THE USE OF DIGITAL GAMIFICATION TO IMPROVE MONEY MANAGEMENT

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ABSTRACT

South Africa is going through one of its most economically turbulent times in its history. This is compounded by worldwide economic instability. Increases in prices, unemployment, poverty, and failure of infrastructure has made it difficult for a large part of the population to make ends meet. It is therefore vital that South Africans become more financially literate and manage their money better. However, even on an individual level, individual financial literacy rates and levels of good money management practices in the country are low. Gamification has proven to be an effective way of educating and driving positive behaviour. Gamification is the use of the psychological and motivational factors that are influential in people playing games, in other real-life contexts. This study focuses on answering the question, to what extent can gamification be used to encourage people to improve their financial literacy and money management abilities to be able to improve their financial situation?

To answer the research question a qualitative study was conducted. This involved interviewing twenty individuals to understand what challenges they face in managing their money well, what factors contribute to their current levels of financial literacy, and to understand what core drivers of gamification, as described in the Gamification Framework Octalysis, would motivate them to learn more about financial literacy and manage their money well.

The study identified twelve challenges which affected the way in which participants manage their money well: 1) *Lacking knowledge or education*, 2) *Personal circumstance or goals not catered for*, 3) *Financial jargon*, 4) *Lacking discipline*, 5) *Increasing prices/cost of living*, 6) *Low salary or not having enough money to manage*, 7) *Taking care of family members*, 8) *Unexpected costs or emergencies*, 9) *Fear of their current situation*, 10) *Lack of interest,* 12) *Having an overview of their finances,* and 12) *Lack of trust or comfortability with banks or financial institutions*. It was shown through literature that gamification can have, or already has, a positive impact on eight of those challenges, with the other four challenges being external to the motivation of the individual.

The study also identified ten factors that contributed towards the participants' level of financial literacy: *1) Information from family and friends, 2) Information from financial advisors and bankers, 3) Life experiences, 4) Information gathered when a trigger or life event occurs, 5) Searching online/online articles, 6) Social media, 7) Learning through their jobs, 8) Banking or other financial institution applications, 9) Reading books,* and *10) Online videos and podcasts*. However, it was shown that these factors are not sustainable, accurate or consistent to progressively improve financial literacy. It was shown that more accredited and centralised sources of financial literacy need to be developed.

This study has shown that *"Development and Accomplishment"* and *"Empowerment of Creativity and Feedback"* were the most important core drivers to the participants. However, it was also identified that other core drivers also need to be implemented in gamified solutions to ensure that individuals' personalities are catered for.

Lastly, it was shown that gamification can have an impact on improving financial literacy and money management in South Africa; however, it cannot be the only solution. It will need to be a part of a bigger, centralised and accredited solution that accounts for personalised circumstances of the individuals, the personality of individuals and their financial situation.

Keywords: Gamification, Financial Literacy, Money Management, Motivation, Income, South Africa

1 INTRODUCTION

1.1 BACKGROUND INFORMATION

Seventy-six percent of South Africans consume all of their money by the end of the month, with 56% consuming all of their money before the middle of the month (Magubane, 2021). The problem can be broken into two parts (Lawlor, 2018). The first part of the problem relates to not having enough money to save, which is related to a broader issue in South Africa around inequality and unemployment (Lawlor, 2018). With regard to inequality, South Africa is ranked as the most unequal country in the world (WorldBank, 2022). The rise in prices of common items is also increasing in South Africa (BusinessTech, 2022), making the lives of people that are on the lower end of the income scale more difficult. So far in 2022, inflation is currently set at 5.9%, which means that it is at its highest point since 2017 (StatSA, 2022a). The interest rate in the country is set at 8% (SARB, 2022). These statistics, in addition to the fact that 34.5% of the population is unemployed (StatSA, 2022b), means that every rand needs to be maximised, especially for the low income population.

The second part of the problem relates to lack of financial literacy and ability to know how to make financial decisions (Lawlor, 2018). Financial literacy is a key factor in a person's ability to make good financial decisions and leads to positive overall financial behaviour (Dewi et al., 2019; Gibson et al., 2022). Individuals with higher levels of financial literacy have more exposure to and understanding of financial matters and therefore are better equipped to make financial decisions (Chen et al., 2023; Xu et al., 2022). Financial literacy can also help to navigate difficult financial situations and economic uncertainty (Damayanti et al., 2018), as well as to help individuals on a day to day basis (Nguyen et al., 2022). The Organisation for Economic Co-operation and Development states that financial literacy is not just about a person's knowledge and their ability to understand financial concepts, but is also determined by their "skills, motivation and confidence" to use their knowledge to manage their money well (Lusardi, 2019).

This raises the question of "What is good money management?" According to Ksendzova et al. (2017), the way in which individuals manage their money changes depending on their circumstances and the resources that they have available. Money management, for some, may be gaining access to basic resources such as food or shelter. For others it may be investments and being able to gain access to more money for luxury purchases. For some it could be that they want to be able to save extra money at the end of each month.

According to Hakeenah (2021), the answer may be situated in the middle. But what are the right decisions when it comes to managing your money? More importantly, how do you motivate people to take a more proactive approach to managing their money better?

The economy of a country and it's communities is largely determined by its digital innovation (Dougherty & Morabito, 2023). Gamification has proven to be a powerful motivating factor in many areas (Bassanelli et al., 2022) such as improving healthcare (Johnson et al., 2016), promoting sustainability (Ferron et al., 2019) and changing eating habits (Chow et al., 2020). Gamification uses different game-like elements that are relatable, fun and engaging for individuals and can be used to change behaviour quite successfully (Dulskaia et al., 2017; Kim & Castelli, 2020). People are driven by different motivators, therefore gamification frameworks such as Octalysis (Chou, 2015) illustrates how these different motivational factors can be addressed.

Gamification has proven to have positive outcomes, especially in learning and education as well (Sailer & Homner, 2020). Gamification is very closely linked to Self Determination Theory (SDT) (Bovermann & Bastiaens, 2020). SDT is a theory of human psychology that describes how individuals are motivated and their resulting behaviour (Deci & Ryan, 2012). Gamified elements in learning and education programmes have the ability to enhance the learning experience by increasing the motivation in an individual by delving into the people's psychological needs, which SDT describes as, "competence, autonomy and social relatedness" (Sailer & Homner, 2020). *"Competence"* describes an individual's need to master tasks and feel empowered, which can be achieved through gamified components such as points and badges (Kam & Umar, 2018). *"Autonomy*" describes an individual's need for control and believing that their individual decisions positively affect an outcome, which can be achieved through gamified components such as personalised dashboards. Lastly, *"Relatedness*" describes the feeling of learning in relation to others, which can be achieved through support, tips, social sharing or competition (Shi & Cristea, 2016).

With regard to gamification in improving financial education and behaviour, a few studies have been done in first world countries. One such study was conducted by Bayuk and Altobello (2019), who conducted a study amongst college students in North America that investigated how adding gamified components to financial apps would improve financial behaviour. Another such study was conducted by deCos (2015), who conducted research in Finland into how banks can gamify financial information for children. Both studies have had positive results that show that gamification can positively improve financial literacy and financial behaviour.

This study intends to understand to what extent can gamification play a role in motivating South Africans to improve their financial literacy and ultimately, make better financial decisions. In addition to that, if gamification can play a role, this study intends to understand which of the core drivers of the Gamification Framework – Octalysis, will motivate South Africans the most.

1.2 PURPOSE OF THE STUDY

The purpose of this study is to understand to what extent can gamification play a role in helping people in South Africa to improve their financial literacy and manage their money better. In addition to that, this study looks at which core drivers of gamification could possibly play a role?

This study aims to first understand the current challenges that affect the way in which people manage their money. Secondly, what are the factors that contribute towards their financial literacy, and lastly how gamification can play a role in improving or maintaining that.

Currently, there is only one study that looks at how gamification can improve financial behaviour by (Bayuk & Altobello, 2019), who identified that including gamification in financial applications would increase user engagement. However, that study was conducted in the United States of America, traditionally a first world country, where financial literacy is higher (57%) compared to South Africa (42%) (Klapper et al., 2014). This study intends to understand how gamification can play a role in South Africa, traditionally a developing country, where financial literacy rates are low (Klapper et al., 2014) and the country experiences issues such as unemployment and increasing cost of living, in addition to a large part of the population living in poverty (WorldBank, 2023).

By identifying whether gamification can play a role in helping South Africans, institutions can structure their offerings to include those gamification core drivers and components. By doing this South Africans will be motivated to take more responsibility and positive steps towards financial freedom.

1.3 PROBLEM STATEMENT

Financial literacy in South Africa is at 42% (Lusardi et al., 2015) and money management practices, especially amongst the middle to lower income brackets in South Africa are not adequate enough to help improve their livelihood (Antoni, 2015). Given how uncertain and turbulent the economic situation in the country has become (Rolland et al., 2021), it is important that people have the knowledge and tools to make the right decisions when it comes to their finances.

Gamification has proven to be successful to motivate individuals, using one or a combination of motivators. Studies have experimented with fun and engaging aspects of gamified components (Chen & Liang, 2022; Suh, 2016), comparing experiences when gamified components have been applied and have not been applied (Lam & Tse, 2022; Ozturk & Korkmaz, 2020), or studies in first world countries (Bayuk & Altobello, 2019; De Cos, 2015). This study intends to use the Octalysis Framework, which approaches gamification from a motivational perspective, to understand what motivational core drivers of gamification would be most effective in designing a gamified money management solution. The study also intends to understand the challenges faced by individuals when managing their money, and what contributes to their levels of financial literacy, and ultimately understanding to what extent gamification can play a role in addressing that as well.

This study does not attempt to create a gamified solution, but rather attempts to address the gap in understanding motivation through gamification in improving financial literacy and money management.

1.4 RESEARCH QUESTIONS

The primary research questions of this study are to understand firstly, to what extent can gamification play a role in helping people to improve their financial literacy and therefore manage their money better?

The secondary research questions are:

1) What are the challenges that affect the way in which people manage their money?
2) What are the factors that contribute to their level of financial literacy?
3) What core drivers of gamification would motivate them the most to become more financially literate and to manage their money better?

1.5 ASSUMPTIONS

An assumption of this study is that the Octalysis Framework is a valid gamification framework.

1.6 LIMITATIONS

A limitation of this study is that questions will be asked only around digital gamification being a solution for improving money management. Other possible solutions will not be explored.

Another limitation is since the study employed a snowball sampling method, which included the expanded network of the researcher's network, all South African income levels were not able to be interviewed. Therefore, this study does not include South Africans who were unemployed, received no income or individuals earning more than R1 million. Further studies could also be conducted that include more than the twenty participants that were included in this study.

Lastly, as the study employed a qualitative approach, participants provided answers to both the financial and gamification questions from their own perceptions towards their situation and motivation. The study did not track any financial information provided by the participants including bank accounts, spending habits or investments. In terms of gamification, participants provided answers to what would motivate them based on what they feel would motivate them. Practical applications of gamification in real life scenarios and possibly a quantitative approach may yield different results.

1.7 EXPECTED CONTRIBUTION

This study intends to understand to what extent gamification can play a role in helping South Africans to improve their money management. If it can do so, it opens the doors for the South African government and financial institutions to structure their products or services in a way that appeals to South Africans. The government and these financial institutions will be able to have a clear understanding of how to motivate people.

For people in South Africa, it will be an opportunity for them to have services and products that they can learn and grow from and thus be empowered. They will be able to educate and uplift themselves on their terms. South Africa is one of the most unequal countries in the world with the Gini co-efficient sitting at 0.65 (StatSA, 2020). Increased financial literacy amongst the lowest earners in the country can go a long way in fixing that.

1.8 BRIEF CHAPTER OVERVIEW

This study aims to understand to what extent gamification can play a role in helping South Africans to improve their money management through financial literacy and will be presented in five chapters.

Chapter One introduces the study through the background information, the problem statement, research questions, assumptions, limitations and expected contribution.

Chapter Two is the literature review and focuses on two main topics. The first being gamification, defining what it is, providing an historical overview, as well as a deeper look at the motivation, psychology, and science behind it. The section on gamification concludes with an examination of different gamification frameworks and how it has already been used in financial literacy and money management in the rest of the world. The second topic addressed in the literature review is financial literacy and money management. This section of the chapter looks at definitions of both concepts, the relationship between financial literacy and money management, why it is important and the social and psychological effects thereof. This section concludes with a discussion of the current state of financial literacy globally and in South Africa.

Chapter Three provides an overview of research methodology typically used in research and highlights the research paradigm, approach, strategy, methodological choice, time horizons and techniques and procedures used specifically in this study.

Chapter Four will present an analysis of the data collected using the data collection methods and an in-depth discussion of the findings.

Chapter Five will present the conclusion by using the data collected to successfully answer the research question, which was to understand whether gamification can play a role in helping South Africans to improve their money management through financial literacy.

2 LITERATURE REVIEW

2.1 INTRODUCTION

This chapter focuses on existing work that is related and contributes toward this research topic. This chapter firstly focuses on a comprehensive view of gamification including definitions, it's history, how it is used to motivate individuals, the psychology and science behind it, different gamification frameworks and how it has been used in financial literacy and money management The second part of the chapter provides a comprehensive view on financial literacy and money management, including definitions, how it has changed in a more digital world, why it is important, the social and psychological impact, a current view of financial literacy and money management globally, as well as a view specifically on South Africa.

2.2 GAMIFICATION

2.2.1 What is Gamification?

Gamification can be defined as the use of psychological and motivational components of games in "non-game" situations or experiences (Robson et al., 2015; Rodrigues et al., 2019). Gamification uses game elements such as rewards in the form of points, badges or trophies, or competition in the form of leader boards, or even the nostalgia of childhood memories to enhance experiences and trigger the same enjoyment and happiness that individuals received when playing games (Kalogiannakis et al., 2021; Marache-Francisco & Brangier, 2013). The need for applying gamification has grown due to "games" being more fun and engaging for individuals (Dichev & Dicheva, 2017). The application of game elements can provide much needed motivation on tasks where motivation is lacking in individuals such as learning or exercise (Rincon-Flores et al., 2022; Rivera & Garden, 2021; Tu et al., 2019).

According to Yee (2007) individuals play games for three main reasons. Firstly, being able to achieve which involves progressing and beating others. Secondly, the social component, being part of a social group, interacting with others and having friends, and lastly the immersion component of being able to escape the realities of life. Gaming itself is a billion-dollar industry, according to Wise (2022), with gaming revenues exceeding the 300-billion-dollar mark in 2022. The report also showed that people spent on average of 16 hours a week playing games and another eight hours on average just watching gaming streams.

2.2.2 The History of Gamification

Despite the term "gamification" only being adopted in 2002 by game designer, Nick Pelling, the concept of gamification has been around since the early 1900s (Christians, 2018). One of the earliest documented examples of gamified concepts being applied involved the "loyalty rewards" by "Sperry and Hutchinson Co." where customers were given stamps that were redeemable for products that the company sold. This concept of gamification is still used today throughout the world (Hollebeek et al., 2021; Hwang & Choi, 2020; Shahid & Arshad, 2021). Another early example was the Boy Scouts of America that rewarded members with badges for performing various tasks. Rewarding of badges also still exists as a modern form of gamification today (Balci et al., 2022; Imran, 2019; Kyewski & Kramer, 2018; Tahir et al., 2022). One of the first digital applications of gamification was a game called "MUD1" (Multi-User Dungeon) which was created by Roy Trubshaw and Richard Bartle (Christians, 2018). The game was purely text based at the time, however the fact that it awarded points and allowed multi-player interaction meant that it became quite popular (Khaitova, 2021). With the introduction and expansion of the internet in the 1990s and 2000s, gamification evolved as more gamified motivators such as competition and being able to display what an individual has won became more popular (Bilgin, 2020). The technological advancements in both hardware and software, as well as the progressive innovation happening with smartphones, means that digital gamification has reached every corner of the world (Khaitova, 2021).

2.2.3 Motivation behind Gamification

Broadly gamification can be broken into two separate types: extrinsic and intrinsic motivation (Mitchell et al., 2020; Wu & Santana, 2022). When the motivation is extrinsic, the focus is upon the outcome. The individual focuses on the reward or what they will receive at the end (Lopez-Navarro et al., 2023; Wallius et al., 2023). This involves gamified components such as points, badges, leader boards and trophies (Dahlstrom, 2017). Extrinsic motivation in gamification can be excellent for driving behaviour, especially in the short term, as it creates a perceived sense of happiness for receiving something in return or not being punished (Wu & Santana, 2022). For example, receiving points and badges for learning a new language on *Duolingo* (Hyunh et al., 2016) or introducing competition with friends and family like *FitBit* did, to motivate individuals to exercise and stay consistent with their workouts (Bitrain et al., 2021). However, with extrinsic motivation, the danger is that the behaviour or motivation to complete the task may stop if the reward stops (Adamma et al., 2018; Encarnacao et al., 2021).

With the intrinsic motivation, it is the opposite. The motivation focuses on the journey rather that the outcome. It is the feeling of happiness or excitement that an individual experiences when completing a task that is of interest to them (Larsson, 2015; Treiblmaier & Putz, 2020). These involve gamified core drivers such as social relatedness or competition, unpredictability, narratives, feedback and being creative (Sailer et al., 2017). The motivation to do or complete something is not dependent on a reward or getting something tangible out of it (Dahlstrom, 2017; Larsson, 2015).

However, extrinsic motivations can sometimes be detrimental to intrinsic motivations, as individuals might be solely focused on the reward as opposed to the experience, or the task at hand (Dahlstrom, 2017; Ledford et al., 2013). It is important that researchers or organisations find the right combinations of intrinsic and extrinsic motivation when implementing gamification (Buckley & Doyle, 2016; Encarnacao et al., 2021; Wu & Santana, 2022).

2.2.4 The Psychology of Gamification

Gamification has also proven to be successful because it has emotional and psychological components to it (Litvin et al., 2020; Weller & Schroeder, 2022). Firstly, this is because these gamified activities create an emotional and psychological connection in the human brain via the "Amygdala", the region of the brain that is primarily related to emotion and creates and increased flow of information between our brain and our interactions (Greipl et al., 2021; Mullins & Sabherwal, 2020). The more immersed a person is into a game, the higher their emotional involvement would be. This increases how much they enjoy and engage with it and improves their overall experience. This also ensures that the person playing the game is more attentive (Mullins & Sabherwal, 2020). People pay more attention and prioritise things that are more relevant to them and this causes more of an emotional reaction (Alqithami, 2021; Linke et al., 2019). This can also cause increased anxiety and negative emotions. Players can be frustrated when they attempt a task that is difficult, as they are more emotionally involved (Mullins & Sabherwal, 2020). Being in this highly immersed emotional state, players also have an enhanced level of decision-making, as our brains play an important role in weighing up the decisions versus the possible rewards. Games that include elements such as strategy and setting up processes improve decision-making and problem-solving ability (Mullins & Sabherwal, 2020; Suvajdzic & Stojanovic, 2020).

2.2.5 The Science of Gamification

From a scientific perspective, the rewards associated with gamification have also been shown to release Dopamine and Serotonin in human brains creating an "overall good mood" (Howard-Jones et al., 2016; Lopez-Jimenez et al., 2021). Our brains latch on to this feeling and yearn to recreate it (Mullins & Sabherwal, 2020). The Dopamine released also triggers signals to the brain that makes you want to discover new behaviours and master those new behaviours much more quickly (Rackwitz, 2012). Lastly, it is effective because people tend to remember stories more than facts and lists. People associate a feeling of trust and empathy with stories because Oxytocin is released when presented with a story and this enhances the stories' validity (GrowthEngineering, 2020; Klock et al., 2020).

2.2.6 Gamification Frameworks

Gamification frameworks, or gamification design elements, can be described as the structure or set of rules that show how gamification should be carried out to achieve a business objective (Riera et al., 2015).

2.2.6.1 6 Steps to Gamification (6D)

The publication *6 Steps to Gamification* (6D) created by Kevin Werbach and Dan Hunter, forms the basis of most gamification frameworks. The 6D Framework involves the following six steps (Gava, 2021; Riera et al., 2015):

1) *"Defining the business objectives"* – This step is meant to outline the goals which this gamified experience is supposed to achieve, either for the organisation or the type of behaviour that needs to be changed.
2) *"Delineate target behaviours"* – This step is meant to detail the desired action expected from individuals, and what it constitutes as completion and success.
3) *"Describing your players"* – This step sets out to describe the groups of individuals involved and how the game mechanics developed would motivate each group.
4) *"Devise your activity loops"* – This step outlines the interaction between the game/gamified experience and the individual. The task that needs to be

completed, the feedback from the system that triggers a response, the motivation that the individual has to complete it and subsequent feedback on the action is creating the “activity loop”.

