed by means of a number of sub-variables. Education was measured as academic level and financial education. Parental and other influences were measured by the variables parental education, parental occupation and financial management skills. Lastly, socio-economic status was measured by calculated and perceived socio-economic status.

After assessing descriptive results for the financial literacy test, all levels of financial literacy (basic, sophisticated and total) were considered. The results showed that students scored on average 71,2% for basic financial literacy and 52,72% for sophisticated financial literacy. This resulted in an overall average score of 59,83%. The shape of the distribution of the scores for each level was also considered and presented graphically and by means of statistical analyses. Overall, the results showed that financial literacy scores have a non-normal distribution.

The statistical analyses used in this study were based upon non-parametric univariate tests. This was supported by the non-normal distribution of financial literacy scores as presented graphically and statistically in Section B. The null hypothesis for each variable

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was either rejected or failed to be rejected at a 5% significance level. This made it possible to reach a conclusion, based upon the results of the statistical tests.

To further elaborate upon the findings emerging from the univariate analysis, a multivariate analysis was conducted, specifically using a logistic regression. A bivariate analysis was run before running the logistic regression. This was done at a 20% significance level. Three logistic regression models were presented in this section, namely Model 1, Model 2 and Model 3. Thus each model represented a level of financial literacy, basic, sophisticated and total respectively, and the results were discussed in detail. Using the Wald statistic, at a 5% significance level, the variables found to be significantly associated with financial literacy scores of students were summarized and presented in Table 4.55.

The following chapter discusses the results of the above analysis in relation to the findings of published research and as discussed in Chapter 2 (the Literature Review). The findings emerging from the univariate and multivariate analysis in the present study are specifically compared with those emerging from previous research. This is completed in order to draw a conclusion and to highlight the contributions made by the present research study, which are then presented in Chapter 6.

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CHAPTER 5 - Discussion

The following section provides a broad discussion of the results that have emerged from the present study. In particular, the two research objectives of this study are linked to the analyses of the data and the results presented in Chapter 4. The first objective was to assess financial literacy levels among South African university students. The second objective was to identify whether age, race, gender, education, parental and other related influences as well as socio-economic status are associated with the financial literacy levels of students. The outcome of the first objective is thus a discussion of the scores for basic, sophisticated and total financial literacy of students at the University of Pretoria. This is followed by the outcome of the second research objective, which includes a discussion of the analyses and results emerging from the univariate analysis of each variable. The second outcome is expanded upon by discussing those variables that were found to be significantly associated with financial literacy, when placed together in a model. The analysis and results of this study are then contrasted with the published literature on the topic, as outlined in the Literature Review.

5.1 Financial literacy score

The first objective of this study was to assess financial literacy scores of a defined cohort of South African university students. These results include test scores for basic and sophisticated financial literacy as designed by Lusardi and Mitchell (2006, 2007b). For this study, a total financial literacy score was calculated using the sum of these two scores. The three emerging scores are discussed in detail and compared with findings from the published literature.

According to Danes and Hira (1987) as well as Chen and Volpe (1998), students who score above 80% are considered to have a high level of financial literacy. Those who score between 60% and 80% are considered to have a moderate level of financial literacy. Lastly, those who score below 60% are considered to have a low level of financial literacy. Based upon the classification of Danes and Hira (1987) and Chen and Volpe (1998), the present study shows that students at the University of Pretoria have moderate basic financial literacy levels. Students scored an average score of 71,2% for the basic financial

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literacy questions. This is similar to research conducted by Shambare and Rugimbana (2012), using a South African university student sample. These researchers specifically found students' average score for basic financial literacy to be 63%. Lusardi and Mitchell (2006, 2013) produced similar results when considering an adult sample. They found adults' average score on the basic financial literacy questions to be 64,87%. Fornero and Monticone (2011) also used the basic financial literacy questions designed by Lusardi and Mitchell (2006) and found the adults' average score to be 72,4%, which is in line with the findings of the present study.

In contrast to the findings of the present study, which found moderate basic financial literacy scores, other researchers found respondents to have low levels of financial literacy. Chen and Volpe (1998) found students' average financial literacy score to be 52,7% when using the basic questions designed by Lusardi and Mitchell (2006). Using the same measurement tool, Almenberg and Säve-Söderbergh (2011) found that the Swedish adult population scored an average of 51,53% for basic financial literacy, while Grohmann et al. (2014) found that adults in Bangkok scored 55,1% on basic financial literacy questions. Lusardi and Mitchell (2007c) found that Americans scored 52,4% on basic financial literacy questions.