5) *“Don’t forget the fun”* – This step details the gamified components to be used that need to correspond to the groups of individuals described in Step Three. The gamified components need to appeal to these individuals and be motivating enough for them to take action. These gamified components include points, badges, leader boards, competitions, and other components that the organisation or game designer feels would motivate the targeted groups.
6) *“Deploy the appropriate tools”* – This step involves executing the gamified system as a whole and how this system interacts with the individual and vice versa.

The 6D Framework has proven to be successful in implementing gamification to induce behaviour change in the software development process (Sisomboon et al., 2019), to develop gamified quizzes to improve “self-regulated learning” (Odincova, 2017) and creating a gamified solution to improve “risk management” (Moreta et al., 2016). Gava (2021) claims that the 6D Framework is best used in combination with other frameworks, as it serves more as a guideline rather than looking specifically at motivation and how it can be used to change behaviour.

2.2.6.2 RAMP Framework

Another popular gamification framework is *RAMP* which was developed by Andrzej Marczewski (Marczewski, 2013). RAMP is described as a framework that is a “model of intrinsic motivation”, as all four components of the framework - *Relatedness, Autonomy, Mastery and Purpose* relate to intrinsic motivation (Salazar-Cardona et al., 2023). This framework is derived from *Self-Determination Theory (SDT)* (Deci & Ryan, 2012). *“Relatedness”* refers to the social aspect of games and the need for individuals to connect and socialise with others. This aligns with the *“Relatedness”* as described in SDT. *“Autonomy”* refers to the need of an individual to make their own decisions and follow a path that they want to follow. This also aligns with *“Autonomy”* as described in SDT. *“Mastery”* means that the person is able to perfect certain aspects through learning and growing and being admired for it. This is described as “*Competence”* in *SDT*. *“Purpose”* means that the person has a reason and context to continue the journey they are on (Charles & McDonough, 2014; Salazar-Cardona et al., 2023). “Purpose” is the only component of RAMP that does not align with SDT, as RAMP creator Andrej Marczewski proposed that it was important to add in an "altruistic" dimension to motivate individuals (Marczewski, 2019).

The RAMP Framework has been used to create platforms that gamify "career guidance" for young individuals (Brandenburger & Janneck, 2023) and online recruitment (Shane et al., 2020), as well as a gamified solution to motivate individuals to add more content to their travel and hospitality reviews (Bravo et al., 2021).

2.2.6.3 MDA Framework

The MDA Framework is primarily used to assist institutions or game designers to analyse game design (Xin, 2022). It details the three components of games: 1) Rules 2) Systems and 3) Fun, and matches that to a game and design framework of 1) Mechanics, 2) Dynamics, and 3) Aesthetics (Hunicke et al., 2004). Firstly, the *Mechanics* describes the components of the game including the data that is input or used by the game, the rules of how the game should function and the algorithms that are pre-set in the game. Secondly, *Dynamics* details what happens for each of the combinations of data and actions and how those work with the algorithms to provide an output in terms of feedback, choices available and completion of the game. Lastly, the *Aesthetics,* describes the creativity that a player has within the game and the "emotion" that they feel when interacting with the game (Hunicke et al., 2004; Mora et al., 2017; Walk et al., 2017; Xin, 2022).

The MDA Framework has been used to gamify learning in high schools (Putra & Yasin, 2021) and universities (Pedroso et al., 2018), as well as to create a model to motivate the elderly to develop healthier habits (Pinho & Paredes, 2019).

It is however claimed that the MDA Framework works optimally for "entertainment" types of games as opposed to "serious games" or gamification that tries to change a level of behaviour (Ferdig & Winn, 2009; Walk et al., 2017).

2.2.6.4 Octalysis Framework

Gamification expert, Yu Kai Chou explains in his book entitled *Actionable Gamification* that gamification encompasses human centred design. This means that people have feelings, they can be insecure and that there are specific motivations that make them do or not do certain things. Therefore, gamification serves as a way in which to optimise experiences by driving engagement through these feelings and motivation. Chou is the creator of the Octalysis Framework that claims that an individual’s motivation to engage with games is based on eight core drivers. Each of these, as a single driver or a combination of drivers, serves as a driving force and the reason why games and gamification are so popular (Mora et al., 2017). Both Riera et al. (2015) and Gava (2021) claim that Octalysis is the most complete framework in respect to gamification because it details the many different types of motivations, looks at both positive and negative motivations, intrinsic and extrinsic motivations and how each of those motivations could change as an individual progresses through a game, gamified experience or stage of their life. Octalysis could be used to evaluate gamified solutions (Economou et al., 2015; Salonen & Mohammad, 2017).

The Octalysis Framework is displayed below (see Figure 1):

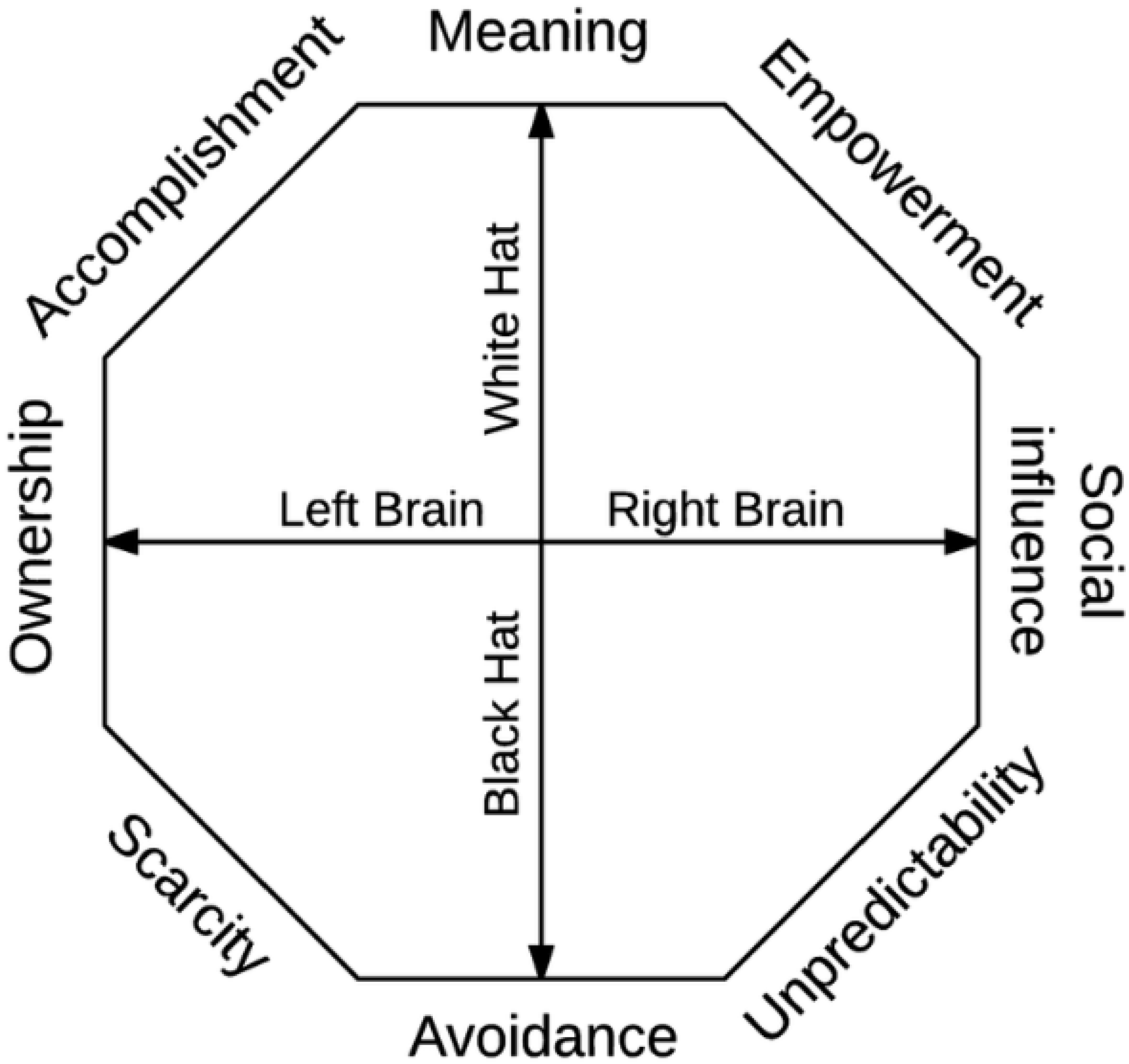

Figure 1: Octalysis Framework (Goschlberger & Bruck, 2017)

According to the Octalysis Framework, all successful games have the following eight core drivers (Chou, 2015):

1. Epic Meaning and Calling: An individual contributes towards a purpose that is bigger than themselves. Another aspect of this core driver is that the individual feels like they are special and that only they can achieve a specific objective.

2. Development and Accomplishment: An individual feels ready to take on a challenge and is able to grow and evolve. Points and badges are a key aspect of this core driver. It serves as a reward for overcoming the challenge.

3. Empowerment of Creativity and Feedback: An individual is encouraged to try various things and is allowed to explore. Feedback is provided on how to improve and be better.

4. Ownership and Possession: When an individual has the ability to take ownership of something, they will have more of an incentive to grow and improve it. This can be seen when people personalise their personal space or digital avatars.

5. Social Influence and Relatedness: An individual feels accepted as part of a group. This could also be because a celebrity does the same thing or endorses a particular brand. This driver also relates to being competitive; leader boards are a big part of this driver.

6. Scarcity and Impatience: This is where an individual has a time limit to complete a task. The time limit creates a thrill when completed. This driver also applies to when there is a limited number of what can be achieved. For example, if something is a limited edition.

7. Unpredictability and Curiosity: This driver is when an individual becomes curious and intrigued about the next step or the next challenge. It's about testing the individual against the unknown and the individual becomes more intrigued.

8. Loss and Avoidance: This driver is when an individual competes to avoid losing out or failing. If they do not keep going, something negative will happen.

Motivation increases in an individual when the concept increases in effectiveness when one or more of these drivers have been triggered (Chou, 2015).

2.2.6.5 Framework chosen for this study

This study has used the Octalysis Framework, as the intention was to understand how gamification can increase or instil the motivation of an individual towards improving their financial literacy and money management. Where the 6D and MDA Framework focuses on the ”mechanics” and “functionality” of a gamified solution (Hunicke et al., 2004; Swacha et al., 2022), and the RAMP Framework focuses on intrinsic motivation (Marczewski, 2015), Octalysis takes a more holistic approach to gamification. As detailed in Section 2.2.6.4 of this study, Octalysis outlines motivational drivers that align with the various reasons that gamified solutions appeal to individuals (Gava, 2021). The framework was chosen as it takes a comprehensive view of motivation and details elements that can be applied against that motivation (Lima, 2016) which matches the objectives of this study.

Weber et al. (2022) showed that Octalysis was mentioned in 366 academic studies with the reasons for usage including 1) creating new gamified systems, 2) comparing gamified theory, 3) evaluating existing systems, and 4) understanding users. This study aligns with the last reason, which is to understand participants, what would motivate them from a gamification perspective and the reasons, challenges, and circumstances in relation to financial literacy and money management.

2.2.7 Uses of Gamification in Financial Literacy and Money Management

According to MarketsandMarkets (2020), financial start-up companies, through gamification, will grow from 9.1 billion US dollars in 2020 to 30.7 billion US dollars in 2025. For a business or organisation that wants to drive change or increase engagement, gamification can be powerful for two reasons; 1) for the party that includes gamification in its products or services, it brings about the desired action or behaviour change in their customers, and 2) for the customers it improves the overall experience and makes it much more fun and engaging than a normal, non-gamified interaction would be (Chauhan et al., 2021).

Gamification is popular in teaching financial literacy and money management because the outcomes of financial decisions can be visualised quite easily. Our financial decisions are already woven into our lives and the way in which we make decisions, be it whether we choose to buy or rent a house, or whether we make use of reward programmes to pay for fuel (Rabin, 2022).

Lusardi (2019), Mahdzan and Tabiani (2013), and Dwiastanti (2015) highlight the importance of *"Saving*" in relation to financial literacy and money management. Gamification has already proven to assist in promoting savings amongst individuals quite successfully. An application called *Digit* helped customers to save over 5 billion US dollars through automated savings of small change and motivating them through bonuses. This focuses on *Core Driver 2: Development and Accomplishment* in the Octalysis Framework. The *Commonwealth Bank* created a game called *SavingsQuest* in 2015. After just three months of being in the market, the bank found that *SavingsQuests* users saved 25% more than other users in the bank. *SavingsQuest* used badges and savings challenges as a motivating factor, speaking to *Core Driver 2: Development and Accomplishment* (Foreman & Walden, 2021).

Another key aspect of financial literacy and money management is "*Investing"* (Kumari, 2020; Navickas et al., 2013; Seraj et al., 2022). Gamification has also proven to be successful in motivating individuals to invest, such as the *Qapital* banking app using *Core Driver 2: Development and Accomplishment* to encourage users to set spending, saving and investing targets and challenging them to achieve it (Foreman & Walden, 2021). An app called *Ayrro* which allows users to trade in the stock market uses leader boards to motivate users. These users can see trades made and who are the highest-ranking traders. This drives competition and envy and is related to *Core Driver 5: Social Influence and Relatedness* (Surf, 2020).

Even regarding the consumption of financial education, gamification has proven to have a positive impact. *BBVA*, a bank in Spain, attracted over 10 000 players in a game which they created that provided educational content. These users were awarded points that allowed them to win tickets to football matches and movies. This focuses on *Core Driver 2: Development and Accomplishment* and *Core Driver 3: Empowerment of Creativity and Feedback* in the Octalysis Framework (Surf, 2020).

However, gamification in money management does have negative aspects too. Research claims that making these subjects too easy can make it seem as though the application of it is easy as well, which may not always be the case. In investing, for example, the risk of volatile stocks may seem trivial in a gamified environment, as opposed to the actual risk which it carries in real life (MoneyMasters, 2022).

As the research around gamification grows, so too will its application. So far though, research showing such success of gamification exists predominantly in first world countries (Sanasi, 2021).

2.3 FINANCIAL LITERACY AND MONEY MANAGEMENT

2.3.1 Defining financial literacy and money management

There are various but not dissimilar definitions for financial literacy. The difference is often in the scope of the definition. The National Financial Educators Council defines financial literacy as *"Possessing the skills and knowledge on financial matters to confidently take effective action that best fulfils an individual's personal, family and global community goals"* (NFEC). The Corporate Finance Institute (CFI) defines financial literacy as *"the cognitive understanding of financial components and skills such as budgeting, investing, borrowing, taxation, and personal financial management"* (CFI, 2021).

Lusardi and Mitchell (2014) define financial literacy as *"peoples' ability to process economic information and make informed decisions about financial planning, wealth accumulation, debt and pensions".* They also developed a measurement of financial literacy called "The Big Three" which was first trialled in a study in the United States of America on health and retirement (Mitchell & Lusardi, 2015). "The Big Three Method" tests three key concepts to measure financial literacy. Firstly, a person's ability to calculate interest and the way in which it compounds. Secondly, understanding inflation, and thirdly, understanding the diversification of risk. These three concepts were further translated into three questions that were used to measure the concepts. The three questions are:

1) *"Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?"*
2) *"Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?"*
3) *"Please tell me whether this statement is true or false. "Buying a single company's stock usually provides a safer return than a stock mutual fund."*

The Big Three Method has been added to financial literacy studies around the world and is seen as an international metric to measure financial literacy (Lusardi, 2019). This method has been used in financial literacy studies in the United Kingdom, Germany, Italy and Sweden (Nicolini & Haupt, 2019) and as part of the United States of America National Financial Capability Study (Mitchell & Lusardi, 2015). This research study has included the Big Three Method as part of the questionnaire.

Amagir et al. (2017) claim that the goal of financial literacy is to assist and encourage people to change their financial behaviour and ensure that they make sound financial decisions. Their definition of financial literacy has three parts, *"Knowledge and Understanding", "Skills and Behaviour" and "Attitudes and Confidence". "Knowledge and Understanding"* refers to being informed about financial matters and concepts (Amagir et al., 2017). This includes understanding terminology, being able to make comparisons between financial products as well as understanding the impact of financial decisions on their short, medium and long term future (Happ et al., 2022; Lajuni et al., 2022). An individual's perception of their level of financial knowledge can sometimes differ from their actual level of financial knowledge. This is referred to as "perceived financial knowledge" (Lee et al., 2023; Pham & Le, 2023). If an individual's perceived financial knowledge is much higher than their actual financial knowledge, it can be quite detrimental to their financial future as it affects their decision making (Aristei & Gallo, 2021; Voros et al., 2021). "*Skills and Behaviour"* is about having the right tools and actions to be able to make changes to one's behaviour (Amagir et al., 2017). This includes knowing when to take calculated risks, saving, investing, taking ownership of purchasing decisions and the accumulation of financial knowledge (Aristei & Gallo, 2021; Morris et al., 2021). "*Attitudes and Confidence"* is about having the right mindset to apply everything together (Amagir et al., 2017). An individual's financial confidence is increased by having more financial knowledge, good financial behaviours, and a proven history of successfully implemented financial strategies (Aristei & Gallo, 2021). The level of confidence an individual has with regard to financial literacy has proven to be important with studies showing that if an individual is overconfident, or not confident enough, it could lead to negative consequences. Individuals could take too many large risks if they are too confident or miss out on opportunities if they are not confident enough (Mudzingiri et al., 2018; Riitsalu et al., 2023).

Given that the “The Big Three Method” is used as part of the questionnaire in this research study, the definition of financial literacy provided by Lusardi and Mitchell (2014) will be used in this study to assess levels of financial literacy. The complete assessment can be found in Appendix A.

Money management can be defined as the way in which a person makes use of their money and all of the supporting functions that contribute to their money such as being able to budget, taxation, investing and the tracking of expenses (Morris et al., 2021; Rai et al., 2019). It is described as a strategy of gaining the maximum value for each amount spent (Akinyede et al., 2017). Topa et al. (2018) believe that financial management can be complex, as it changes depending on how difficult or important the financial decision is. They also claim that a person’s experience and the ability to practice financial activities can have an impact on their ability to make good financial decisions. This is further backed by Krava et al. (2021) who illustrate that a person’s ability to make good financial decisions is determined by their experience of making financial decisions, the amount of information provided, their processes when making decisions and their intuition. That illustrates the complexity of money management as those contributing factors might differ depending on the financial decision to be made.

Increased financial literacy leads to better financial behaviour and therefore, better money management (Patrisia & Fauzia, 2019; Rahman et al., 2021; Rai et al., 2019).

2.3.2 Financial Literacy and Money Management in a digital world

The digitisation of the world has increased financial literacy with increased access to the internet via technology such as smartphones and computers (French et al., 2019; Liu & Lin, 2021). Financial literacy acquired from these digital platforms has also proven to positively impact individuals’ behaviour when it comes to saving and spending (Frimpong et al., 2022; Nguyen et al., 2022). This is a result of information being more accessible, digital nudging of customers to take actions, easier methods to invest and make payments, and lastly customers being more influenced by user interface designs and targeted algorithms (Koskelainen, 2023).

2.3.3 Why is financial literacy and money management important?

People that do not have a reasonable amount of financial literacy will not be able to manage their money well (Khawar & Sarwar, 2021). This prohibits them from planning their finances or being able to invest towards their future. According to (Xu et al., 2022), people with higher levels of financial literacy are more likely to exhibit what is seen as positive financial behaviours such as purchasing financial growth vehicles like shares and mutual funds, saving for retirement, opening their own businesses and participating in the stock market. The stability that comes with higher financial literacy also allows these individuals to think more rationally, as their decisions are much more informed and diversified (Xu et al., 2022). People have different personalities with different circumstances, and as a result their priorities when it comes to spending their money are very different. Therefore it is critical for individuals to have the necessary knowledge and skills to save or invest, and to be able to navigate difficult financial decisions and changes in the socio-economic environment, to be able to meet their personal needs and circumstances (Gumbo et al., 2021).