Considering the case of sophisticated financial literacy, the present study showed that students have a low level of financial literacy. An average score for sophisticated financial literacy of 52,7% illustrates this fact. This is in contrast to the research of Alessie et al. (2007) who showed that adults score an average of 74,17% on sophisticated financial literacy questions. Similarly, Lusardi and Mitchell (2007b) found adults to score an average of 73,33% for sophisticated financial literacy. Lusardi and Mitchell (2010) also found that adults have moderate levels of sophisticated financial literacy. These researchers specifically found consumers to score 67,9% on average for sophisticated financial literacy. Such sophisticated questions have not been used to test financial literacy using a student sample, particularly South African students.

The present study made use of Lusardi and Mitchell (2007b) measurement tool. The basic financial literacy score for University of Pretoria students was found to be moderate, while the sophisticated score for students was found to be low. Other published research that

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makes use of student samples such as that of Mckenzie (2010) applied a different financial literacy test. This author found that students have moderate financial literacy levels, which is in line with the findings of the present study's core for basic financial literacy. Another study conducted by Cameron et al. (2013) found that students have low levels of financial literacy with an average financial literacy score of 46,2%, which is in line with the sophisticated financial literacy score found in the present study.

The overall score denoted by 'total score' used in the present research showed that students have relatively moderate financial literacy levels. This is represented by an average score of approximately 60% for students' total financial literacy. These results are consistent with the findings from a student and adult sample, as seen in research conducted by Chen and Volpe (2002); Lusardi and Mitchell (2007b) respectively. Lusardi (2008) also presented similar results, showing that most respondents scored relatively well on basic financial literacy, but more poorly on sophisticated financial literacy questions, resulting in a moderate overall financial literacy.

The research objective of the present study was to assess financial literacy of South African university students. The results showed that basic financial literacy score was on average moderate for the students sampled. However, sophisticated financial literacy scores of the university students was found to be low. Overall, a total score concludes that South African university students have moderate financial literacy scores.

5.2 Self-assessed financial literacy

The findings of the present study show that self-assessed financial literacy is associated with actual financial literacy. When making use of univariate analysis, the results of this study led to the conclusion that students who estimate their financial literacy to be good/very good, tend to score significantly higher in basic, sophisticated and total financial literacy. This is in contrast to students who perceive their financial literacy to be bad/very bad. Previous research supports this view that self-assessed financial literacy is associated with objectively measured financial literacy (Alessie et al., 2007; Lusardi & Mitchell, 2007b).

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5.3 Variables associated with financial literacy

This section considers the variables associated with financial literacy. In particular, the second research objective was to assess which variables would apply to the financial literacy of a defined suite of South African university students.

5.3.1 Age

The results of the research showed that age does not play a significant role in financial literacy of students. It should be noted that the sample used in this study was that of students and thus a narrow sample. However, similar research conducted by Oseifuah (2010) and Murphy (2005) made use of student populations, and also found no significant relationship between age and financial literacy of students. Research by Alessie et al. (2011) who made use of an adult sample, also found that age is not significantly related to financial literacy.

In contrast to the above findings, past researchers have found that age is a significant factor in financial literacy level, although the relationship is not absolute. Some researchers specifically found that younger individuals have lower financial literacy (Agnew *et al*., 2013; Cameron *et al*., 2013; Chen & Volpe, 1998; Worthington, 2006). This is in contrast to some other researchers who found that younger respondents were more financially literate (Beckmann, 2013; Klapper & Panos, 2011). These studies generally used samples with a wider age range to that used in the present research study and this could explain why the findings differ.

5.3.2 Race

The univariate analysis results applied in the present study showed that there is a significant difference in financial literacy scores, at all levels, across different racial groups. This is similar to the results of a study conducted by Chen and Volpe (1998) who found that financial literacy of students differs significantly across racial groups, when using univariate analysis. Shambare and Rugimbana (2012) found that White students possess a greater ability to answer the basic questions correctly, when compared to other racial

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groups. They proposed that this might be due to Apartheid, which resulted in non-White racial groups being denied access to this sort of literacy.

The univariate analysis applied in the present study does not control for other variables such as socio-economic status. Thus, further analysis was conducted so as to control for other variables by making use of a logistic regression. This additional analysis still found race to be significant at all levels of financial literacy. It should be noted that the variables used in this study to measure socio-economic status did not necessarily capture all elements of socio-economic status, because they were based upon self-assessed measures.