At a more basic level, a good level of financial knowledge and management will allow people to make ends meet and ensure that they are able to put food on the table for their families (Carman & Zamarro, 2016; Millimet et al., 2015), and allow people to prepare for worst case scenarios (Sukanya, 2023). It also allows them to be able to achieve their goals in life and to ensure that they are more confident when making major life decisions (Fernando, 2022). A low level of financial literacy can have negative effects such as long term financial debt causing a burden on you and your family leading to possible bankruptcy (Fernando, 2022). (Askar et al., 2020) claim that people with low financial literacy may not be able to choose the right financial products. They also claim that people with poor money management abilities and with low incomes may choose to borrow more to make ends meet. These decisions are further compounded by choosing to borrow from more informal lenders, associated with higher rates and fees, as opposed to formal institutions such as banks. In addition, this exposes them to a higher level of fraud.

However, there are studies that claim that financial literacy alone is not enough to guarantee better financial management and that other factors such as families, surroundings, experiences and emotional behaviour also shape’s a person’s financial behaviours (Alsemgeest, 2015; Fauziyah & Ruhayati, 2016; Potrich et al., 2016).

2.3.4 The Social and Psychological effects of financial literacy and money management

Increased financial literacy and money management have been shown to have both social and psychological benefits. Individuals with higher financial literacy were shown to have more self-confidence in making financial decisions (Akinyede et al., 2017; Ramalho & Forte, 2018). Research has also shown that increased financial knowledge reduced stress, sickness and family conflict, including child abuse. Given that short term decisions could have a medium to long term impact, bad money management could lead to negative consequences for the individual, their families and society, such as debt, becoming bankrupt and negative psychological issues as well (Topa et al., 2018).

Studies have shown that psychological elements like self-esteem and impulse buying also factor into people's financial behaviour (Kebede et al., 2015; Simanjuntak & Rosifa, 2016; Tang & Baker, 2016).

2.3.5 Financial Literacy and Money Management Globally

In a study based on 150 000 people from 140 nationalities by (Klapper et al., 2014) on financially literacy rates around the world, it was shown that only 1 out of 3 people are financially literate. The study was conducted by testing participants from different countries on four different concepts – *"Numeracy", "Risk Diversification", "Inflation" and "Compound Interest".* The test was later adapted to form part of the "Big Three Method" (Lusardi, 2019). The study showed that developed countries with developed economies have high literacy rates, with Norway, Sweden and Denmark scoring the highest (71%), and with other North American and European nations such as Canada, the United Kingdom, Germany and the Netherlands following close behind. On the other end of the scale, no South American country, and only one African country (Botswana) scored more than 50%.

The study also claimed that richer countries did not necessarily have higher levels of financial literacy than all of the poorer countries. It is highly likely that consumer protection and education played a much more important role in determining financial literacy (Lusardi et al., 2015).

On-going political tensions, higher inflation, increasing debt servicing costs and financial exclusion are some of the biggest factors affecting individuals worldwide. The result of this has led to a decrease in salaries and disposable incomes in households (OECD, 2023b). The need to be financial literate globally has also increased in the last 20 years due to the increased complexity and globalisation of financial products (Alsemgeest, 2015). Financial products designed in developed countries, with more mature financial structures and higher rates of financial literacy, now have the ability to gain exposure in developing countries as well. Therefore, the onus falls on the individual in developing countries to understand and make financial decisions based on concepts that were not developed specifically for their country or taught to them at any level of formal education (Faulkner, 2021).

2.3.6 Financial Literacy and Money Management in South Africa

South Africa has one of the highest levels of inequality in the world with regard to distribution of wealth and income (OECD, 2022). South Africa's "tax collection authority", the South African Revenue Services (SARS) defines the lowest income bracket as an individual earning R1 to R237 100 annually (SARS, 2023). To put that in context 74.9% of the eligible work population earned below R62 500 annually (R5200 a month) in South Africa in 2020. According to the Decent Standard of Living Report published in 2018, around R7000 a month is required for a decent living standard that includes clothes, food and electricity (Frye et al., 2018). The South African government, as of 1 January 2019, set the minimum wage to R3 500 a month, however the law has not been widely enforced due to lack of knowledge (OECD, 2022). Askar et al. (2020) believe that money management is most difficult for low-income earners, as the consideration might not just be about good money management, but also about having extra money to manage.

There are few studies on financial literacy in developing countries, including South Africa (Askar et al., 2020), such as financial literacy research that was conducted for the Financial Sector Control Authority (FSCA) by the Human Sciences Research Council in 2017 (Roberts et al., 2018), and research carried out by FinMark (2022) where they presented levels of financial literacy in their annual report for 2021. Both studies displayed the challenges facing people in South Africa. FinMark (2022) showed that 41% of South African adults depend on social grants since 2021, moving up considerably from 29% from 2019. The study also claims that this amount would increase to over 50% if the data included adults that were dependent on borrowing from family members as well. In surveys conducted by the Organisation for Economic Co-Operation and Development (OECD), it was found that some grants such as the child support grant were not enough to cover basic needs such as food (OECD, 2022). It was also claimed that 33% of South African adults withdraw all of their money from their bank accounts on the day it is deposited to cover their expenses. It was also interesting to note that 43% of these individuals claimed that their income was not enough and that is why they needed all of it at once.

The survey done by the FCSA was designed to measure financial literacy by focusing on four key areas. The first area was *Financial Control* – this describes an individual that has a solid approach to finances which includes saving and being able to budget to make ends meet. Participants in this section scored 62/100. The second area was *Financial Planning* – this describes an individual that can set financial goals and is able to meet them. This individual focuses on the long term and has savings in case of emergency. Participants in this section scored 47/100. The third area was *Choosing Appropriate Products* – this involves the individual's knowledge about different banking products like credit, investments, savings and insurance, actually having these products, conducting research into these products before making a choice and any regrets on product decisions' financial knowledge and understanding. Participants in this section scored 48/100. Lastly, *"Financial Knowledge"* which involves an individual's numeric knowledge and how well they understood financial concepts. Participants in this section scored 55/100. The overall financial literacy average was recorded at 54/100. It is important to note that the highest scorers in this survey were 1) educated at a tertiary level, 2) wealthy, 3) employed full-time and 4) lived in urban areas (Roberts et al., 2018) which is not a complete reflection of the population of South Africa.
South Africa has one of the lowest savings rates in the world at 0.5%. This is considerably lower than other emerging nations such as Brazil (16.9%) and India (10.8%) (Constanius, 2023). Some of the biggest challenges which South Africans face are caused by a number of external factors such as ongoing black outs as the country is plagued by the energy crisis, the global recession and lack of foreign investment (Constanius, 2023), and as the factors drive up inflation and prevent growth (OECD, 2023a). However challenges are also caused by factors closer to home such as low income, high cost of living, spending more than they earn, lack of financial literacy and increasing debt (Maluleke, 2023).

2.4 GAP IN EXISTING LITERATURE ADDRESSED IN THIS STUDY

As stated in the Problem Statement in Section 1.3, gamification has been studied quite extensively. For example, studies have looked at the "fun" elements of gamification (Chen

& Liang, 2022; Suh, 2016), comparing gamified and non-gamified experiences (Lam & Tse, 2022; Ozturk & Korkmaz, 2020), and studies in first world countries (Bayuk & Altobello, 2019; De Cos, 2015). However, this study addresses to what extent gamification can be used to motivate and improve financial literacy and money management in South Africa. Currently, there are no studies that address financial literacy and money management specifically from a "motivation" and "core driver" point of view.

In addition, there are currently no qualitative studies on financial literacy and money management in South Africa that address how individuals become financially literate or attempt to understand their challenges. Similar to financial literacy studies, Roberts et al. (2018) conducted a quantitative study to understand the levels of financial literacy in South Africa, and Sibanda and Sibanda (2016) looked at financial initiatives both in the private and public sector. Nanziri and Olckers (2019) studied factors that impact financial literacy such as age, education levels, wealth, and employment status, and how these factors differ from patterns identified internationally.

From a "challenges that affect the way in which individuals manage their money perspective", similar studies include, firstly, Chitimira and Ncube (2020), who identified challenges that impact financial inclusion in South Africa and secondly, Pillay (2000) who discussed economic challenges that emerge from government policies in South Africa.

2.5 CONCLUSION

The literature review conducted in this chapter shows that gamification has had a significant impact on motivating individuals, especially in different scenarios, and with regard to education and changing behaviour. The literature review also highlights the importance of financial literacy and money management and why it is crucial for individuals to take a more proactive approach to their finances. The gap in existing literature, and what this study intends to address is whether gamification can also help South Africans to become more financially literate and manage their money better, and specifically which gamified core drivers can be used.

3 METHODOLOGY

3.1 INTRODUCTION

Research methodology describes the "systematic process" that a researcher uses to answer a research problem (Bhaskar & Manjuladevi, 2016; Patel & Patel, 2019). It outlines the paradigms, the approach, the techniques, and the methods used in a study. The research methodology outlined by a researcher intends to provide the best path to be able to answer the research questions with the most accuracy (Patel & Patel, 2019). It outlines the process of how the data for the study was obtained and the methods used to analyse the data. This research study makes use of the "Research Onion" developed by Saunders et al. (2007) to outline the research methodology applied. The "Research Onion" describes the various stages that a researcher needs to apply when conducting a research study. It depicts each stage as a layer of an onion, where once one stage of the process is completed or "peeled away", the next stage is narrowed down to provide further context on how the study will be approached, conducted and analysed (Melnikovas, 2018) (Abdelhakim & Badr, 2021; Melnikovas, 2018). The layers of the Research Onion are listed as follows: 1) Research Philosophies/Paradigms, 2) Approaches, 3) Strategies, 4)

Methodological Choices, 5) Time Horizons, and 6) Techniques and Procedures (Saunders et al., 2007). Each of these layers will be discussed further in subsequent sections.

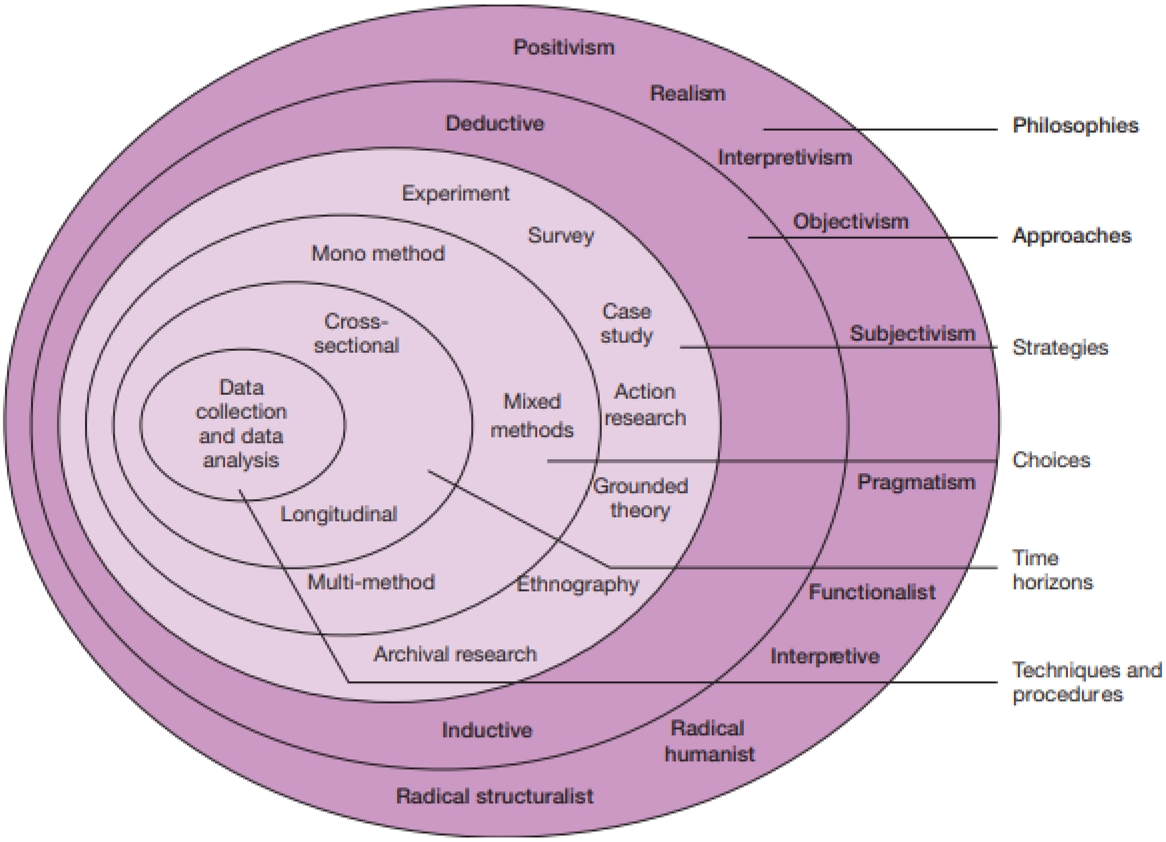

Figure 2: Research Onion (Saunders et al., 2007)

This chapter focuses on the research methodology that will be undertaken in this study to answer the question as to whether gamification can be used to improve financial literacy and money management in South Africa. This chapter also outlines the sampling methods used, an overview of the data analysis and the ethical considerations of this study.

3.2 RESEARCH PARADIGM

A research paradigm is the "set of beliefs" or "ideologies" that shape the way in which a researcher sees the world (Brown & Duenas, 2019; Kaushik & Walsh, 2019). A chosen paradigm describes the context in which the study will be conducted and determines the way in which the researcher will execute their research, the type of methods used, and the way in which the results will be examined (Khatri, 2020; Matta, 2021). It is the "lens" through which the researcher examines a problem and will determine the type of solution that will be proposed (Kivunja & Kuyini, 2017; Zukauskas et al., 2017a).

The three most used paradigms (Kivunja & Kuyini, 2017; Ryan, 2018) are detailed in the sections below.

3.2.1 Positivism Paradigm

A positivist paradigm is one where knowledge is examined and measured through empirical and quantifiable methods (Junjie & Yingxin, 2022). It is primarily, but not always, a quantitative research paradigm that is often conducted using the scientific method of creating a theory, hypothesising and creating an experiment to verify the theory (Taylor & Medina, 2011). The subject being studied needs to be controlled and measured (Park et al., 2019). The researcher looks for patterns in the data and tries to identify whether there are any “cause and effect” relationships that emerge between the dependant and independent variables in the experiment (Rehman & Alharthi, 2016). The researcher also has to take a neutral position, be objective and have no direct interaction with the participants, so as not to influence the data (Mwitta, 2022). A positivist view is that the world can only be viewed as one reality – a world that can be accurately and scientifically measured (Omodan, 2022; Rahi, 2017).

3.2.2 Interpretivism Paradigm

An interpretivist paradigm is more subjective in nature and is used to provide depth and context to what is being studied (Kivunja & Kuyini, 2017; Miskon et al., 2015). It tells us why something is happening. The researcher immerses themselves in the lives of the test subjects to gain a deeper understanding of their situations (Alharahsheh & Pius, 2020; Gichuru, 2017). Another aspect that differentiates interpretivism from positivism, is that interpretivism has a multi-layered view of the world. The world exists through the eyes of the many people that view it differently, through their own experience, situations and contexts (Dewi, 2021; Rahi, 2017). Where positivist research uses quantitative data, interpretivists use qualitative methods such as interviews, focus groups, transcripts or a combination of those methods that can most effectively derive more understanding around the topic being studied, the context around it and why this occurs (Alharahsheh & Pius, 2020; Dean, 2018).

3.2.3 Critical research

Critical research looks at society from a moral and equality point of view. The researcher aims to challenge existing values and beliefs, especially when there seems to be an unfairness in society (Kivunja & Kuyini, 2017; Yong et al., 2021). It looks to contribute towards a better society by using either qualitative or quantitative methods to shine a light on these injustices and suggest better ways of doing things through critical action research (Asghar, 2013; Elshafie, 2013).

3.2.4 Chosen paradigm for this study

The underlying philosophy used in this study was interpretivism. The purpose of this study was to understand to what extent gamification can play a part in improving people's financial literacy and money management. As part of that, the researcher needed to understand what challenges affected the way in which people managed their money, what were the factors that contributed to their financial literacy, and lastly, which core drivers of gamification would help to motivate them to manage to improve their financial literacy and to better manage their money. In order to understand this, the researcher attempted to understand what the answers to these research questions were, to have an in-depth understanding of why they chose those options and the circumstances which led them to this point in their lives. A view was also taken that the realities, specifically regarding their financial standing, would be different for some of the participants chosen. This study was a qualitative one and was subjective for people in South Africa. As these factors align with the interpretivist paradigm highlighted in Section 3.2.2, it was the most suitable for this research study.

3.3 RESEARCH APPROACH

The research approach refers to the procedure or process of conducting the research and can be divided into two main categories: Deductive and Inductive (Saunders et al., 2019; Sik, 2015).

3.3.1 Deductive Approach

A deductive approach can be described as an approach that follows a process that starts with a theory. The research formulates a hypothesis or theory, the hypothesis or theory is tested, and it will either be proven right or wrong at the end of the test (Saunders et al., 2019; Woiceshyn & Daellenback, 2017). Park et al. (2020) claim that a deductive approach is based on knowledge that currently exists. The hypothesis or theory is verified against this knowledge and if the result of it is proven to be correct or incorrect, the outcome can be accepted or rejected. If the results or hypothesis are not proven to be "satisfactory" then the research can be used in the future as a reference for similar research. A deductive approach is often described as a "top-down" strategy, as it starts off with "general" theories or hypotheses and works towards a specific one (Burney & Saleem, 2008; Malhotra, 2011; Shin, 2019).

3.3.2 Inductive Approach

An inductive approach can be described as an approach that follows a process that starts with conducting research or tests, and summarising the data found. The next step is to understand patterns from the data derived to formulate possible relationships between the data and the research objectives. Lastly, the theory or model is created based on the relationships found, or not found, in the data (Saunders et al., 2019; Thomas, 2006). The researcher attempts to collect and analyse data to create a new body of knowledge either as new information, a theory or a model (Park et al., 2020). An inductive approach is often described as a "bottom-up" strategy, as it starts off with targeted observations and works towards more generalised theories or conclusions (Burney & Saleem, 2008; Malhotra, 2011; Shin, 2019).

3.3.3 Chosen Approach for this study

A deductive approach was chosen for this study as the researcher used the existing Octalysis framework as a basis to examine the extent at which gamification can be used to motivate South Africans to improve their financial literacy and money management. The Octalysis framework was used as the existing "theory" as described in section 3.3.1 and the data collected from the interviews was examined against the framework. The core drivers from the Octalysis framework were reframed by the researcher to possible motivators to understand what could possibly motivate them to better manage their financial literacy and money. The research provided is to what extent gamification can play a part in improving financial literacy and money management in South Africa based on the participant interviews and the existing Octalysis core drivers. All these factors align with the description of a Deductive approach as outlined in section 3.3.1.

3.4 RESEARCH STRATEGIES

A research strategy can be described as the plan that a researcher outlines for their data collection (Malhotra, 2011). The chosen research strategy is informed by what the researcher intends to achieve from their study, available literature or information and the time available to complete the study (Saunders et al., 2007). The following strategies can be chosen by a researcher (Larrinaga, 2017):

3.4.1 Survey

Survey research can be described as a researcher providing test subjects with a list of pre-defined questions, and their responses are collated and analysed to form a particular conclusion or form an argument. It explores both quantitative methods where test subjects are required to rate or rank specific items, or qualitative methods where the questions are more open ended and the researcher can ask follow up questions to add more depth to the research (Ponto, 2015).

Surveys can be done digitally or in person in the form interviews, online questionnaires or forms sent via email or printed out on paper as well (Creswell & Hirose, 2019).

Advantages of surveys include them being easy to administer and they can be sent to a large number of people to increase the sample size (Jones et al., 2013). Surveys help the researcher from a time perspective as they can be done digitally and without having to be conducted each time by a researcher. They are also a cost effective method with most online forms and email being free (Owens, 2002).

The first disadvantage is that if questions are closed ended or require additional queries, the researcher is not able to go back to delve deeper or unpack specific outcomes if the surveys are sent out (Kelley et al., 2003). The second disadvantage is that some of the population may be left out if they do not have access to a computer or access to the internet if the surveys are done online (Owens, 2002).

3.4.2 Experiment

In experiment research, researchers manipulate variables in the design and record their results at different levels. The change in the variable manipulation which causes the resultant change in dependant variable and possible patterns is the experiment outcome (Bhattacherjee, 2012; Ross & Morrison, 2003).

The biggest advantage of experiment research is its validity. The outcome of an experiment, if it is designed without bias or has not been tampered with, is its validity and rigour (Wogu & Wogu, 2014). The results of the variable manipulation can show, or not show, a correlation between the dependant and independent variable. The results are more quantitative in nature and are not subjective to the researcher's bias. As the variables are controlled, experiments can also be replicated, therefore outcomes can be verified to strengthen the legitimacy of the original findings (Bhattacherjee, 2012; Hyde, 2015).

A big disadvantage of experiment research is that its validity can be compromised if the instruments and design are not comparable across different studies. Experiments are also difficult to conduct and can be time consuming. If the theories are not framed well, it results in an inadequate hypothesis which results in an inadequate or misdirected experiment (Bhattacherjee, 2012; Bruggemann & Bizer, 2016).

3.4.3 Action Research

Action research is an immersive and sometimes iterative form of research that is used to bring about social change (Kemmis, 2010; MacDonald, 2012; McNiff, 2013). The research, sometimes a practitioner working in collaboration with a researcher, acts as a catalyst for change in a specific context (Clark et al., 2020; Masters, 1995). A situation or process is observed, change is made to create a desired outcome and the results are observed (Adelman, 1993). It can be an iterative process where changes can be made after multiple reflections back on the outcomes (Hine & Lavery, 2014).

An advantage is that it is a practical research method. Results can be observed very quickly and action can be taken just as quickly, due to the immersive nature of action research (Dresch et al., 2015). Another advantage of action research is that it can allow researchers to reflect and collaborate on common problems (Bolghari & Hajimaghsoodi, 2017). This allows for different perspectives and richer solutions (Bryant, 1995).

A disadvantage is that it is open to many biases and the action taken can be due to the researcher's or practitioner's own view of the situation or process (Coghlan & Brannick, 2005). The results can also only be viewed in that particular context due to the multiple variables at play (Cornish et al., 2023; Dresch et al., 2015).

3.4.4 Design Science Research

Design science research is unique because it does not just focus on understanding a problem, but looks at solving it as well (Absari et al., 2022; Venable et al., 2012). It can take the form of an artifact, a model, or a framework, where one of these is designed to improve our understanding of a particular problem or solving it (Carstensen & Bernhard, 2018; Elragal & Haddara, 2019). Design science can also focus on a problem at a high level and allow other researchers to use the designed artifact, model or framework in a way that applies to their particular context (Vom Brocke et al., 2020). The outputs derived from design science research generally comprise of four types, 1) Constructs, 2) Models, 3) Methods and 4) Instantiation (De Sordi et al., 2020; Geerts, 2011). Constructs define the problem through "languages and symbols" and how it will be communicated. Models use the constructs to design the situation or to frame the problem in the real world. Models "create the process" and provide a path to the solution of the problem. Instantiation is a working solution or artefact and an implementation of the construct, model and method (Ayanso et al., 2011; Henver et al., 2004).

A benefit of design science research is that it can solve actual problems in the world as opposed to other types of research that are more controlled or an expansion of literature (Haj-Bolouri, 2015).

3.4.5 Case Study

Case study research is used for when a researcher is trying to identify "How" or "Why" a phenomenon occurs (Baxter & Jack, 2008). The researcher needs to specify the boundaries of the study, as case studies take an in-depth view of a specific context (Crowe et al., 2011; Quintao et al., 2020).

There are predominantly three types of case studies: Explanatory – where the researcher looks to delve deeper into relationships between two or more things being studied, descriptive – where the researcher tries to describe, contextually, why something is happening, and exploratory, where the researcher tries to explore a particular occurrence, even though there may not be a specific answer to the question posed (Bartlett & Vavrus, 2017; Baxter & Jack, 2008).

The first advantage of a case study is that it occurs within a specific context, so it helps to gather a better understanding of that particular case and is not too broad of a study (Flyvbjerg, 2006). This is also an advantage because it helps to conduct further research in other contexts. Secondly, it allows for both qualitative and quantitative data, or a mix of both, depending on what the researcher feels best to answer their research question (Ridder, 2017). Lastly, case studies can help to understand complex relationships and have a deeper understanding of why something is happening in a specific context (Baxter & Jack, 2008; Lucas et al., 2018).

The first disadvantage of a case study is that the biasness of the researcher can filter through to the research, the analysis and the conclusions that come from it. The second disadvantage is that the research can be disregarded on the basis of it being just one case or too small of a sample size (Baxter & Jack, 2008). Lastly, it can be time consuming, with some case studies having to occur over a period of years to really have any validity (Harrison et al., 2017; Kekeya, 2021).

3.4.6 Grounded Theory

Grounded Theory is a strategy that works towards a theory that is created from "grounded" data collection and analysis (Cullen & Brennan, 2021; Khan, 2014). The concept behind Grounded Theory is that even though the researcher may have knowledge on the subject which they are researching, they should have no fixed biases or ideas that they want to prove right or wrong (Bytheway, 2018; Yu & Smith, 2021). The strategy involves the experiences of the participants being captured and coded, and the evolution of more data and thus, the final theory of the participants' experiences are derived from this (Charmaz & Thornberg, 2020; Mills et al., 2006).

3.4.7 Ethnography Research

Ethnographic research is grounded in the field of anthropology (Saunders et al., 2007). It is the study of the social aspects of the world including the behaviours, interactions, activities and beliefs that are created or adopted by societies, communities, or groups (Arnout et al., 2020; Reeves & Hodges, 2008). It can involve researchers immersing themselves in these societies, communities, or groups to gather a first-hand understanding of their environment (Gautam, 2016; Hammersley, 2006). Ethnographic research can be done through a combination of methods including observation, interviews and analysing existing artefacts (Reeves et al., 2013; Sangasubana, 2011). This process can be quite time consuming as it can take a period of weeks, months or even years to adapt to the activities of the studied group and gather enough of an understanding to be able to derive any conclusions (Morgan-Trimmer & Wood, 2016).

3.4.8 Archival Research

Archival research is the evaluation of historic or “archived” documents or materials (Brenna, 2023). Even though the term “historic” is used to describe this strategy, more modern and technologically advanced methods can also be used such as digital documents, emails or websites (Kim, 2022; Saunders et al., 2007). Archival research can be beneficial as it can recount information from primary sources and provide context around historic events (Tretreaualt et al., 2013).

3.4.9 Chosen research strategy for this study

The chosen research strategy for this study was surveys. Surveys can be a useful strategy when the researcher wants to understand “who, what, why and how” something happens (Saunders et al., 2007), which aligns with the objectives of this study. It is also helpful in trying to use a reasonable sample size when trying to gather findings about a large population, in this case South Africa as a country.

Interviews were the chosen data collection method. Interviews were chosen as they allow the researcher to have detailed discussions with the interviewees using a combination of the semi-structured interview method as well as open ended questions. Interviews are an excellent choice for this as they allow the researcher to ask follow up questions and prompt the interviewee with follow up questions to gain a deeper understanding of what they mean and why they feel the way that they do (Hofisi et al., 2014).

Interviews were chosen to be able to understand the level of financial literacy of people in South Africa, what challenges they experience in managing their money, and lastly what do they feel are possible gamification core drivers that would motivate them to be more financially literate in managing their money, and why.

3.5 METHODOLOGICAL CHOICE

Methodological choice, or choices, are the tools or instruments that a researcher uses to collect and analyse data. They are broadly divided into three categories (Saunders et al., 2007):

3.5.1 Qualitative

First, qualitative methods can be described as interpretive and non-numeric, and allow the researcher to ask how and why things happen (Agius, 2018; Hancock et al., 2009). Qualitative methods allow the researcher to provide contextual information to studies including emotions, beliefs and opinions (Alamri, 2019; Daniel, 2016). These methods can be interviews, case studies, focus groups or documents (Barret & Twycross, 2018; Tomaszewski et al., 2020). The advantages of qualitative research include that it can be adapted as new information develops during the study, it adds more detail and depth, data can be collected from a number of individuals or situations to ensure that the findings do apply to a larger population, and data gathered from "human experience" can be intriguing (Anderson, 2010; Rahman, 2017). Some disadvantages include that the validity of the study depends on the skill and experience of the researcher, evaluating the data can be time consuming, and responses from individuals may not always be accurate or can be influenced (Atieno, 2009; Rahman, 2017).

3.5.2 Quantitative

Second are quantitative methods, which can be described as numeric and accurate and include methods like experiments to get statistical and detailed data (Lakshman et al., 2000; Mohajan, 2020). Quantitative methods aim to identify relationships between variables (Barroga & Matanguihan, 2022) and data is analysed to understand patterns or trends in those relationships (Albers, 2017). Data gathered from quantitative methods can be measured and quantified (Mohajan, 2020). Advantages of quantitative methods include that the experiments and results can be replicated if the process has been documented accurately, and it can be used when data sets are large (Myers, 2009; Xiong, 2022). However, the limitations of quantitative methods include that they cannot always answer why specific relationships between variables exist, they can be too objective by overlooking specific circumstances, and can describe the relationships between variables at that particular time, providing only a small view of a larger concept (Rahman, 2017; Rashid, 2021).

3.5.3 Multiple Methods

The third option is where the researcher uses a combination of methods, both qualitative and quantitative, to collect and analyse the data (Saunders et al., 2007) (Battacherjee, 2012). Multiple methods allow the researcher to increase the amount of data collected and increase the validity of the data (Ngulube & Ngulube, 2022; Roomaney & Coetzee, 2018). This can also be useful where the researcher needs to unlock an initial part of research before being able to conduct the next part (Schoonboom & Johnson, 2017). Multiple methods are also beneficial because they add the valuable components of both qualitative and quantitative research to increase the quality of the study (Dawadi et al., 2021).

However, using multiple methods also has its disadvantages (Hafsa, 2019). Firstly, it could be costly both in terms of finances and time (Halcomb, 2018). Another reason is that qualitative and quantitative research are fundamentally different in their data collection and analysis, therefore trying to integrate them and derive coherent and clear conclusions might also prove to be difficult (Creswell & Garrett, 2008; Regnault et al., 2018). Lastly, when conducting the methods sequentially, data collected from one method might influence another affecting the outcome of the study (Dawadi et al., 2021).

3.5.4 Methodological choice for this study

The methodological choice for this study was a qualitative method, which was done through the use of surveys. This allowed the researcher to gather an in-depth understanding of what core elements of gamification would help participants to improve their money management and why, the challenges experienced in their lives that hinder the way in which they manage their money, and how they currently learn more about financial matters. Qualitative methods, as stated in Section 3.5.1, are the best to understand participants' motivations, feelings and opinions which align with the objectives of this study.

3.6 TIME HORIZONS

Time horizons describe the length of time in which a study will be conducted. There are typically two types of studies in relation to time horizons (Saunders et al., 2007):

3.6.1 Cross Sectional Studies

Cross sectional studies are studies that occur over a short period of time, where the research contributions occur within a "snapshot" of time (Kesmodel, 2018). Cross sectional studies can be advantageous, as they may be quick to set up and carry out, many factors or outputs can be assessed in the study in a short period of time, (Pandis, 2014) and because researchers can follow up on answers to questions at a later stage, if needed (Levin, 2006).

A disadvantage however is that, as it is only a "snapshot" of time, the outcomes of the research may differ if conducted in a different time period (Solem, 2015). Another disadvantage is that some studies, for example, studies of diseases or medicine, may show different effects over longer periods, which may not be captured within the time frame of the study (Wang & Cheng, 2020).

3.6.2 Longitudinal Studies

Longitudinal studies are studies that take place over a longer period of time, for example over a period of years or possibly longer (Caruana et al., 2015; Tarris et al., 2021).

A big advantage of longitudinal studies is that they help to track changes over time and can more accurately describe relationships and causation between variables (Bala, 2020; Carduff et al., 2015). Longitudinal studies can also be used to project or estimate change over time (Winiarska, 2017).

The first disadvantage is that research, especially when conducted with individuals, could become incomplete over time due to participants being anonymous (Audette et al., 2019), participants dropping out of the study, or participating occasionally (Nese et al., 2013). Another disadvantage is that studies conducted over a long period of time have a danger of being impacted by external variables that are not accounted for in the study, such as the frame of mind of the participant on one day versus a year later (Rajulton, 2001). Lastly, longitudinal studies by design are very time consuming, and as a result could become financially consuming as well (Moufdi & Mansouri, 2021).

3.6.3 Chosen Time Horizon

The chosen Time Horizon for this study was a Cross Sectional study as it was conducted through the use of once-off interviews and not conducted over a long time period. This aligns with the description of a Cross Sectional study as outlined in section 3.6.1

3.7 TECHNIQUES AND PROCEDURES

Techniques and procedures outline the tools used to collect data, detailing the sampling methods and size, and lastly explain the processes that the researcher uses to analyse the data (Melnikovas, 2018; Saunders et al., 2007).

3.7.1 Data collection Methods

Data collection is the process of gathering information through a specific method or multiple methods to provide answers in relation to a topic (Austin & Sutton, 2015; Taherdoost, 2021). Data collection methods are chosen in line with methodological choice (Kabir, 2016), as outlined in Section 3.5. As this is a qualitative study, the most commonly used methods to collect data in this type of study are listed in the sections below (Busetto et al., 2020; Polkinghorne, 2005).

3.7.1.1 Interviews

Interviews can be classified as a one-on-one interaction between an interviewer and an interviewee that is able to provide rich data via a list of preselected questions compiled by the interviewer (Paradis et al., 2016). As the interaction is often direct, the interviewer is able to follow up on questions and get a deeper understanding of the interviewee's position on the question asked (Alshenqeeti, 2014). It allows for in-depth discussion and is often helpful when concepts are confusing and need to be clarified or rephrased to gain a more accurate understanding (Hofisi et al., 2014).

There are three types of interviews: *"Structured"*, *"Semi-structured"* and *"Unstructured"* (Gill et al., 2008; Jebreen, 2012). *"Structured"* interviews are interviews where all of the questions are set before the interview occurs, and very little or no follow up questions or in-depth discussions take place (Elhami, 2022). This can either be in the form of a face-to-face interview or a paper or online questionnaire (Rashidi et al., 2014). *"Structured"* interviews can be administered relatively quickly, however they will lack in-depth reasons for the participant's choices (Ayala & Elder, 2011). *"Semi-structured"* interviews are interviews where the important questions are set by the interviewer, with room for discussion and elaboration on answers provided for the set questions (Ruslin et al., 2022). This allows the interviewer to have a level of direction when administering the questions, and also allows for participants to discuss why they chose the answers that they did (Stuckey, 2013). *"Unstructured"* interviews are where interviewers do not have any pre-set questions (Jamshed, 2014). They open the discussion by asking a general question and will let the discussion progress from there (Aborisade, 2013). *"Unstructured"* interviews can be helpful as they require little to no time to set up and allow a generous amount of time for discussion (Gill et al., 2008). However, this can also be seen as a disadvantage as there is no set time for the interviewer or participant to know when the interview has reached its end (Bihu, 2020). Another disadvantage is that, as there are no set questions or direction, the discussion could progress to topics not related to the intended interview, which could provide no data that contributes towards the research question (Gill et al., 2008).

3.7.1.2 Focus Groups

Focus groups is a type of data collection method where a researcher conducts a discussion on their research topic with a group of participants at the same time (Barret & Twycross, 2018; Powell & Single, 1996). The question or list of questions are posed to the group and the conversation, sometimes debate, develops (Massey, 2011). This can be beneficial as it allows the researcher to speak to multiple participants and gather multiple perspectives on a particular topic (Tausch & Menold, 2016). It could also develop data, through the building of ideas, that the researcher might not have initially considered (Acocella, 2011). It could be helpful to participants as well to be able to feel less intimidated in more of a group discussion, as opposed to a one-on-one conversation (Barret & Twycross, 2018).

Focus groups, however, do also have their limitations as the researcher might find it difficult and time consuming to capture all of the thoughts expressed in a focus group, resulting in some points not being captured (Blackburn & Stokes, 2000). Another limitation is that researchers need to be skilled enough to moderate the conversation and ensure that the group does not stray away from the objective of the focus group (Mishra, 2016) (Tausch & Menold, 2016). Individual group members could also agree with points being made by the larger group to confirm and not feel singled out (Nyumba et al., 2018). Lastly, it could also be difficult for more introverted members of the group, as they might feel too intimidated to speak up, especially if there are more dominant or vocal members in the group (Leung & Savithiri, 2009; Slovak et al., 2023).

3.7.1.3 Observations

Observation is a data collection method that allows a researcher to gather data through viewing and studying participants, objects or any type of phenomena, to understand their behaviour, the way they change over time, their activities and the habits that develop (Cowie, 2009; Kumar, 2022).

There are two main types of observation methods: participant observation and direct observation (Kawulich, 2012). Participant observation is where the researcher is also part of the study as a participant, as well as a researcher (Liukkonen & Astedt-Kurki, 1994). In direct observation, the researcher is not a participant; they just observe and have no interaction with the individuals or phenomena which they are observing (Kawulich, 2012).

Observation can be advantageous as it provides a clear and “natural” account of a particular occurrence and all information collected can be important (Saunders et al., 2007; Walshe et al., 2011). It can also have its limitations, as it might be difficult for a researcher to document all of the data while being in a natural setting. It can lead to researcher biasness if the researcher is “too close” to the situation being observed and because it can take a long time to observe an occurrence before any data emerges (Kawulich, 2012; Saunders et al., 2007).

3.7.1.4 Document Analysis

Document analysis is the process of reviewing written, printed or online papers, images, or files to collect data (Morgan, 2022; Paradis et al., 2016). This method allows the researcher to view pre-existing information as a way in which to derive meaning and gain knowledge. The researcher is required to interpret the data to contribute towards building additional knowledge, but the fact that the raw data exists means that it is a useful tool to collect data (Bowen, 2009). An added advantage is that because it already exists, it does not require a lot of time and money to gather. The focus of the researcher can solely be on interpreting the source (Cardno, 2018). Disadvantages of using document analysis, however, can include that it may be difficult to source from a legal or geographical point of view, or it might not have sufficient details, as it may not have been produced for the purposes of research (Saunders et al., 2007).

3.7.1.5 Chosen data collection method for this study

Face-to-face, semi structured interviews were chosen as the primary method for this study, as it allows for questions from the researcher to understand what core drivers of gamification would motivate participants, and it allowed for a discussion on why they chose those options. It also allowed for a discussion around financial literacy and money management. Participants were able to detail how they learn about these topics and the challenges which they face. This method of data collection allowed the researcher to ask follow up questions and have more in-depth discussions on topics that were not listed as questions but contributed to this study.

3.7.2 Pre-testing

Pre-testing is conducted to improve the quality of the data collection process by evaluating the process with a smaller sample of individuals. It allows the researcher to detect any issues early on that are related to, but not limited to, language, ambiguity or flaws in the testing process (Hilton, 2015; Hurst et al., 2015).

The questions used in the evaluation of financial literacy were pre-tested by a money management expert at a leading South African financial institution. The gamification questions around the core drivers were pre-tested by the gamification experts at a leading financial services provider in South Africa as well. A qualified copywriter also evaluated the questions to ensure that the language was simple and easily understandable.

3.7.3 Sampling

Sampling involves choosing a smaller group of individuals from a larger population to serve as a representation of that larger group's views and characteristics (Igwenagu, 2016).

Sampling is an important part of research due to the practicalities of attempting to conduct research with an entire population (Acharya et al., 2013). This is due to the fact that populations might to too large to speak to each individual within that population, the time it would take to gather information from each individual, being able to gain access to each individual might be difficult, certain studies might require things to be destroyed to be tested, and lastly the fact that research in large populations may lead to lazily collected data (Mujere, 2016; Singh & Masuku, 2013).