The multivariate results from the present study are similar to those of Murphy (2005), who also used a student sample to measure financial literacy. In contrast, however, Chen and Volpe (1998), who used the same measurement tool as was used in the present study, found that when controlling for other variables, race was no longer significantly related to the financial literacy of students. Similarly, research by Struwig et al. (2013) using a large South African sample, that was not student-specific, found race was still significantly related to financial literacy in a multivariate analysis that also controlled for other socio-economic and human capital factors. These researchers suggested that further research is needed to understand whether cultural differences between population groups could be contributing factors.

5.3.3 Gender

The research presented in the present study showed that gender is significantly related to financial literacy of students, at least when considered in isolation. Female students scored significantly lower on financial literacy questions for all levels of financial literacy than their male counterparts. These findings support the results of previous research that also makes use of the measurement tool used in the present study, showing that females score more poorly than males in basic financial literacy questions. This was particularly found to be the case in the Netherlands (Alessie *et al*., 2011), Japan (Sekita, 2011), the United States (Lusardi & Mitchell, 2006), Romania (Beckmann, 2013) Germany (Bucher-Koenen & Lusardi, 2011) and South Africa (Shambare & Rugimbana, 2012). This is, however, in

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contrast to research showing that there is no significant difference between female and male students (Avard et al., 2005; Jorgensen & Savla, 2010; Sabri et al., 2010). These authors all found that gender was not significant in financial literacy of university students. Importantly, however, none of these researchers considered the role of gender when controlling for other variables, and this could explain the discrepancy in the results of the various studies.

In the present study, additional analyses were conducted to control for other variables and thus made use of a logistic regression. The current study showed that when controlling for other variables, gender no longer plays a significant role in financial literacy of students at all levels of financial literacy. Being male or female does not significantly improve the likelihood of scoring above average in a basic or sophisticated financial literacy test. This finding is in contrast to the findings of Chen and Volpe (1998), Chen and Volpe (2002) and Lusardi et al. (2010), who found differences in financial literacy between males and female students, even after controlling for other variables.

5.3.4 Education

In this study, student education was measured using three questions, namely student's academic year, faculty of study and previous participation in a finance course. These variables aimed to assess general academic education and financial education. The following section elaborates upon these variables and the findings from this study.

5.3.4.1 General education

The results of the present study considering general education, as measured by academic year, showed no significant differences related to financial literacy of students at all levels of financial literacy. The majority of the students sampled in the present study do not yet have a degree and thus it is difficult to make a comparison with other studies, such as the research by Alessie et al. (2011), who found that students with a university degree have high levels of financial literacy. Additionally, research by Klapper and Panos (2011), Sekita (2011) and Beckmann (2013) who made use of the measurement tool designed by Lusardi and Mitchell (2006), found comparable results to Alessie et al. (2011). However, these

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researchers did not use student-specific samples. Similarly Struwig et al. (2013) made use of a large sample of South African people and found that having a matric certificate or tertiary education is positively related to financial literacy. The difference here is that the present study specifically considered students.

It is important to recognise that the sample used in the present research represented a narrow sample of university students and the variable 'academic year' was used to measure education. For this reason, limited variation of education level is likely to exist between the respondents. Thus, in order to be at university, students would have already obtained a matric certificate. Furthermore, Section 4.1.1.4 of this study highlighted the fact that the majority of the sample was that of first year students. In conclusion, the findings of this study are not directly comparable with studies conducted using respondents with diverse education levels. For example, the study of Alessie et al. (2011) found students with a university degree to have high levels of financial literacy, but still their sample was more diverse than the present study.

5.3.4.2 Financial education by faculty of study

The findings emerging from the present study relating to financial education differ from those of general academic education. This study measured financial education using two variables, namely faculty of study and previous participation in a finance course. The results of each of these components of the study are discussed in the following paragraphs.

From the univariate analysis it was found that there is a significant difference in basic, sophisticated and total financial literacy score of students in different faculties. The univariate test does not provide detail as to where these differences might lie. The variable 'faculty' was then considered in a logistic regression and the following differences were found. For basic financial literacy, it was found that students in the Faculty of Law, as well as those in the Faculty of Humanities/Theology, are more likely to score below average than those in the Faculty of Economic & Management Sciences. For sophisticated financial literacy, it was found that students in the Faculty of Law are more likely to score below average than those in the Faculty of Economic & Management Sciences. Lastly, for

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total financial literacy it was found that students in the Faculties of Law, Humanities/Theology as well as Education are more likely to score below average than those in the Faculty of Economic & Management Sciences. These results are similar to those of studies that also made use of logistic regression analysis and found that studying 'finance' at university is associated to financial literacy of students (Beal & Delpachitra, 2003; Chen & Volpe, 1998, 2002). Thus, those students who are enrolled in a business degree are typically more financially literate (Power *et al.*, 2011).