Broadly, there are two types of sampling techniques (Martinez-Mesa et al., 2016). The first technique is probability sampling, where participants are selected randomly and each individual or an item has an equal chance of being selected within a population (Adwok, 2015; Wisniowski et al., 2020). For example, in a population of 10 people, each individual has a 10% chance of being selected. The second technique is non-probability sampling, where there may not be an equal chance of selection for each individual within a population (Singh et al., 2023). The chances of selection of each individual or item is unknown. The selection process is determined by the process of the researcher and the probability is not as equal as it is in probability techniques (Ayhan, 2011). Non-probability techniques are commonly used in qualitative research (Taherdoost, 2016).

The following methods are associated with probability techniques (Taherdoost, 2016):

1) **Simple Random Sampling** – This sampling method involves the researcher having a defined list of the target population. From this list, participants or items are selected randomly through the use of a computer or a lottery method (Elfil & Negida, 2017).
2) **Stratified Sampling** - This sampling method involves dividing a population into sub-groups, called strata, of similar characteristics. These characteristics could include age, jobs or gender, amongst others. Once the strata has been defined and participants allocated, a participant or equal number of participants from each stratum is chosen. This gives the researcher equal representation across the entire target population (Etikan & Bala, 2017).
3) **Cluster Sampling** – This sampling method involves choosing a smaller geographical area like a region or community that can be representative of a larger population as a whole (Taherdoost, 2016).
4) **Systematic Sampling** – This sampling method involves first selecting a larger population then selecting a period, either a period of time or a specific number, that an individual or item will be selected at. For example, if the larger population is selected at 100 items, the researcher can choose a systematic sampling method to choose every 10^{th} item to be part of the study (Sharma, 2017).
5) **Multistage Sampling** – This sampling method involves the researcher starting wide and narrowing down the targeted population as the selection process progresses. Various methods can be used on different stages of the process (Etikan & Bala, 2017).

The following methods are associated with non-probability techniques (Taherdoost, 2016):

1) **Quota Sampling** – This sampling method involves identifying certain characteristics, conditions, or traits that the target population possesses. Once these characteristics, conditions or traits match with an individual or item, they can be selected to be a part of the target population (Etikan & Bala, 2017).
2) **Judgement Sampling** – Also known as purposive sampling, this sampling method relies on the judgement of the researcher to select individuals or items based on the researcher's thoughts, feelings and experiences (Etikan & Bala, 2017). It also involves the researcher choosing specific participants or groups of participants because they feel that they can add information that other participants may not be able to add (Taherdoost, 2016).
3) **Snowball Sampling** – This sampling method involves the researcher approaching their own network to conduct research and those within the network recommending others. This process then allows the number of participants to grow through this network of recommendations (Sharma, 2017).
4) **Convenience Sampling** – This sampling method involves choosing participants that are easily accessible to the researcher. This can sometimes involve the researcher choosing friends and family to be part of the research (Taherdoost, 2016).

3.7.3.1 Target population

The target population can be defined as individuals that match the criteria stipulated for a particular research objective (Banerjee & Chaudhury, 2010). It needs to be specific enough so that participants that match the criteria chosen will be able to provide insight to the research objective and to avoid having participants that do not represent the topic of interest (Enarson et al., 2004; Willie, 2022).

The target population for this study was South Africans over the age of 18. This was chosen as the research topic applied to all South Africans of an employable age that could legally earn an income and have money to manage. This study did not focused on a specific race, gender, or income bracket. As much as children are allowed to work from when they are fifteen years old in South Africa, the age of eighteen was chosen as it encompasses the legal practices around the minimum age for all types of work (Labour, 2022).

3.7.3.2 Sample size

The sample size refers to the number of participants chosen within the larger population to gather data from on behalf of the larger target population (Andrade, 2020). Sample sizes need to be chosen appropriately as this could affect the quality and validity of the data gathered (Gumpili & Das, 2022; Noordzij et al., 2010).

For qualitative research, Boddy (2016) claims that data saturation, the point at which no additional data can be found and themes would have sufficiently been found (Saunders et al., 2018), can be reached from a sample size of twelve. Hennink and Kaiser (2022) show that for interviews, which were used in this study, a sample size of nine to seventeen participants is sufficient. As the study focuses on all South Africans over the age of eighteen and that this range is quite broad, a larger sample size of twenty was chosen for the purposes for the study.

3.7.3.3 Sampling method chosen for this study

This study used a non-probability sampling method called the snowball sampling method. This involved the researcher reaching out to their immediate network and the network recommending more participants in their network (Naderifar et al., 2017; Noor et al., 2022). This was done to ensure that a wider demographic was chosen, rather than just the researcher's immediate network and social group. This sampling method was also chosen as prospective participants were much more receptive to being interviewed when they were convinced by a friend, colleague or someone within their personal network as opposed to a researcher. This was due to the questions being personal and relating to their financial situation, financial literacy, and motivations. Participants felt much more comfortable in proceeding with the interview when their friends, colleagues or personal network assured them that it was a legitimate study, it was not "too intrusive" and since the person that recommended them had already participated.

3.7.4 Data Analysis

Data analysis is the processing of cleaning and processing raw information gathered in a way that makes this information understandable and actionable, to be able to make decisions or develop theories (Kelley, 2022). Data analysis is an important part of research, as the validity of the research could be in question if the data is not processed well (Bhatia, 2018).

Some commonly used data analysis methods include (Warren, 2020):

1) **Content Analysis**: Where the researcher examines content in the form of recordings, text or journals, in relation to the context in which it was said or written (Zhang & Wildemuth, 2005).
2) **Narrative Analysis:** This involves the researcher analysing people's stories or experiences received either directly from conversations with individuals or from autobiographies (Earthy & Cronin, 2008).
3) **Thematic Analysis:** Where the researcher studies the data to look for "themes" or specific "patterns" that emerge (Dawadi, 2020).
4) **Discourse Analysis:** Where the researcher searches for deeper meanings in the interactions that they have with participants, in relation to the research questions (Earthy & Cronin, 2008). This can be either directly with the participants or through their letters or diaries (Taylor, 2013).
5) **Grounded Theory:** Where the researcher evaluates the data, to understand why something occurs, to be able to create a theory (Tie et al., 2019).
6) **Interpretive Phenomenological Analysis:** Where the researcher examines the "lived experience" of the participants and makes sense of their feelings and behaviour (Alase, 2007).

3.7.4.1 Chosen data analysis method for this study

The chosen data analysis method for this study was a thematic analysis. This allowed the researcher to look for patterns in the feedback to understand the challenges that people in South Africa face when it comes to managing their money, how they currently learn about financial matters and what core drivers of gamification will motivate them to manage their money better.

To conduct the data analysis effectively and efficiently, the "Framework Method" was chosen. The "Framework Method" provides a step-by-step guide to conduct thematic analysis (Goldsmith, 2021; Rosen et al., 2023).

The steps of the "Framework Method" as detailed by Gale et al. (2013) and how it was used in this study are outlined in below:

1) ***"Transcription":*** This step refers to the recording to the data as part of the collection process. The framework recommended that it is important to gather a "word for word" record of the interaction.

   As part of the data collection process, all interviews were captured via an audio recording mobile phone application and the researcher also captured notes on "Google forms" as well.

2) ***"Familiarisation with the interview"*:** This step refers to the process of revisiting the data that was collected and reflecting on the interaction. It is important for the researcher to have a clear understanding and familiarity with the data collected.

   This was done by the researcher by listening to the recordings multiple times, especially to try to understand whether there were any points that were not captured. Points made by the participants that were captured in the audio recording but not in the researcher's notes were recaptured in the notes, so that the data in both collection methods were aligned.

3) ***"Coding"*:** Coding refers to the understanding of the data and being able to derive both meaning and themes in the answers provided by the participants. It helps researchers to understand commonalities between participants and form comparisons between them as well.

   This was conducted by the researcher by creating "labels" on a spreadsheet once each question from each participant was analysed. Each "label" was created based on concepts that the participant mentioned and from the in-depth discussion of their answers.

4) ***"Developing a working analytical framework"*** – This step involved creating groups or categories based on the codes created. This is an iterative process as all codes need to be captured and grouped, therefore this process continues until the categories include all of the codes.

   This was done in a two-step process. Firstly creating "groups" for the answers for each of the interview questions and secondly to align each of the groups with the research questions. This was a really important step in this research study as participants mentioned concepts and reasons for particular questions before they were asked. This added to the richness of the data, however made it difficult to "code", as some answers to a research question were revealed when asking a question relating to a different research question. The researcher then looked at how many times a particular code appeared, which types of participants mentioned this particular code, and what were the possible reasons for mentioning those codes.

5) ***"Applying the analytic framework"*****:** This step involved "indexing" the relevant codes and categories against the transcripts that were captured, for easy analysis.

   As mentioned in Step Four, this had to be conducted multiple times as there were multiple codes, for the multiple research questions.

6) ***"Charting the data into the framework matrix":*** This step involved creating a summarised view of the data, which still contains enough detail to allow the researcher to start interpreting the data.

   This was done in a spreadsheet with "filters" that were created which provided both high level and in-depth views depending on the context that was needed. The researcher was able to filter by all profile information, codes derived, choices of gamification core drivers and answers to financial literacy questions.

7) ***"Interpreting the data"*****:** This step involved deriving findings from the data presented. The researcher needed to understand whether there were any patterns that emerged, connections between answers provided, and derived "deeper meaning" from the data.

   In this study, the researcher then looked at how many times a particular code appeared, which types of participants mentioned this particular code and what were the possible reasons for mentioning those codes. The researcher was able to find patterns in answers, gather reasons for answers and position the data in a way that provided answers to the research questions.

3.8 ETHICS

Ethics is an important component of research to ensure the validity of results, integrity of the researcher and protection of the rights of the participants (Sivasubramaniam et al., 2021; Zukauskas et al., 2017b).

All participants were asked to sign and submit a Participant Consent Form. The form outlined that the participant was willingly and knowledgably participating in this study. The form outlined what the information provided was be used for and that consent to their participation could be revoked. The research proposal detailing the nature of the study, a brief literature review, the interview questions and a motivation for the interview questions were submitted to the University of Pretoria Ethics Committee. An ethical clearance provided by the Committee can be found in Appendix B of this study. There were also not ethical issues that resulted from the data collected.

3.9 CONCLUSION

This chapter outlined the research methodology that was used in this study. A summary of this chapter can be found in the table below.

Research Methodology	**Method Chosen for this study**
Research Paradigm	Interpretivist
Research Approach	Deductive
Research Strategy	Survey
Methodological Choice	Qualitative
Time Horizon	Cross-Sectional
Data Collection Method	Face-to-face, Semi-Structured Interviews
Sampling Method	Snowball Sampling
Sample Size	Twenty Participants
Data Analysis Method	Thematic Analysis

Table 1: Summary of Research Methodology Chapter

4 ANALYSIS OF FINDINGS

4.1 INTRODUCTION

The primary research objective of this study was to understand what core drivers of gamification could be used to help South Africans to manage their money better. The secondary questions that this study aimed to answer were firstly, what are the challenges that South Africans experience that prohibit them from managing their money better and secondly what factors contribute to how they currently increase their level of financial literacy. This chapter carries out a detailed discussion of the data.

4.2 DATA COLLECTION METHOD

To collect data as part of this study, interviews were conducted with twenty participants. The questionnaire, found in Appendix A, was divided into four sections, firstly a "Profile Information" section that asked questions including age, gender, level of education, income, level of education and number of dependants, to understand whether these factors impacted their answers on gamification core drivers chosen or challenges experienced in managing their money. The second section included questions based on and adapted from international financial surveys that looked at how people felt about their financial situation (NCES, 2018; Warmath & Zimmerman, 2018). These surveys did not test for financial literacy, but looked at people's behaviour, their actions, and their attitudes towards managing their money. This section involved the researcher reading out a statement about financial actions and attitudes and the participant rating their feeling towards the statement on a range from "I completely disagree" to "I completely agree". Follow up questions were posed to the participant on why they rated the statement the way that they did. This section also involved three open ended questions to understand the challenges which they faced in managing their money, how do they learn more about managing their money and the process they currently go through to manage their money. The third section was a short financial literacy test based on Annamaria Lusardi's "Big Three" questionnaire, which is the international standard for measuring financial literacy (Lusardi, 2019). This was to understand the level of financial literacy of the participants and measure whether they matched up to their perceived levels of financial literacy. The last section of questions involved the researcher explaining what gamification is, explaining each of the core drivers in detail and how it could be applied to money management. The participants also had printed out or digital versions of each of the core drivers and were asked to pick the three that would best motivate them to manage their money better. Further follow up questions were asked as to why they made the choices that they did.

All interviews were one-on-one interviews and were either conducted in person or via Microsoft Teams for circumstances where transportation was not possible. All data was documented on Google Forms and all interviews were audio recorded. Interviews were chosen as they allow for a deeper discussion of the choices that the participants made. They also have the benefit of it being a one-on-one and anonymous discussion so that participants would feel free to discuss their financial literacy and the reasons for them experiencing challenges in managing their money (Hofisi et al., 2014).

4.3 ANALYSIS OF INTERVIEW DATA

This section provides a view and analysis of all of the data collected in the interviews. Data captured was detailed and summarised to be able to contribute towards further discussion and answering the research questions outlined at the beginning of the study.

4.3.1 Analysis of Profile Data

Age

Out of the twenty participants, eleven were between the ages of 25 – 35 (55%), eight were between the ages of 35 – 45 (40%) and one participant was between the ages of 18 – 25.

Gender

Out of the twenty participants, ten were male (50%) and ten were female (50%).

Level of education

Out of the twenty particiants, eight had completed a diploma (40%), six had completed a Bachelors degree (30%), three had Post Graduate degrees and three had only completed Matric. None of the participants failed to complete school or had a Phd.

Current Employment Status

Out of the twenty participants, sixteen (80%) were employed full time and four (20%) were freelancers. None of the participants were unemployed or worked part time.

Salary Range

Out of the twenty participants, five earned between R0 - R200 000 (25%), two earned between R200 001 – R400 000 (10%), three earned between R400 001 – R600 000 (15%), six earned between R600 001 – R800 000 (30%) and four earned between R800 001 – R1 000 000.

Number of dependants

Out of the twenty participants, eleven of the participants had no dependants (55%), four had one dependant (20%), three had two dependants (15%), one had three dependents (5%) and one had four dependents (5%).

All participants answered all of the questions. None of the "I prefer not to answer" options were selected for any of the question asked.

4.3.2 Analysis of Financial Behaviour - Statements

For this section, participants were provided with 17 statements and were asked to rate, on a scale from 1 to 5, whether they agree or disagree with the statement. In addition, participants were asked to, if they could, expand on why they chose they option that they did.

Scale	
1	I strongly agree
2	I disagree
3	I am neutral/In the middle
4	I agree
5	I strongly agree

Table 2: Scale for answers to interview questions

Statement 1: I have all the information I need to manage my money well.

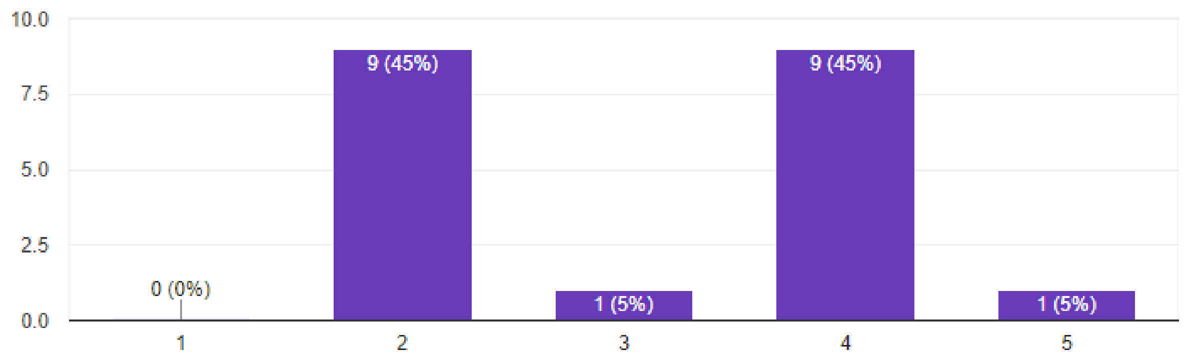

Figure 3: Responses to "I have all the information I need to manage my money well".

This was divided by very small margins as the majority of the participants either "agreed" (nine participants, 45%) or "disagreed" (nine participants, 45%). However, one participant (5%) also selected "strongly agree". So it can be claimed that more participants felt that they do have the information they need to manage their money well. The one participant that strongly agreed with this statement claimed that it was a "really long road to get there". One participant (5%) was "neutral".

Thirteen out of the twenty participants (65%) indicated that they are comfortable with "short term" or "day-to-day" money management, but lack knowledge on "long term" or "more advanced" topics such as investments, retirement plans, tax or legal topics around managing their money.

Five participants (25%) mentioned "banking terms", "jargon" and "lack of understanding" as reasons for not having the required knowledge to manage their money well.

Ten partipants (50%) mentioned that information available is very generic and does not cater for them specifically. They mentioned that their personal circumstances were not catered for. Two out of these ten participants mentioned that they feel that financial information only applies to the "rich and famous".

Four out of the twenty (20%) claimed that they do not actually want to manage their money at all. They were happy to let someone that they trust (one participant), a professional (two participants) such as their financial advisor (one participant), manage their money and assist with what needs to happen with respect to their finances. Three out of the four mentioned that this is the case because they don't "understand finances" nor do they want to learn. It seems “too difficult” and it is not something that interests them. The remaining one felt that it was too early to worry about "long term" decisions. They fell within the 25 - 35 age group.

Interestingly, out of the nine participants that indicated "I disagree" to this statement, two earn between R800 000 and R1 million, one earns between R600 000 and R800 000 and two earn between R400 000 and R600 000. All five have additional investments over and above their salary and they all mentioned additional financial topics, that were not mentioned by participants earning in the lower income range such as forex trading, crypto currency, retirement annuities and financing and leveraging options. The insight that is key here is that the more these participants knew, they more they felt they did not know.

Statement 2: I read more on how to manage my money well.

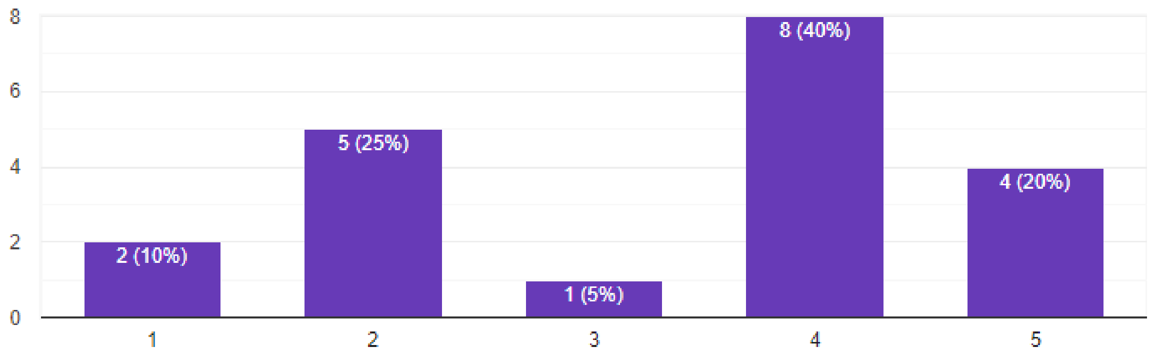

Figure 4: Reponses to “I read more on how to manage my money well”.

The majority of participants, twelve participants in total (60%), claimed that they do read more about how to manage their money, with eight participants (40%) stating that they “agree” and four participants (20%) stating that they “strongly agree” with the statement. Seven participants (35%) indicated that they don’t read more on how to manage their money well, with five participants (25%) indicating that they “disagree” and two participants (10%) “strongly disagreeing” with this statement.

Eight out of the twenty participants (40%) indicated that they only read when there is a "trigger" in their personal life, such as they need to buy a house or someone mentions a specific type of investment.

For this question, five participants (25%) mentioned that the terms used and their ability to understand money management jargon prevents them from reading more. Ten out of the twenty participants (50%) mentioned that information is very generic and does not cater to their circumstances.

Four participants (20%) of the participants mentioned that they don't really "bother with this stuff" as it does not interest them.

Statement 3: I reach out for help when it comes to managing my money.

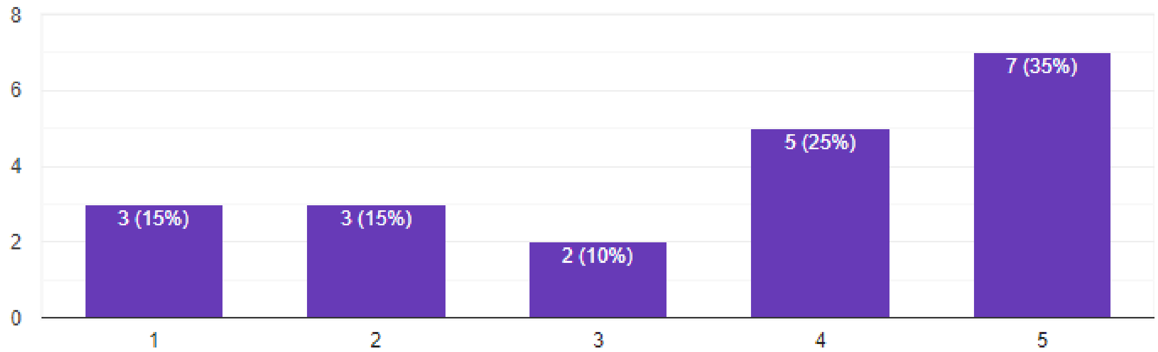

Figure 5: Responses to "I reach out for help when it comes to managing my money".

The majority of participants, twelve in total (60%), claimed that they do reach out for help, with four participants (25%) stating that they "agree" and seven participants(35%) stating that they "strongly agree" with this statement. Six participants (30%) claimed that they do not reach out for help, with three participants (15%) "agreeing" and three participants (15%) "strongly agreeing" with this statement. Two participants (10%) were neutral.

Seven out of the twenty participants (35%) indicated that they reach out to family members for advice including parents, grandparents, siblings and cousins.

Nine participants indicated that they reach out to a professional such as a private banker or financial advisor. As expected, of these nine participants, two earn between R400 000 - R600 000, four earn between R600 000 to R800 000 and three earn between R800 000 and R1 million.

Six participants indicated that they do not reach out for help at all. Four of these participants indicated that they do not reach out for help because they do not know who to reach out to either due to accessibility or trust. One participant mentioned that it is due to the fact that they are comfortable with where they are and know that their money will not go further.

Statement 4: I would say that I am financially savvy.

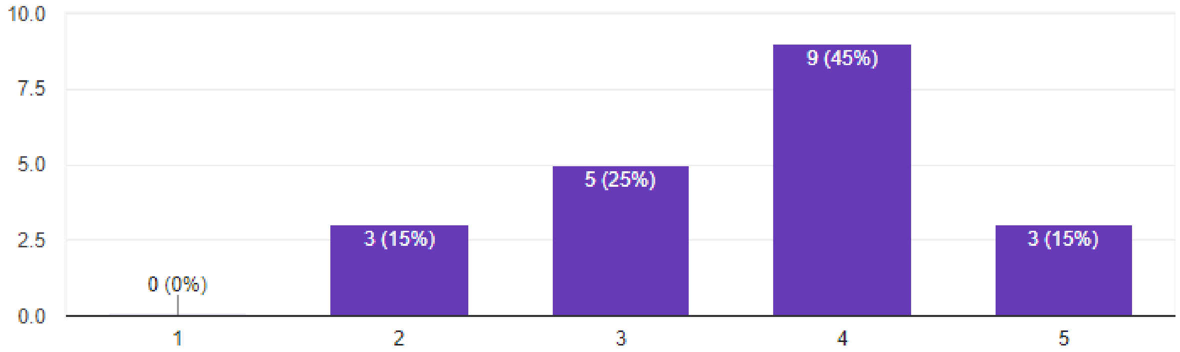

Figure 6: Responses to "I would say that I am financially savvy".

The majority of participants, thirteen in total (60%), claimed that they are financially savvy, with nine participants (45%) claiming that they agree and three participants (15%) stronly agreeing with the statement. Five participants (25%) were "neutral". Three participants (15%) claimed that they were not financially savvy with all three participants "disagreeing" with this statement. No participant "strongly disagreed" with this statement.

However, it was apparent throughout the research that the term "financially savvy" was down to the intepretion of the participant and the information they felt was sufficient about money management. (Morgan & Trinh, 2017) define "financially savvy" as "financial behaviour" and the ability to "take action" with regard to their money. The study describes these behaviours or actions as paying bills, planning for the future and choosing the right type of investment products, and how these actions can have a positive or negative effect based on the choices which the individual makes. Basically, it is described as the use of financial literacy to make financial decisions. Therefore, even though twelve participants (60%) in total indicated that they are "financially savvy", it might not necessarily be on the same scale. It seems to be more personal and is in respect to the type of decisions which the individual would make. For example, some participants felt that they were savvy because they were able to save every month, whereas others may spend more but they would be spending on necessary long time financial products. Thus, their definitions and actions would be totally different. To illustrate this point further, two out of the three participants that disagreed that they were financially savvy earn between R600 000 and R800 000 and have investments and other financial products. They felt that because they had these products, there was more details about financial matters that they did not know.

Four out of the five participants that stated they are neutral to this question claim that there would always be things they don't know or understand about financial matters.

Statement 5: I need help with managing my money and making financial decisions.

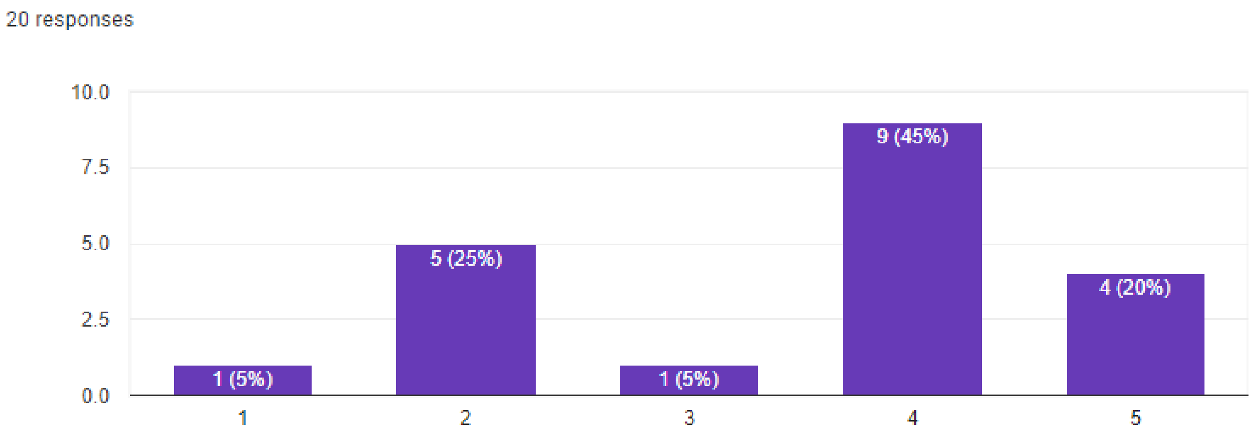

Figure 7: Responses to "I need help with managing my money and making financial decisions".

The majority of participants, thirteen in total (65%), claimed that they do need help with managing their money and making financial decisions, with nine participants (45%) agreeing and four participants (20%) strongly agreeing with this statement. Six participants (30%) claimed that they do not need help, with five participants (25%) "disagreeing" and one participant (5%) "strongly disagreeing" with the statement. One participant was "neutral".

The thirteen participants that claimed that they do need help due to reasons ranging from needing help with day-to-day items, like being in debt, budgeting and saving, to long term aspects of money management such as investments and retirement. The help needed differed depending on the financial position which the participant is in and what they felt was important to them right now.

Three out of the six participants that claimed that they do not need help said that the knowledge they have or that their family provides is sufficient to be able to make “good” financial decisions.

Statement 6: I save a portion of my income every month.

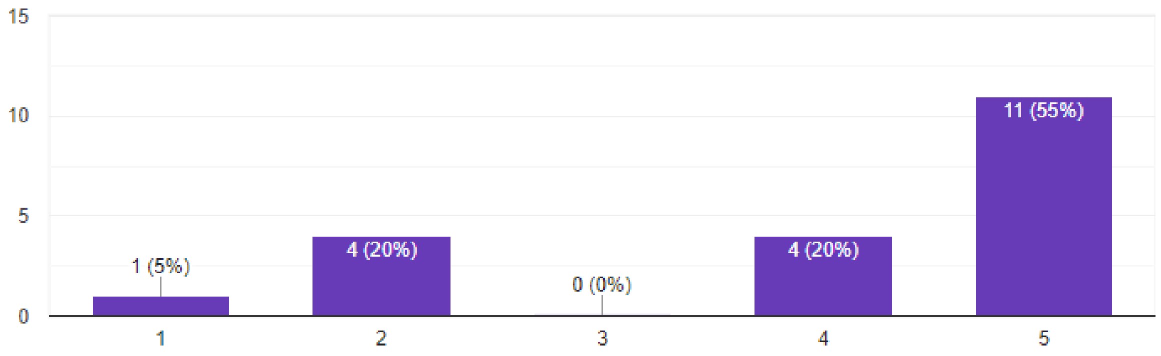

Figure 8: Responses to “I save a portion of my income every month”.

The majority of participants, fifteen in total (75%), indicated that they do save a portion of income every month, with four participants (20%) agreeing and eleven participants (55%) strongly agreeing with this statement. Five participants (25%) claimed that they do not save a portion of their income, with four participants (20%) “disagreeing” and one participant (5%) “strongly disagreeing” with the statement.

Two out of the five participants indicated that they disagree or strongly disagree with the statement, due to having very low salaries and the increasing prices in the country.

Statement 7: I create a budget every month.

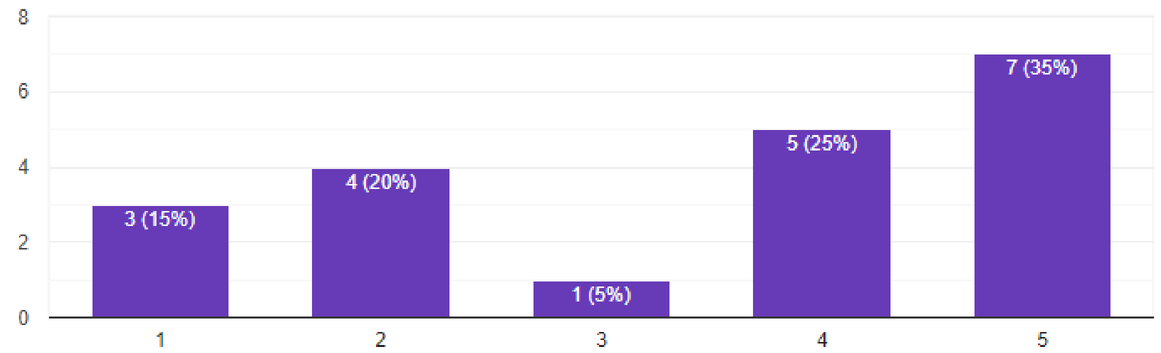

Figure 9: Responses to “I create a budget every month”.

Most participants, twelve in total (60%), indicated that they budget every month with five participants (25%) "agreeing" and seven participants "strongly agreeing" with the statement. However only seven (35%) of those have a formal budget. The remaining five (25%) have knowledge of their income and expenses and consider this as budgeting. The one (5%) participant that selected "neutral" conceded that their "budget" is not a formal one. Seven participants (35%) claimed that they do not create a budget every month, with four participants (20%) "disagreeing" and three participants (15%) "strongly disagreeing" with this statement.

Four (20%) out of the twenty participants do not budget because they feel that they are good at saving.

Statement 8: I am always able to spend less than I earn.

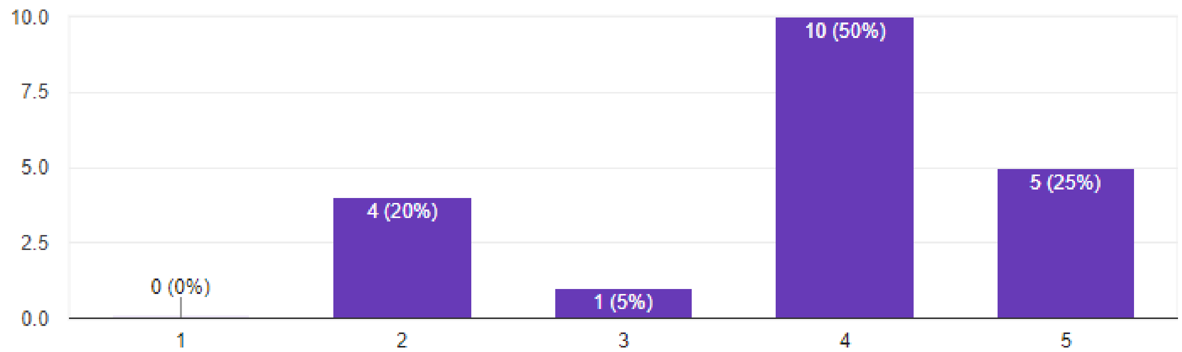

Figure 10: Responses to "I am always able to spend less than I earn".

The majority of participants, fifteen in total (75%), indicated that they are able to spend less than they earn, with ten participants (50%) "agreeing" and five participants (25%) "strongly agreeing" with this statement. Four participants (20%) claimed that they are not always able to spend less than they earn, with all four participants "disagreeing" with this statement. Just one participant (5%) was "neutral". No participants "strongly disagreed" with this statement.

All four participants (20%) that indicated that they are not able to spend less than they earn claimed that each month is different and changes in prices in the country affect them differently each month. This is not just due to low salary, as two of the four participants earn between R400 000 and R800 000 a month.

Statement 9: I am always able to put money into a savings accout, property or other types of investments.

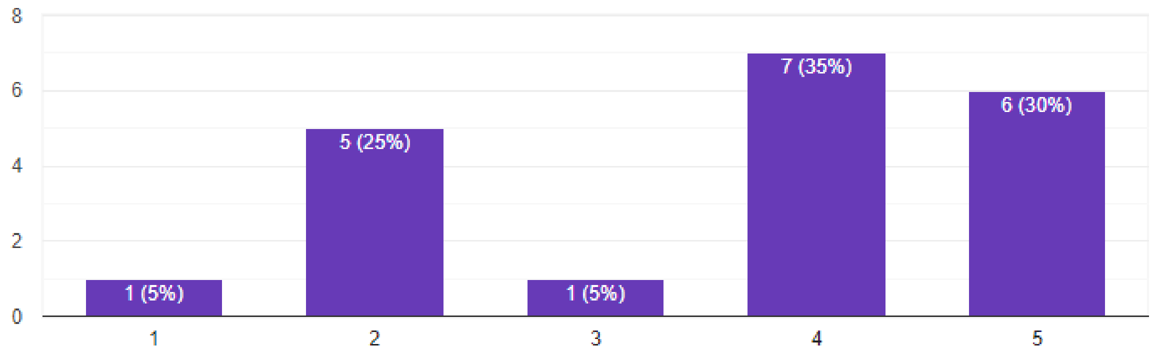

Figure 11: Responses to "I am always able to put money into a savings account, property or other types of investments".

The majority of participants, thirteen in total (65%), claimed they are able to invest, with seven participants (35%) "agreeing" and six participants (30%) "strongly agreeing" with this statement. Six participants (30%) claimed that they were not able to put money into any types of investments with five participants (25%) "disagreeing" and one participant (5%) "strongly disagreeing" with this statement. Just one participant selected "neutral" (5%).

Seven participants (35%) indicated that the only investment they have is a savings account. Only five (25%) out of the twenty indicated that they actively invest in property, shares or other types of investments, that is not a savings account.

Six participants (30%) indicated that they were not able to put money into any investment vehicles due to not having enough after expenses and putting more emphasis on short term, day-to-day needs.

One participant selected "neutral" and claimed that they were only recently able to afford to start investing because they recently received an increase.

Statement 10: When I retire, I will be able to continue my current lifestyle on the money that I have saved.

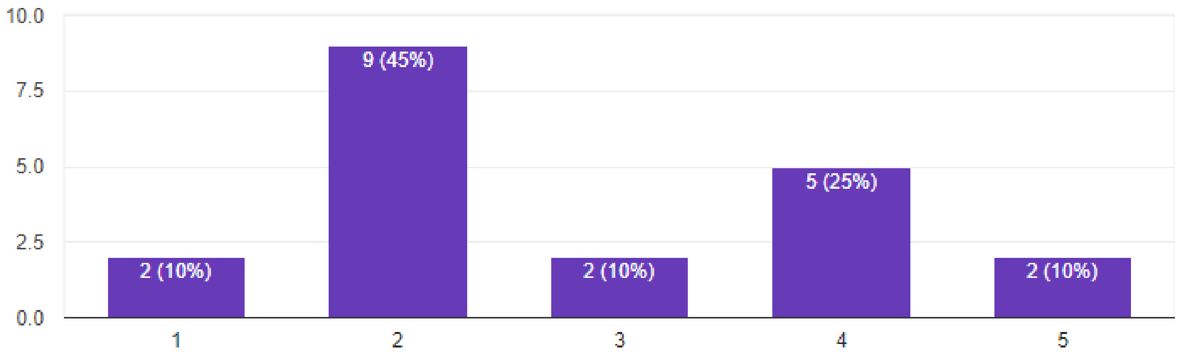

Figure 12: Responses to "When I retire, I will be able to continue my current lifestyle on the money that I have saved".

The majority of participants, eleven in total (55%), indicated that they will not be able to continue their current lifestyle when they retire with the money which they have saved, with nine participants (45%) disagreeing and two participants (10%) strongly disagreeing with this statement. Only seven participants, five (25%) agreeing and two (10%) strongly agreeing felt that they are currently, or on their way to be, on track to retire comfortably.Two participants (10%) were "neutral".

Six participants (30%) indicated that they are uncertain about what would be enough or whether or not they would be ready to retire.

Five participants (25%) indicated that they fear retiring and seven participants (35%) indicated that they have not started or not even thought about it as yet.

Statement 11: I am able to withstand increasing prices in the country including interest rates, fuel, electricity and other increases.

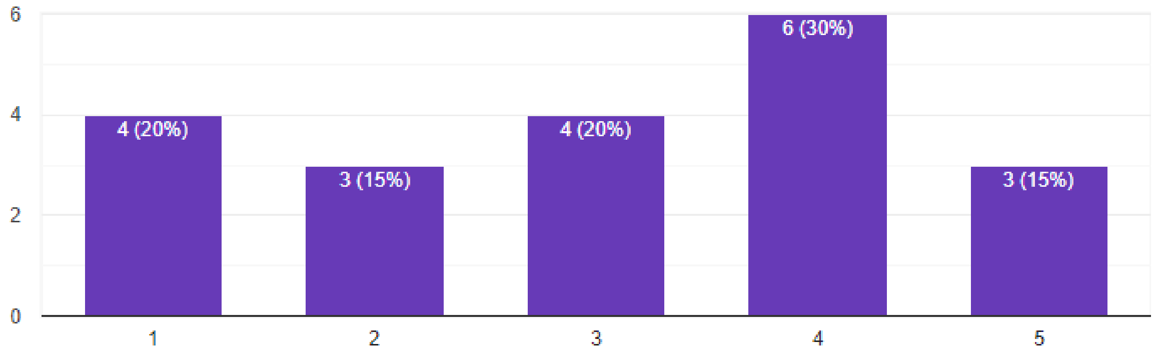

Figure 13: Responses to "I am able to withstand increasing prices in the country including interest rates, fuel, electricity and other increases".

This was just a slight majority with nine participants (45%) in total claiming that they are able to withstand these increases, with six participants (30%) "agreeing" and three participants "strongly agreeing" (15%) with this statetment. Seven participants (45%) claimed that they are not able to withstand these increases, with three participants (15%) "disagreeing" and four participants (20%) "strongly disagreeing" with this statement. Four participants (20%) selected "neutral".

Seven participants that indicated that they are not able to withstand the increases due to both their salaries as well as the rapid increases in the country. Of the four participants (20%) that selected "neutral", one (5%) indicated that it is due to their low salary, one (5%) indicated that it is due to how frequently prices change, one (5%) indicated that they just barely make it every month and one (5%) indicated that they only made it due to getting an increase recently.

Statement 12: If there is an emergency, I have at least 3 months of income saved.