5.3.4.3 Financial education by previous finance course

The results emerging from the analysis of financial education in the present study are similar to those discussed above. For the univariate analysis, the results showed that those respondents who previously partook in a finance course, offered at school, university or elsewhere scored significantly higher than those who had not partaken in a finance course. This is consistent with previous research conducted in Africa beyond the borders of South Africa, showing that financial education improves financial literacy of students (Oseifuah & Gyekye, 2014). In other developing countries such as South Africa (Cole *et al*., 2010), Tanzania (Honohan & King, 2009), India and Indonesia (Cole *et al*., 2011), financial education is also found to improve financial literacy.

The multivariate analysis presented in the present study showed that in the case of basic financial literacy, participation in a previous finance course is not a significant factor contributing to the financial literacy of students. This, however, is not true for sophisticated financial literacy. Students who partook in a finance course were significantly more likely to score above average in a sophisticated financial literacy test, than those who had not had this experience. Existing research that considers basic and sophisticated financial literacy among an adult sample has produced similar results (Lusardi & Mitchell, 2010). These researchers study concluded that respondents who are exposed to economics at school are more financially literate.

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5.3.5 Parental and other influences

Parental and other influences were measured using three variables. These included parental education, parental occupation and where students learnt money management skills. The findings emerging from this study are disused below.

5.3.5.1 Parental education

This research study measured education level of students' mother and father. These variables were independently compared with financial literacy of students. The univariate findings showed that a father's education is not significantly related to financial literacy score at all levels of financial literacy. The univariate analysis for the variable mother's education showed that sophisticated financial literacy score is significantly related to mother's education, although there were no clear trends here. Consistent with these results, previous research has shown that parental education is significantly related to financial literacy (Tennyson & Nguyen, 2001).

The findings from the multivariate analysis showed that students with highly educated fathers are significantly more likely to score above average in the sophisticated financial literacy. In contrast, the multivariate analysis found that students with mothers who are more educated are not significantly more likely to score above average for sophisticated financial literacy questions. Murphy (2005) published results that partially support the findings of the present study. He found that parental education is significantly related to financial literacy in a multivariate analysis. This is similar to the findings of Lusardi et al. (2010) who showed that students with mothers who have higher academic qualifications are more financially literate.

5.3.5.2 Parental occupation

The impact of parental education and influence has previously been studied, albeit not widely so. A variable that has not been widely researched, if at all, is that of the impact of parental occupation on students' financial literacy. The present study measured parental occupation of each student's mother and father. The univariate analysis showed that the

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more "senior" the occupation of the student's mother, the better the sophisticated financial literacy score of the student. A similar result emerged for fathers with the inclusion of total financial literacy score. In the case of the multivariate analysis, parental occupation of fathers was found to significantly improve the likelihood of students scoring above average in a sophisticated financial literacy test. To elaborate upon this, fathers in less "senior" occupations were more likely to score below average on financial literacy than those in senior occupations.

5.3.5.3 Origin of money management skills

Few studies have measured other influences on financial literacy. The present study measured other influences by considering where students learnt most about managing their money. In univariate analysis, to assess where students learnt most about money management, it was found that where students learn their money management skills is significantly related to financial literacy score at a basic level. Thus, there is a significant difference in basic financial literacy, based upon where students learn most of their money management skills. However, this was not true for sophisticated and total financial literacy. The univariate test did not highlight where the differences lie. However, the results showed that the highest rank was of students who learnt most of their skills at home from their family. This is similar to the results of a number of previous studies, which found that students who discuss finances with their parents are more financially literate than those who do not have this experience (Chen & Volpe, 2002; Chowa & Despard, 2013; Sekita, 2011).

The present study further analysed the data by making use of a logistic regression to control for other variables. The results showed that where students learn most of their financial literacy skills does not significantly improve the likelihood of scoring above average in financial literacy, at all levels. Existing research has not made use of this variable in a multivariate analysis, and a comparison can thus not be made here.

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5.3.6 Socio-economic status and income

Income, which could be considered a proxy for socio-economic status, was not measured because the sample used was that of students. Rather, this research study measured respondents' calculated and perceived socio-economic status. These measures and findings are explained in detail below.

Calculated socio-economic status was measured by calculating the number of household items available to students. A univariate analysis showed that calculated socio-economic status, as measured by number of household items available to students, is not a significant variable in the financial literacy of students. This was found for all levels of financial literacy. The results are consistent with studies that used income as a proxy of socio-economic status and found income not to be a significant factor. In this respect, Chen and Volpe (2002) found that income has no significant impact upon financial literacy of students.

Perceived socio-economic standing was found to be significantly related to financial literacy. This research specifically showed that perceived socio-economic status is significant for basic and total financial literacy, when using univariate analysis. To elaborate upon this finding, it was shown that those who perceived themselves to be of high socio-economic standing, scored significantly higher in basic and total financial literacy. Other researchers have also found a positive relationship between socio-economic status and financial literacy of adults (Alessie *et al*., 2011; Lusardi & Mitchell, 2007c).

Upon further analysis, especially making use of logistic regression to control for other variables, it was found that perceived and calculated socio-economic standing is not significantly related to financial literacy. Most of the existing research makes use of income as a measure of socio-economic wellbeing. When using a logistic regression, Chen and Volpe (1998) found that income is not statistically significant in financial literacy of students, which supports the results of the present study. Oseifuah and Gyekye (2014) found similar results using a logistic regression and a South African sample.

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5.3.7 Conclusion

In conclusion, the findings of this research project have shown that students have a moderate basic financial literacy. However, their sophisticated financial literacy scores are low. This result is consistent with many studies conducted around the world using the same measurement tool and similar samples.

Many of the variables, including gender, race, faculty, previous finance course and self-assessed literacy were found to be significant at all levels of financial literacy, when assessed in isolation. Some variables were found only to be significant at a sophisticated level. This was, for example, the case, where mother's education as well as mother's and father's occupation were considered. In contrast, perceived socio-economic status was only found to be significant at a basic level. Other variables, such as calculated socio-economic status, age, academic education and money management were not found to be significant at any of the levels of financial literacy considered.

Deeper analysis applying a logistic regression showed some variables to be significant in a model. These included race, faculty of study, father's occupation and participation in a previous finance course. White students were found to be significantly more likely to score above average at a basic, sophisticated and total financial literacy level than Black African students. Students in the Faculty of Economic & Management Sciences were found to be significantly more likely to score above average in basic and total financial literacy than students in the Faculties of Law and Humanities/Theology. In addition to faculty, students who had previously participated in a finance course were found to be significantly more likely to score above average in sophisticated and total financial literacy questions, than those who had not participated in a finance course.

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CHAPTER 6 – CONCLUSION

6.1 Summary of findings

In this section, summaries of the key findings are discussed. The overall findings of students' financial literacy score at a basic, sophisticated and total financial literacy level are considered. This is followed by the findings from the univariate results, as well as the multivariate results.

At a basic level, students' financial literacy scores were found to be moderate. However, the sophisticated financial literacy scores showed that students have low financial literacy. A total score was calculated as the sum of the basic and sophisticated score. The average total score of students at the University of Pretoria is 59,83%. Based upon the total score of 59,83%, students sampled are considered moderately financially literate.

The univariate analysis showed a number of variables to be significantly related to financial literacy score. However, upon placing some of these variables in a model, many factors are no longer found to be significant. The following paragraphs conclude the findings from the present study.

The gender bias in financial literacy is widely debated. This study made use of a student sample. The findings from the univariate analysis show female students to be significantly less financially literate than male students. The multivariate analysis, which controlled for other variables, found gender not to be significant in financial literacy for all levels of financial literacy.

The literature finds some differences in financial literacy across racial groups. This is in line with the univariate analysis in the present study, which found that financial literacy differed significantly across racial groups. When controlling for other variables, race was still found to be a significant factor in financial literacy at all levels.

Research finds previous financial education to impact financial literacy positively. This research supports this notion. In particular, the present research findings show that those

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who partake in a previous finance course perform better at all levels of financial literacy. Additionally, financial literacy differs significantly across faculty of study. These findings are partially supported when these variables are placed in a model. Even when controlling for other variables, previous participation in a finance course is significantly related to sophisticated financial literacy. Additionally, faculty of study significantly impacts the level of financial literacy.

In a univariate analysis the more educated the mother of a student, the better the sophisticated financial literacy scores of the student. Moreover, the more senior the occupation of the mother and father, the higher the sophisticated financial literacy score of the student. This was also true for total financial literacy in the case of father's occupation. In terms of socio-economic standing, a student who perceives himself or herself to be of higher socio-economic standing, performs better in basic and total financial literacy. However in a multivariate context the only significant predictor was father's occupation with respect to sophisticated financial literacy.

From a univariate perspective a number of variables are significantly related to financial literacy, however not all levels of financial literacy. Mother's education, mother's occupation and father's occupation are not related to basic financial literacy score, while perceived socio-economic status as well as where students learn most of their money management skills are not related to sophisticated financial literacy score. Lastly, mother's education, mother's occupation and where students learn their money management skills are not related to total financial literacy score.