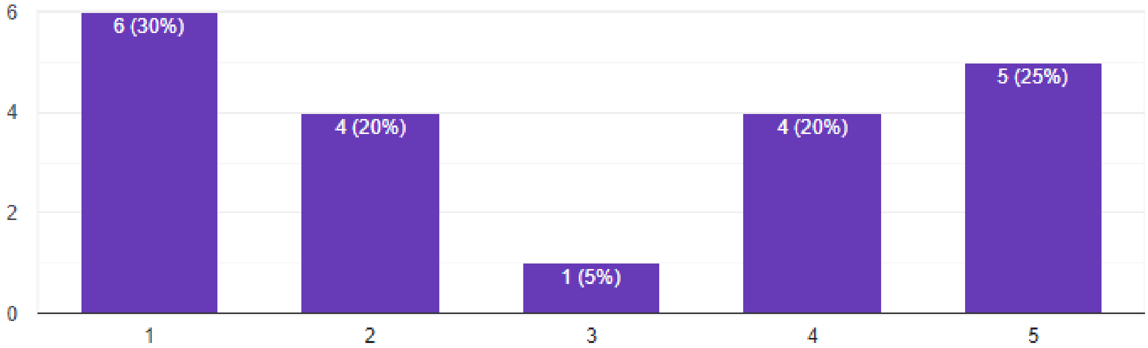

Figure 14: Responses to "If there is an emergency, I have at least 3 months of income saved".

This was just a slight majority with ten participants (50%) claiming that they do not have three months of income saved, with six participants (30%) "strongly disagreeing" and four participants "disagreeing" with the statement. Nine participants (45%) claimed that they do have three months of income saved with four participants (20%) "agreeing" and five participants (20%) "strongly agreeing". Just one participant selected "neutral".

Of the nine participants (45%) that indicated that they do have enough income saved, three participants earn between R800 000 and R1 million, two earn between R600 000 and R800 000 and two earn between R400 000 and R600 000. Therefore it does seem to indicate that the more money the individual earns, the more they can save.

Statement 13: I am able to prioritise buying just the items that I need.

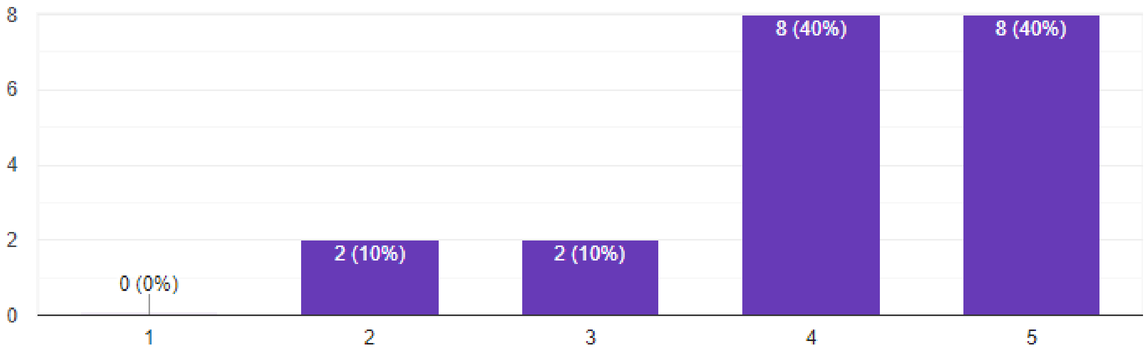

Figure 15: Responses to "I am able to prioritise buying just the items that I need".

The majority of participants, sixteen in total (80%), claimed that they do prioritise buying just the items that they need, with eight participants (40%) "agreeing" and eight participants (40%) "strongly agreeing" with the statement. Two participants (10%)

“disagreed” with the statement and two participants (10%) were “neutral”. None of the participants selected “strongly disagree”.

No further key findings or themes were found from these questions, as most participants did not choose to elaborate further.

Statement 14: I always consider whether I really need an item before buying it.

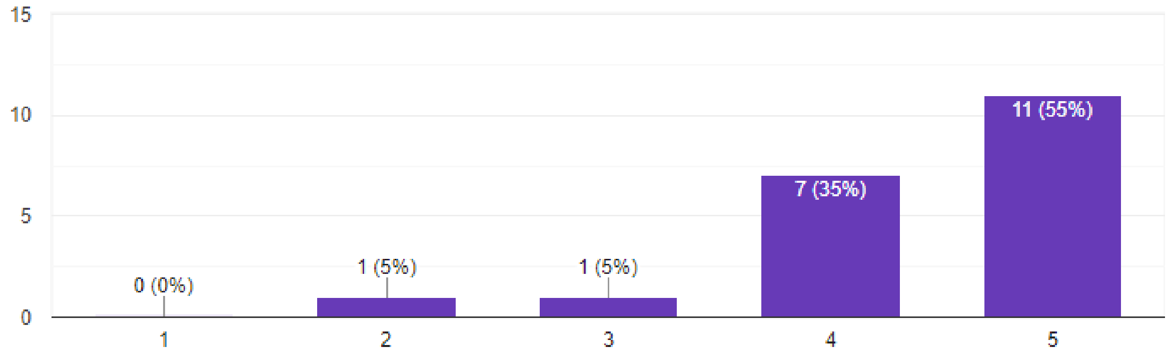

Figure 16: Responses to “I always consider whether I really need an item before buying it”.

The majority of participants, eighteen in total (90%), claimed that they do always consider whether they really need an item before buying it, with seven participants (35%) “agreeing” and eleven participants (55%) “strongly agreeing” with the statement. Just one participant (5%) “disagreed” with this statement and one participant (5%) was “neutral”. None of the participants selected “strongly disagree”.

No further key findings or themes were found from these questions as most participants did not choose to elaborate further.

Statement 15: I always compare prices before buying an item.

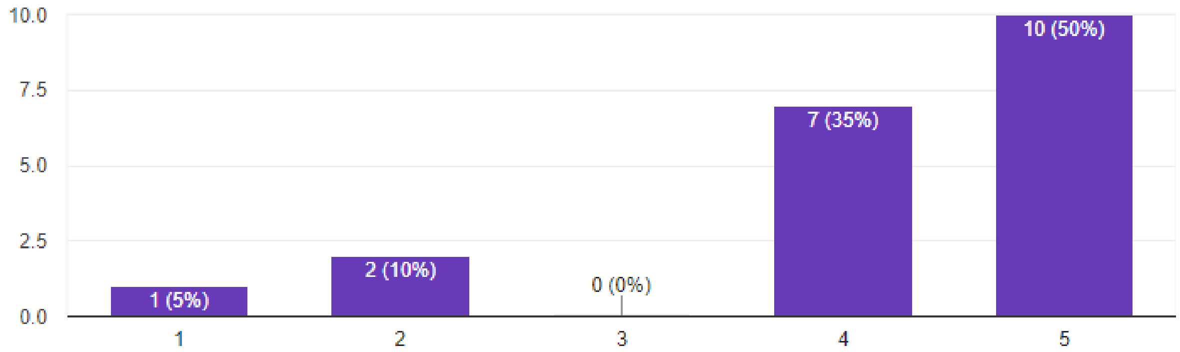

Figure 17: Responses to "I always compare prices before buying an item".

The majority of participants claimed that they do always compare prices before buying an item, with seven participants (35%) "agreeing" and ten participants (50%) "strongly agreeing" with the statement.

Four participants (20%) claimed that it depended on the item and there would be certain things that they decided to spend more on depending on what was important to them. One participant also raised the point of sometimes spending more on an item of higher quality so that it lasts longer. This raises an important question with regard to this statement, which would be better for money management – choosing a cheaper option right now that may not last long, or choosing an expensive option that would last longer? It does come back to the point which the participants made about being dependent on the item being bought, but it is an important point as to how an individual manages their money "well".

Another participant commented that they save more when shopping online as it is "easier to compare" by clicking on multiple products and comparing on different tabs. However, shopping in store requires a lot of traveling around and remembering places and prices which makes it quite difficult.

Statement 16: I use digital platforms like websites and apps to help me learn more about money management.

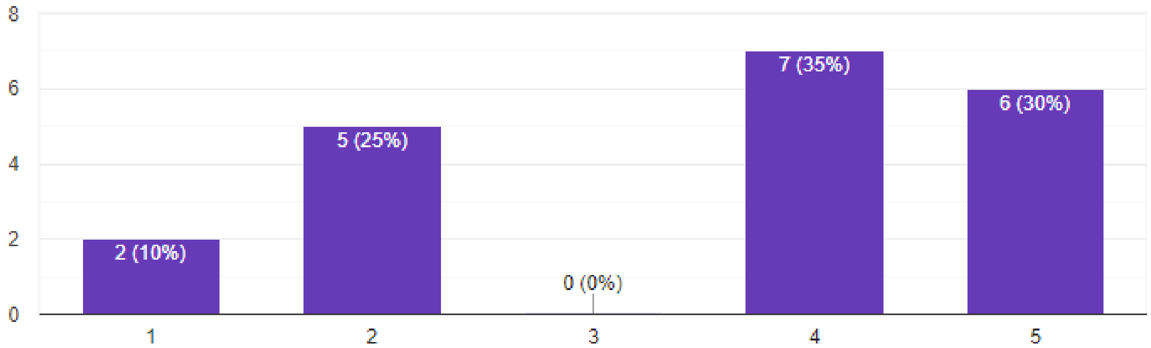

Figure 18: Responses to "I use digital platforms like websites and apps to help me learn more about money management".

The majority of participants, thirteen in total (65%), claimed that they do use digital platforms like websites and apps to learn more about money management, with seven participants (35%) "agreeing" and ten participants (50%) "strongly agreeing" with the statement. Seven participants (35%) claimed that they do not use digital platforms to learn more about money management, with five participants (25%) "disagreeing" and two participants (10%) "strongly disagreeing" witht this statement. None of the participants selected "neutral".

Four participants (20%) indicated that they do not use digital platforms because they are too difficult to understand and not relevant to them.

Two participants (10%) indicated that they would still prefer their family over any digital platform because they understand their circumstances and have ease of access.

Statement 17: Information online is sufficient to help me learn more on how to manage my money better.

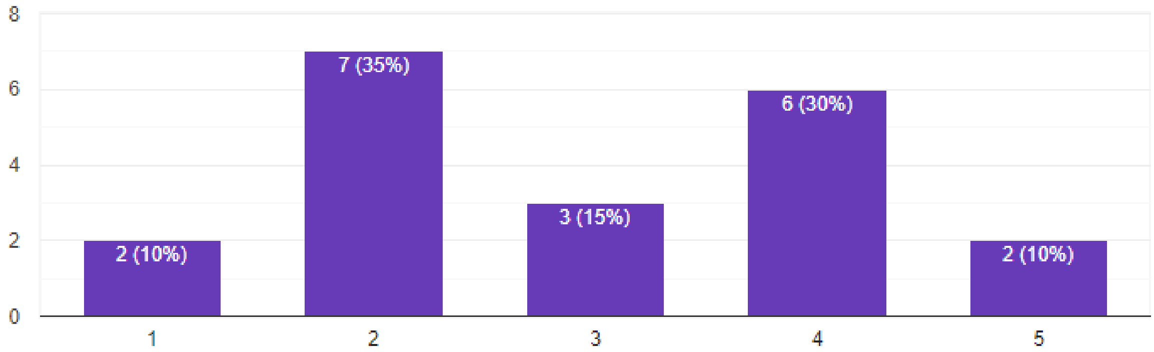

Figure 19: Responses to "Information online is sufficient to help me learn more on how to manage my money better".

There was a slight majority towards people indicating that information online is not sufficient to help them learn more on how to manage their money better, with nine participants (45%) indicating that they either "disagree" (seven participants (35%)) or "strongly disagree" (two participants (10%)). Eight participants (40%) indicated that they either "agree" (six participants (30%)) or "strongly agree" (two participants (10%)) that information is sufficient. Three participants (15%) selected "neutral"

Four participants (20%) indicated that they don't understand information online due to banking terms, jargon and concepts with which they are not familiar.

Twelve participants (60%) indicated that information online is not always relevant to their situation and does not take their circumstances into account. These participants felt that there were nuances to their journey and that the information provided is very generic.

Four participants (20%) indicated that they do not trust information online, as it is either a scam where people try to "hook you in" and steal your money, or banks trying to sell you products which you do not need.

Two participants (10%) indicated that they don't even know if the information is sufficient because they do not know where to find it.

4.3.3 Analysis of Financial Behaviour – Open Ended Questions

This section presents the data collected through the open-ended questions included in the interview.

Open Ended Question 1: What are the biggest challenges that impact your ability to manage your money in the best possible way you can?

Ten participants (50%) claimed that "lacking knowledge" and "education" on what to do with regard to their money, and lacking knowledge on how to begin growing it is the biggest challenge. The topic of "circumstances" and "relevance" came up in this discussion as well. There are many nuances to this as these participants just did not know where to begin. Their challenge was the basics and intermediate concepts of money management. On the other hand, four participants (20%) had challenges with growth and knowledge about planning for the long term. The growth aspect was discussed at length, as two participants (10%) felt that banks and financial institutions "put people into a box". They felt they were not able to take big steps because the information provided only catered for where they were right now, not where they wanted to be. Both of these participants wanted to become millionaires through investing, however felt that banks and financial institutions provided basic information on savings and retirement based on what banks and financial institutions felt they needed, not what the individual wanted. Another participant (5%) indicated that they want to invest, but do not want to take risks, so for them it was more about steady growth as opposed to just becoming a millionaire.

Six participants (30%) indicated that lacking "discipline" was their biggest challenge. One participant (5%) indicated that it was due to the fact that they plan poorly and do not budget and another participant (5%) indicated that the lack of discipline was due to "social behaviour". One participant felt that the need for "young people" in South Africa to "show off" on nights out was a big part of their overspending. Another participant felt that the more they earned, the more they "wanted to enjoy life".

Six participants (30%) also indicated that the "cost of living" and the "increasing prices" in the country were their biggest challenges. In addition to this, three participants (15%) mentioned that "low salary" was their biggest challenge. Two participants stated that it is difficult to manage their money every month because prices increase but their salary never increases.

Five participants (25%) mentioned that “taking care of family members” was a challenge for them. Two participants mentioned that “Black tax” was hard on them because, as eldest children within the family, the responsibility fell on them to take care of parents and grandparents. All five participants mentioned that they do want to take care of their family and felt proud of that responsibility, but it did factor into how they budget and make financial decisions.

Four participants (20%) mentioned unexpected “items” or “emergencies” as a challenge. These included situations such as medicial emergencies, car maintenance like replacing tyres, or items that their children needed for school including fees, books or excursions.

One participant (5%) mentioned that is was the “fear” of their current situation that posed their biggest challenge.

Four participants (20%) indicated that not being interested in financial matters is a challenge for them. This makes it difficult as they know they need to do it, and they do the basic tasks such as paying bills, but have no interest in doing anything over and above that.

One participant (5%) indicated one of their challenges was having an overview of their finances. Their salary, expenses and investments sat in different places so having a consolidated view that allowed them to make decisions effectively is difficult.

Open Ended Question 2: How do you currently learn more about how to manage your money?

Eight participants (40%) mentioned that they do not actively try to learn more about managing their money, either because their jobs give them the information they need (two participants (10%)), they are comfortable with the way they manage their money having learned their behaviour through their experiences (one participant (5%)), or they do not have enough money to manage or make decisions with (one participant (5%)). The last participant indicated that once their bills are paid, there is no money left therefore there is no point in learning about money management.

Seven participants (35%) indicated that they learn through friends and family.

Six participants (30%) indicated that they only attempt to learn about something financially related when it applies to them or they need to do something specific. For example, their bills are too high, they need to buy a house or need to make an investment.

Six participants (30%) mentioned that they learn more by "searching online" or reading "online articles".

Three participants (15%) mentioned that they get their information from banking apps or other financial apps.

Five participants (25%) mentioned that they get their information from a financial advisor or a banker.

Three participants (15%) mentioned that they learn by viewing random social media posts on Instagram or Twitter.

Two participants (10%) mentioned that they read books on money management and ensure that the information is from recognised and successful authors.

Only four participants (20%) actually make a concious effort every month to learn more about new ways to manage their money, by actively reading articles on Bloomberg or trying to find podcasts.

Four participants (20%) mentioned that "there is always something that you do not know" in relation to financial literacy. Therefore, for some, there is a comfortability in just not having more financial literacy.

Open Ended Question 3: Can you talk about the process that you go through to manage your money?

Four participants (20%) have a formal budget through the use of digital tools or apps. All four of these participants take money management very seriously and ensure that every cent is tracked. One participant (5%) mentioned that they felt it was important to track constantly to measure whether or not they were aligned to their future goals, and having this information would allow them to make changes where needed.

Three participants (15%) have a formal budget through the use of writing things down in a book at least once a month. All three participants sit down (with the help of partners) once they get paid to plan their forecasted expenses against their income and to plan against future goals or bigger purchases.

Interestingly, out of the seven participants (35%), four participants (20%) earn between R600 000 and R800 000 and three participants (15%) earn between R800 000 and R1 million. This could lead to two possible insights, either 1) People earn more because they budget, or 2) People budget because they earn more.

4.3.4 Summary of findings of Financial Behaviour Questions

A summation of the reasons provided for each of the answers in the interview and categorised by which secondary question they can relate to can be found in the table below:

Question	Contributes to Financial Literacy	Challenges that affect the way people money their money
1) I have all the information I need to manage my money well.		• Lack of knowledge on long term aspects • Lack of understanding – banking, financial jargon • Information is not specific • Not concerned about learning more
2) I read more on how to manage my money well.	• Information is only needed when there is a "trigger" or life event	• Financial jargon
3) I reach out for help when it comes to managing my money	• Information from family/friends • Private banker/Financial advisor • Do not reach out at all (No one that they trust or are comfortable with)	• Not having enough money to make it go further
4) I would say that I am financially savvy		• Interpretation of the term "Financially savvy"
5) I need help with managing my money and making financial decisions	• Information provided by family/friends is sufficient	• Needs help on longer term, advanced aspects of financial managent • Contextual to their life stage
6) I save a portion of my income every month		• Low salaries • Increasing prices in the country
7) I create a budget every month		• Do not create a budget, "feel" the way they spend is sufficient
8) I am always able to spend less than I earn		• Low salaries • Increasing prices in the country
9) I am always able to put money into a savings accout, property or other types of investments		• Not enough money to invest, focus on short term needs • Lack of knowledge on investing
10) When I retire, I will be able to continue my current lifestyle on the money that I have saved	• Not enough knowledge on how much would be enough • Feels like it's too early	• Lack of knowledge on where to start
11) I am able to withstand increasing prices in the country		• Low salary • Increase in prices

including interest rates, fuel, electricity and other increases		
12) If there is an emergency, I have at least 3 months of income saved		• Do not earn enough
13) I am able to prioritise buying just the items I need	No contributing data	No contributing data
14) I always consider whether I really need an item before buying it	No contributing data	No contributing data
15) I always compare prices before buying an item		• Understanding whether buying a cheaper item that does not last versus an expensive item that lasts • Effort and time to compare items
16) I use digital platforms like websites and apps to help me learn more about money management	• Digital platforms, mostly searching on Google • Family/Friends	• Does not cater for their specific circumstance • Not easy to use/find information
17) Information online is sufficient to help me learn more on how to manage my money better	• Insufficient information • Don't know where to look	• Financial terms/Jargon/Not familiar with the concepts • Not relevant to their circumstances • Distrust of banks and financial institutions
18) What are the biggest challenges that impact your ability to manage your money in the best possible way you can?		• Lacking knowledge, education, don't know where to start • Information not revelent or catered to their circumstance • Lack of discipline • Cost of living, increasing prices • Low salary • Taking care of family members • Unexpected costs/emergencies • Fear of current circumstance • Not interested in money management at all • Having an overview of their finances
19) How do you currently learn more about how to manage your money?	• Learn through their jobs • Learned through life experiences • Do not have enough money to manage or do anything extra with • Family/Friends • Want to learn only when there's a trigger or life event • Search online/Online articles • Social media	• Do not have enough money to manage or do anything extra with

	• Banking apps/Services/Banker/Financial Advisor • Read books on financial management • Online podcasts, videos	
20) Can you talk about the process that you go through to manage your money?		• Informal budget • No budget at all

Table 3: Summary of answers to Financial Behaviour questions

Based on Table 1 and overall data collected from the interviews, the following themes stand out as challenges that prevent individuals in this study from managing their money well:

1) Lacking knowledge or education
2) Personal circumstances or goals not catered for
3) Financial jargon
4) Lacking discipline
5) Increasing prices/cost of living
6) Low salary or not having money to manage
7) Taking care of family members
8) Unexpected costs or emergencies
9) Fear of their current situation
10) Lack of interest
11) Having an overview of their finances
12) Lack of trust or comfortability with banks or financial institutions

Table 4: Summary of challenges that affect the way people manage their money.