Within a univariate context a number of variables are not significantly related to all levels of financial literacy. These include calculated socio-economic status, father's education level, age and academic year.

The multivariate analysis found that at a basic financial literacy level, Black students are more likely to score below average than White students. Additionally, students in the Faculties of Law and Humanities are more likely to score below average than Economic & Management Sciences students.

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At a sophisticated level, similar results were found with respect to race and faculty (with the exception of the Humanities/Theology Faculty). Furthermore, students with fathers in senior professions are more likely to score above average than students with fathers in less senior professions. At a sophisticated level, students who had previously participated in a finance course were more likely to score above average than students who had not.

Lastly, the total financial literacy logistic regression model, which is but a combination of basic and sophisticated financial literacy, showed race, faculty and previous financial participation to impact upon financial literacy of students. Black students in particular are more likely to score below average than White students. Students in the Faculties of Law, Education and Humanities/Theology are more likely to score below average than students in the Faculty of Economic & Management Sciences. Finally, students who had previously participated in a finance course are more likely to score above average than those who had not.

6.2 Conclusion

The research objective of this study was two-fold. The first objective was to assess financial literacy levels of students, while the second objective was to better understand which factors are significantly associated with financial literacy. From the findings presented in this research study, it can be concluded that university students are not necessarily financially literate and a number of variables are significantly associated with financial literacy of students, even when considered within a model.

This research concludes that students are moderately financially literate in basic financial literacy. However, when considering sophisticated financial literacy, students have low financially literacy scores. Students at the University of Pretoria are thus, overall, moderately financially literate.

This study provided evidence that various factors are significantly associated with total financial literacy when not considered within a model, namely race, gender, previous finance course, father's occupations and perceived socio-economic status. However, when controlling for other factors it was found that many of the factors considered in this

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research study are no longer significantly associated with total financial literacy. The factors still found to be significant when placed in a model include race, faculty and previous participation in a finance course.

6.3 Summary of contributions

This study contributes to the existing body of research by adding to data about financial literacy levels of students for basic and sophisticated financial literacy. Moreover, this study contributes to the existing research that has shown that various factors are significantly related to financial literacy in isolation, as well as when incorporated into a logistic regression model.

This study adds to the few studies that have used a more sophisticated measure of financial literacy. Previous studies have been conducted in South Africa to assess financial literacy, but it would appear that none have measured sophisticated financial literacy of students such as those measured by Lusardi and Mitchell (2007b). The present study thus adds to the body of data on sophisticated financial literacy levels of students.

Although various variables were found to be related to financial literacy score when considered in isolation, a significant contributing result of this study was that the results of multivariate analysis provided evidence to support the fact that financial education is a significant factor in financial literacy of students. Thus, some sort of previous financial education, offered at school, university or elsewhere, may improve sophisticated financial literacy and thus overall financial literacy of students.

In addition to previous participation in a finance course, the students' faculty of study was another variable found to be significant in financial literacy of students at a basic, sophisticated and total level. These findings highlight the importance of financial literacy education. Previous research has shown that financial literacy is related to future financial wellbeing. Thus, the significance of this study provides a case for financial education within a university context.

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The research conducted in this study has some limitations. The sample is that of students attending a specific university. Furthermore, the study was conducted at a single point in time. In addition, racial grouping in the South African context should be carefully evaluated due to a history of racial segregation. Caution should thus be taken when making generalizations from this study.

6.4 Suggestions for further research

There are a number of areas for future research that have arisen as a result of the findings from this study. These include additional research conducted using a number (rather than one) of South African universities. In addition, research should be conducted to better understand how financial education and interventions in this field might affect the financial literacy of students. The following section discusses these in some detail.

More extensive research could be conducted on the effect of financial education on students. In the present research study, financial education was found to be a variable that is associated with overall financial literacy. Two variables in particular, namely faculty and previous participation in a finance course, were found to be significant in isolation and when controlling for other factors. These variables were tested at a single point in time and thus could be better understood by making use of an observational or longitudinal study. Thus, research could be conducted over a period of time to determine whether those who enrolled in a finance course at university score better than those who had not enrolled in a finance course. The same could be done using the variable faculty.

The details of the previous finance courses, as well as the courses offered by the different faculties, should be further researched. For example, the content of these courses needs to be understood, so as to understand the financial knowledge needed to improve financial literacy of students.

Evidence of financial intervention was not addressed at all in this study, yet it is an issue that is widely debated. Financial education intervention could be tested by providing a finance-specific course for students, with the aim of improving financial literacy and then testing whether such a course improves financial literacy. Thus, more extensive research

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is needed to accurately assess whether financial education intervention could be useful in aiding students to better understand financial issues.

The present study provides evidence that further financial literacy research is critically needed, especially among the youth. Financial education methods specifically aimed at key demographic groups could assist in providing beneficial financial aid to students. This would ensure that they are better equipped to plan and save towards retirement and a sound financial future.

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Appendix

APPENDIX A

- Introductory letter, Informed consent & Data collection instrument -

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UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Faculty of Economic and
Management Sciences

Informed consent for participation in an academic research study

Dept. of Financial Management Sciences

'The relationship between demographic factors and financial literacy among students at a South African university'

Research conducted by:
Ms B Wingfield (29012172)
Cell: 082 762 4102

Dear Respondent

You are invited to participate in an academic research study conducted by Beverley Wingfield, a Masters student from the Department Financial Management Sciences at the University of Pretoria.

The purpose of the study is to investigate whether South African university students are financially literate. In addition this study will add to the existing body of knowledge as to which demographic variables are significant in explaining financial literacy.

Please note the following:
This study involves an anonymous survey. Your name will not appear on the questionnaire and the answers you give will be treated as strictly confidential. You cannot be identified in person based on the answers you give.

- Your participation in this study is very important to us. You may, however, choose not to participate and you may also stop participating at any time without any negative consequences.
- Please answer the questions in the attached questionnaire as completely and honestly as possible. This should not take more than 15 minutes of your time.
- The results of the study will be used for academic purposes only and may be published in an academic journal. We will provide you with a summary of our findings on request.
- Please contact my supervisor, Dr M. Reyers (michelle.reyers@up.ac.za) if you have any questions or comments regarding the study.

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Before continuing with this questionnaire, please place a cross in the box alongside to indicate that you have read and understand the information provided in the supporting letter and you give your consent to participate in the study on a voluntary basis.	**Consent** ☐

PART A (Financial Literacy)

Please answer the following questions by selecting the correct answer and placing a cross in the appropriate box (select only one answer for each question)

Please do not use a calculator.

If you do not know the answer to a particular question please do not guess and rather select the "Do not know" option.

For office use only

1. How would you rate your level of financial knowledge?

Very good	1
Good	2
Satisfactory	3
Bad	4
Very bad	5

V1 ☐

2. Suppose you had R100 in a savings account and the interest rate was 2 percent per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

More than R102	1
Exactly R102	2
Less than R102	3
Do not know	4

V2 ☐

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3. Suppose you had R100 in a savings account and the interest rate is 20 percent per year and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total?

More than R200	1
Exactly R200	2
Less than R200	3
Do not know	4

V3

4. Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. After 1 year, how much would you be able to buy with the money in this account?

More than today	1
Exactly the same	2
Less than today	3
Do not know	4

V4

5. Assume a friend inherits R10,000 today and his sibling (brother or sister) inherits R10,000 3 years from now. Who is richer because of the inheritance?

My friend	1
His sibling	2
They are equally rich	3
Do not know	4

V5

6. Suppose that in the year 2014, your income has doubled and prices of all goods have doubled too. At the end of 2014, how much will you be able to buy with your income?

More than today	1
The same	2
Less than today	3
Do not know	4

V6

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7. Which of the following statements describes the main function of the stock market?

The stock market helps to predict share earnings	1
The stock market results in an increase in the price of shares	2
The stock market brings people who want to buy shares together with those who want to sell shares	3
None of the above	4
Do not know	5

V7	

8. Which one of the following statements is correct?

Once one invests in a unit trust, one cannot withdraw the money in the first year	1
Unit trusts can invest in several assets, for example invest in both shares and bonds	2
Unit trusts pay a guaranteed rate of return which depends on their past performance	3
None of the above	4
Do not know	5

V8	

9. If the interest rate falls, what should happen to bond prices?

Rise	1
Fall	2
Stay the same	3
None of the above	4
Do not know	5

V9	

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10. True or false? Buying a company share usually provides a safer return than a unit trust.

True	1	V10
False	2	
Do not know	3	

11. True or false? Shares are normally riskier than bonds.

True	1	V11
False	2	
Do not know	3	

12. Considering a long time period (for example 10 or 20 years), which asset normally gives the highest return?

Savings accounts	1	V12
Bonds	2	
Shares	3	
Do not know	4	

13. Normally, which asset displays the highest fluctuations over time?

Savings accounts	1	V13
Bonds	2	
Shares	3	
Do not know	4	

14. When an investor spreads his/her money among different assets, does the risk of losing money:

Increase	1	V14
Decrease	2	
Stay the same	3	
Do not know	4	

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PART B

Please answer the following questions by providing a cross in the appropriate box or further detail where specified.

For office use only

15. What is your gender?

Male	1	
Female	2	

V15

16. What is your current age (in years)?

	1	

V16

17. What is your population group?

Black African	1	
Coloured	2	
Indian	3	
Caucasian/White	4	
Asian	5	
Other (Specify): _____	6	

V17

18. In which academic year are you currently enrolled?

First Year (Undergraduate)	1	
Second Year (Undergraduate)	2	
Third Year (Undergraduate)	3	
Fourth Year (Undergraduate)	4	
Honours	5	
Masters	6	
PhD/ Doctorate	7	

V18

19. In which faculty are you currently enrolled?

Economic Management Sciences	1	
Education	2	
Engineering, Built Environment and IT	3	
GIBS Business School	4	
Health Sciences	5	
Law	6	
Natural and Agricultural Sciences	7	
Theology	8	
Veterinary Sciences	9	

V19

20. For which degree program are you currently enrolled?

	1	

V20

21. Have you previously participated in a finance course/module of any sort?

Yes, offered at university	1	
Yes, offered at school	2	
Yes, offered elsewhere	3	
No	4	

V21

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22. If you answered 'yes' to question 21 please provide brief details

V22	

23. Who was primarily responsible for your upbringing (you can select more than one person)?

Mother	1	V23	
Father	2	V24	
Other1 (please specify): _____	3	V25	
Other2 (please specify): _____	4	V26	

24. What is the **highest** level of education qualification of your parents/caregivers?

	Mother	Father	Other 1	Other 2
No school	1	1	1	1
Some primary school	2	2	2	2
Primary school completed	3	3	3	3
Some high school	4	4	4	4
Grade 12 / Matric	5	5	5	5
Diploma	6	6	6	6
Undergraduate	7	7	7	7
Honours	8	8	8	8
Masters	9	9	9	9
Doctorate / PhD	10	10	10	10

V27 V67	

25. Which of the following best describes your parents/caregivers occupational status?

	Mother	Father	Other 1	Other 2
Legislators, senior officials and managers	1	1	1	1
Professionals	2	2	2	2
Technical and Associate professionals	3	3	3	3
Administration	4	4	4	4
Service workers, shop and market sales workers	5	5	5	5
Skilled agricultural and fishery workers	6	6	6	6
Plant and machine operators and assemblers	7	7	7	7
Domestic workers	8	8	8	8
Other	9	9	9	9

V68- V103	

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26. If you answered "other" in question 25, please provide brief details for each instance:

	1

V104

27. Where did you learn **most** about managing your money (select only one)?

At home from my family	1
At school / university in class	2
From talking with my friends	3
From magazines, books, TV and the radio	4
From experience in managing my own funds	5
In my residence hall	6
Other (please specify)	7

V105

28. I talk to my family about:

	A lot	On Occasion	Seldom	Never
My own use of money	1	2	3	4
The importance of saving	1	2	3	4
Our family finances	1	2	3	4
How our family money should be spent	1	2	3	4

V106
V107
V108
V109

29. How would you assess the financial situation of your immediate household?

Very good	1
Good	2
Satisfactory	3
Bad	4
Very bad	5

V110

30. Which group of people do you think you belong to ('we' refers to your family)?

We hardly make ends meet. We do not have enough money even for food	1
We have enough money to buy food, but buying clothes causes financial difficulties	2
We have enough money to buy food and clothes, but purchases of durable goods (a TV-set, refrigerator) is problematic	3
We have no trouble buying durable goods, but purchases of a really expensive item (i.e.: a car) is a financial burden	4
We can afford relatively expensive luxuries – an apartment or house	5

V111

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31. How satisfied are you with:

	Very satisfied				Very dissatisfied	
Your current family income	1	2	3	4	5	V112
Your family resources available to meet emergencies	1	2	3	4	5	V113
Your family's material objects	1	2	3	4	5	V114
The amount of your family's net worth	1	2	3	4	5	V115

32. Which of the following do you have in your family home (you can select multiple items)?

Desk for study	1	V116
A room of your own	2	V117
A quiet place to study	3	V118
A computer available for university work	4	V119
Educational software	5	V120
A link to the internet	6	V121
Your own calculator	7	V122
Classic literature (eg: Shakespeare)	8	V123
Books of poetry	9	V124
Works of art	10	V125
Books to help with your studies	11	V126
A dictionary	12	V127
A dishwasher	13	V128
More than 100 books	14	V129

Thank you for completing this questionnaire

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