The following themes stand out in contributing to an individual's financial literacy:

1) Information from family and friends
2) Information from financial advisors and bankers
3) Life Experiences
4) Information gathered when a trigger or life event occurs
5) Searching online/Online articles
6) Social Media
7) Learning through their jobs
8) Banking or financial institution apps
9) Reading books
10) Online videos/Podcasts

Table 5: Summary of factors that contribute towards financial literacy.

4.3.5 Analysis of Financial Literacy Test

The Financial Literacy test by (Lusardi, 2019) is the international standard for measuring financial literacy. Participants were asked to select the options that they thought were right after reading or hearing the question.

Only six participants (30%) answered all questions correctly. Out of these six participants, three participants (15%) had diplomas, two participants (10%) had Bachelor's degrees and one participant (5%) had a Post Graduate Degree. Out of the same six participants, one participant (5%) earned between R0 and R200 000, one participant (5%) earned between R400 000 and R600 000, three participants (15%) earned between R600 000 and R800 000 and one participant (5%) earned between R800 000 and R1 million.

Question 1: Suppose you had R100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

The right answer: More than R100

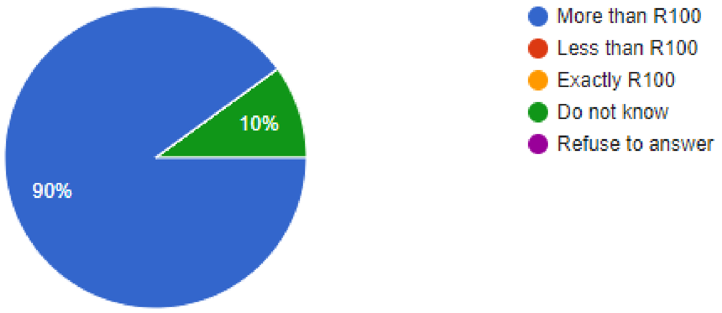

Figure 20: Responses to Financial Literacy Test Question One

Eighteen participants (90%) answered the question correctly. Two participants (10%) claimed that they did not know and no participants answered the question incorrectly.

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

The right answer: Less than today

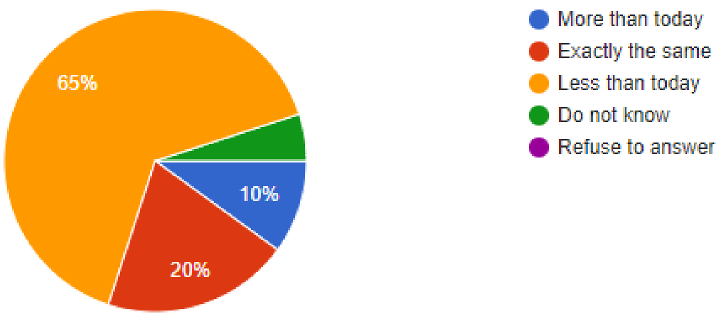

Figure 21: Responses to Financial Literacy Test Question Two

More participants struggled with this question with only thirteen participants (65) answering this question correctly. Six participants (30%) answered this question incorrectly, with four participants (20%) stating that the answer was “Exactly the same” and two participants (10%) stating that it was “More than today”.

Participants took their time with this question, often asking the researcher to repeat the question multiple times. As the first question was straightforward in terms of "savings" and understanding the interest rate, participants answered quickly. With this, participants took their time and sometimes struggled with having to compare interest rates with inflation and the relationship between the two.

Question 3: Please tell me whether this statement is true or false. "Buying a single company's stock usually provides a safer return than a stock mutual fund."

The right answer: False

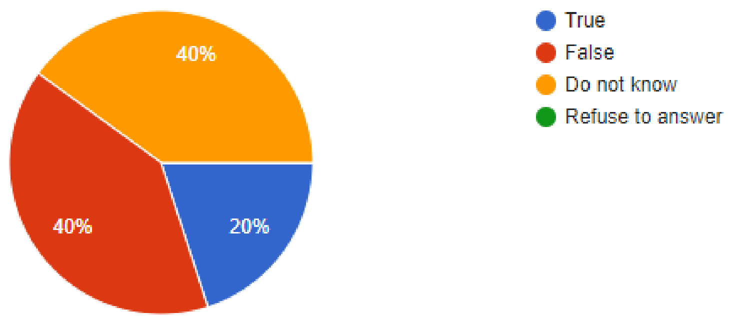

Figure 22: Response to Financial Literacy Test Question Three

Only eight participants (40%) answered this question correctly. Eight participants (40%) claimed that they did not know and four participants (20%) answered incorrectly.

Unlike with the second question, where participants took time to weigh up and compare the answers, the eight participants (40%) really just claimed that they did not know the answer to this question as they did not know much about investing. Even the four participants that answered the question incorrectly, answered to "just take a chance" as opposed to making an informed decision. Even with the eight participants that answered correctly, only four were really confident in their decision.

4.3.6 Analysis of Gamification Questions

In this section of the interview, the researcher explained what gamification is, what the Octalysis Framework is, what are the eight core drivers, examples of eight core drivers in gamification and how each can be used in a money management context. Participants were asked to select three core drivers based on the explanation and discuss why they chose each driver. The complete explanation can be found in Appendix A.

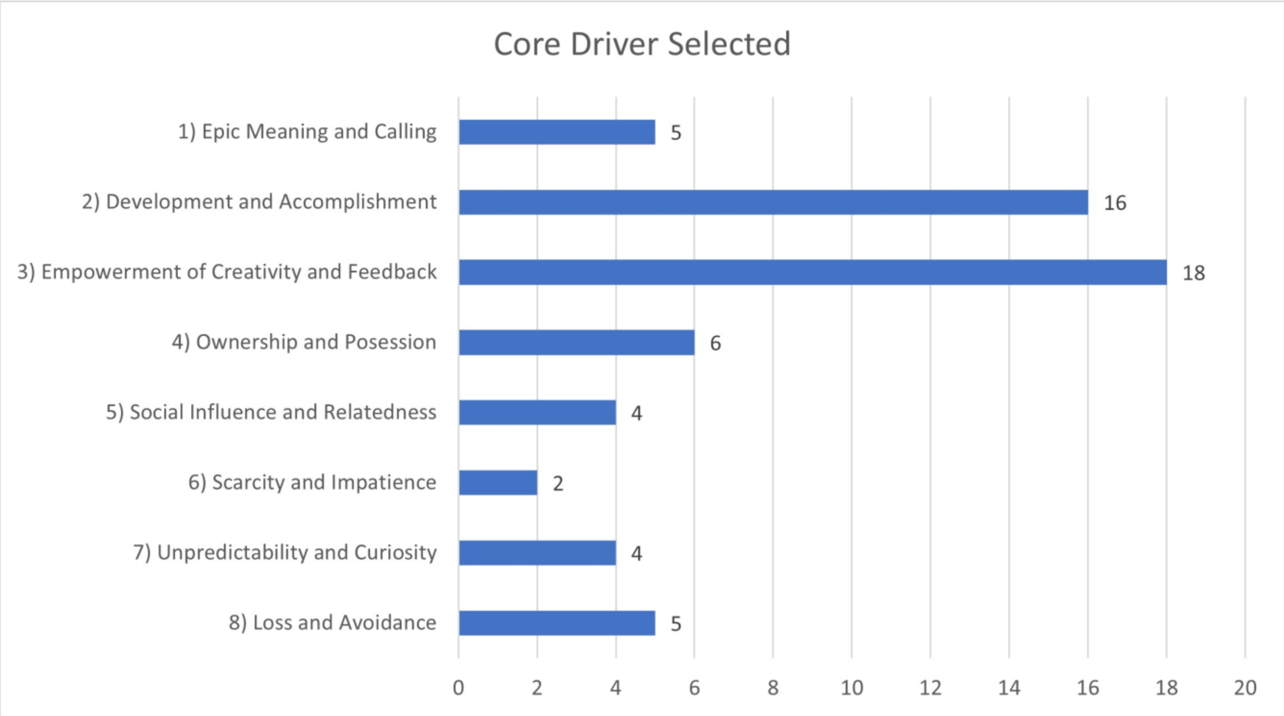

Figure 23: Responses to Gamification Core Driver selection

The most chosen core driver was *Core Driver 3: Empowerment of Creativity and Feedback,* with eighteen participants (90%) selecting this option. All eighteen participants that chose *Core Driver 3: Empowerment of Creativity and Feedback* stated that they chose this option because in a money management context, it would be great for them to get feedback on their financial journey and advice on how to improve. All eighteen participants claimed that “personalised”, “contextual” or “relevant” information is exactly what they are looking for right now to help them to manage their money; they feel that contextual guidance is missing. Ten out of these eighteen participants (56%) also mentioned that the “creativity” part of this core driver also appealed to them, because it would allow them to take the feedback provided and try different things that appeal to them. The combination of the “guidance” and the freedom that they feel that this core driver could bring was a massive deciding factor.

The second most chosen core driver was *Core Driver 2: Development and Accomplishment,* with sixteen participants (80%) choosing this option. Eight of the sixteen participants (50%) that chose *Core Driver 2: Development and Accomplishment* said that this appealed to them because they would enjoy or appreciate receiving any type of reward, be it a financial reward, points, badges, or a trophy. Participants also mentioned that if the reward was specifically a financial reward, it would show the benefits of any time, effort, or knowledge they put towards managing their money better. Six of the sixteen participants (38%) claimed that they chose this driver because they like the feeling of “winning”, with one participant claiming that when it comes to gaming, they do not sleep until that reward is received. Six of the sixteen participants (38%) claimed that the core driver appeals to them because it speaks to “being recognised” and having a sense of “accomplishment” for your efforts. Two participants out of the sixteen (13%) claimed that the core driver appeals to them because they enjoy “challenges” and overcoming them, it means that they “work hard” and “deserve” they rewards they receive. Two participants out of the sixteen (13%) claimed that they chose this core driver because it is about having a goal and working towards something.

These two options, *Development and Accomplishment*, and *Empowerment and Accomplishment* were by far the most frequently chosen option, with the next highest being *Core Driver 4: Ownership and Possession,* with only six participants (30%) choosing this option, which means that it was 50% less chosen than *Core Driver 2: Development and Accomplishment* and 60% less chosen than *Core Driver 3: Empowerment of Creativity and Feedback.* All six participants that selected *Core Driver 4: Ownership and Possession* claimed that this would motivate them because they felt that this driver could help them to own something or grow what they currently have. Two out of the six participants (33%) indicated that “property” would be the thing that they would like to “own” and would be motivated if this driver could show them how to get that. The remaining four participants (66%) indicated that they would like to “own” or “possess” more wealth, and that is how they see this core driver working for them. Three out of the six participants (50%) claimed that this core driver motivates them because owning any type of asset would mean that they are “doing well” and have some level of financial “security”.

The fourth most frequently chosen option was both *Core Driver 1: Epic Meaning and Calling* and *Core Driver 8: Loss and Avoidance,* with both being chosen by five participants (25%) each. Three out of the five participants (60%) chose *Core Driver 1: Epic Meaning and Calling* because they claimed that they like to feel that they are the only ones to do something. They feel empowered by knowing that they have a mission and only they have the ability to complete that mission. Two out of the five participants (40%) claimed that they are motivated by this core driver because they are motivated by using their abilities or "gifts" to help other people, for example, using the money they make or the knowledge they have to help their family. Participants claimed that they chose this option because they like feeling "special" and that they are "making a difference".

All five participants (25%) that selected *Core Driver 8: Loss and Avoidance* mentioned that the primary motivator for choosing this option is not losing more money and losing out on rewards. One participant claimed that they are not "very ambitious", so having a lot more money is not a big motivator, but losing out on the money they have is much more important. Three out of the five participants called on experiences that they currently have with rewards programmes such as Discovery's "Vitality" and FNB's "eBucks" programme where gamified components of losing out on points, levels, and discounts for not adhering to certain practices already exists.

This was followed by *Core Driver 5: Social Influence and Relatedness* and *Core Driver 7: Unpredictability and Curiosity* with both being chosen by four participants (20%) each. There were three different sets of reasons for participants choosing *Core Driver 5: Social Influence and Relatedness*. The first was "competition" which two out of the four participants mentioned, with one participant claiming that they "cannot sleep" if there's a game or competition at stake. The other participant likened this core driver to school where they claimed that everyone in a classroom gets the same information, but we all understand it in our own way and when you "beat your friend in a test", it's a "good feeling". One participant chose this driver due to the "mentorship" aspect. They felt that having a mentor, who understands your context, circumstances, needs and wants would be really motivating and helpful for them. They wanted someone that could look at their situation and provide "mentorship and guidance from their knowledge and expertise". They claimed that the "competition" part would not appeal to them at all. The last participant chose this option because they felt that they would be motivated by the "community" or "relatedness" factor. They felt that it would be beneficial to see other people on the same journey and be able to build off their experience.

All four participants that chose *Core Driver 7: Unpredictability and Curiosity* claimed that this would motivate them because it would be "fun" and "exciting", and because there is an element of risk to it. They claimed that this core driver would "keep money management interesting". They felt that they would enjoy the feeling of being intrigued about what might come next, even if it was negative. When the question was posed that, due to the unpredictable nature of this driver, the result could also be negative, but all four participants claimed that it was fine. One participant claimed that even if they lost out on money, at least they would learn, and another participant claimed that it is just the nature of financial decisions and life, in general, "not everything will work out".

The least chosen core driver was *Core Driver 6: Scarcity and Impatience* which was only chosen by two participants (10%). Both participants claimed that it appealed to them because they felt that they would be motivated by having knowledge that no one else or very few people had.

4.4 DISCUSSIONS OF FINDINGS

The aim of the study was to understand to what extent can gamification be used to motivate people to manage their money better, what challenges they experience in managing their money and what contributes to their level of financial literacy.

This section attempts to take a deeper look at each of the answers provided and how they contribute to the research questions stated.

4.4.1 Challenges that affect the way people manage their money

As stated in Section 4.3.2, participants indicated that the following challenges affected the way in which they manage their money:

1) **Lacking knowledge or education:** This is one of three themes that came up most often in this study. Participants do not know "where to start" or how to go about managing their money. They are unsure about what is good financial practice and just go from day to day with the knowledge that they have or the habits which they form. Sixty-five percent of participants claimed that they are comfortable with the "day-to-day" management of their money, but struggle with "more advanced topics" such as investments. Participant number ten claimed that this is because money management is not something that is "taught to most South Africans. You just learn as you grow". Participants also mentioned that they don't have knowledge on how to even start managing their money. Both participants that mentioned this where in the lowest income bracket (R0 – R200 000). Eleven participants (55%) only described paying their expenses when describing managing their money. For these participants "paying the bills" constituted "money management". Even when discussing the questions on "retirement", participants know that it is an important decision, but do not know what to do about it, and feel that it's "too early to start" or just remain in fear and choose to not do anything about it. This may be due to there being a lack of exposure to financial products and financial education, and the fact that participants did mention that, in some cases, just making ends meet was a priority.

   This challenge can be divided into two sections, the first part being "knowing how to start". Participants mentioned that it was difficult because they did not know what to look for or who to consult or gave up because they felt it was not relevant to what they were looking for. This speaks to at least three other challenges discussed later on this section, namely "*Personal circumstances or goals not catered for*", "*Financial jargon*" and "*Personal circumstances or goals not catered for*".

The second part of this challenge relates directly to an individual's financial literacy. The way participants described it in this study, they do not know what to do, how to make financial decisions or how to manage their money well. This speaks directly to the definitions and relationships discussed in Section 2.3 of this study. This was also reflected in participants when discussing retirement plans, where 30% of participants were not able to say for sure if they had enough for retirement or not. Research conducted by the Financial Sector Conduct Authority shows that 90% will not have enough post-retirement to be able to continue the same lifestyle that they were used to while working (FSCA, 2022).

This further illustrates the point of how important financial literacy is in relation to money management. This also illustrates that there needs to be more of a sequential process to improving financial literacy and then improving money management.

With regard to gamification and its link to education and knowledge, Manzano-Leon et al. (2021) claim that gamified education improves overall scores or grades, as gamification is more engaging than older and more traditional learning methods. Swacha (2021) notes that gamified learning has been applied effectively at all levels of education from pre- or primary schools all the way to tertiary education. It has also proven to be successful in teaching adults in difficult topics such as "anatomy and physiology, architecture, computer programming, chemistry, foreign languages, mathematics, or organisational behaviour". For example, *Duolingo*, an app that uses gamification to teach people languages has over 300 million users and 42 million users actively using their platform at least once a month (T. Nguyen, 2022). *Duolingo* makes use of six out of the eight Octalysis Core Drivers including *Epic Meaning and Calling*, *Development and Accomplishment*, *Ownership and Possession*, *Social Influence and Relatedness*, *Scarcity and Impatience* and *Loss and Avoidance*. Another example is *BitDegree,* an educational app that provides courses in data, digital marketing, web development and programming. In three months since implementing gamification, *BitDegree* saw an increase of 300% of course completion and decreased course "completion time" by 50%. The app made use of seven out of the eight Octalysis core drivers, namely *Epic Meaning and Calling*, *Development and Accomplishment*, *Empowerment of Creativity and Feedback*, *Ownership and Possession*, *Social Influence and Relatedness*, *Scarcity and Impatience*, *Unpredictability and Curiosity*, and *Loss and Avoidance*.

2) **Personal circumstances or goals not catered for –** This theme is the second of three themes that were mentioned most often. Participants felt that their own financial position and goals were not catered for by information online or information provided by banks. Participants made comments on available financial information being "too generic" and "only for rich people". They felt that it did not "cater for my circumstances" or "apply to me". Participant number seven mentioned that "people are different, people's circumstances are different, and people's commitments are different". They did not feel understood. For example, some did not have any money management knowledge at all, some wanted to start investing, some felt that they were looking for investment options that were not risky, or wanted investments that were high risk. However, all ten of these participants felt that their contexts were not provided for by information online or by their banks. Participant number five also claimed that their "needs change every year, depending on circumstances and perspectives", so they need to adapt but the information and help provided does not cater for those changes.

Studies have shown that individual's circumstances, particularly those of poor individuals, are not taken into consideration when providing financial information or advice on how to manage their money (Sebstad & Cohen, 2023; Wentzel, 2014). Sebstad and Cohen (2023) claim that when dealing with situations where their expenses outweigh their income, and a lack of formal information on how to proceed, individuals have to become quite "inventive" in developing their own financial strategies. These "reactive" strategies can become quite detrimental in the long term (Achtziger, 2022).

Another topic related to this challenge was the concept of individuals' goals not being catered for. Studies have proven that goal setting is an important part of money management and helping improve financial behaviour, by keeping individuals on track and motivated (Muizzuddin et al., 2017; O'Neill et al., 2000; Riitsalu, 2018). Participants in this study felt that current financial management advice does not include goal setting. Goal setting provides an individual with a measure of what an optimal level of an outcome is and a pathway to achieve that outcome through advice, nudges and visual cues (Landers et al., 2017; Tondello et al., 2018).

Gamification can have a positive impact with regard to understanding an individual's circumstances and goals, as well as helping them to achieve those goals in various aspects such as fitness (Arshad et al., 2022; Kappen et al., 2020; Ozdamli & Milrich, 2023), nutrition (Berger & Jung, 2021; Jones et al., 2014) and employee productivity (Davydova, 2022; Hamari et al., 2018; Kien & Nguyen, 2021).

Specifically with regard to understanding an individual's personal circumstances and financial goal setting, an application called *SmartyPig* onboarded more than 40 000 clients and banked more than 250 million dollars through goal setting gamification (StriveCloud, 2022). This "goal savings" application firstly allows the user to set a goal such as buying a house, or a car, or saving towards a vacation. It then considers the user's personal circumstances and needs to provide personalised advice on how to save. Lastly, it uses those savings to contribute towards the initial goals set by the user (Arnold & Rhyne, 2016; Kanazawa, 2023). Another example of personal circumstances and goals in gamification is *HelloWallet.* This application uses daily transaction data to understand users' spending behaviour and provides them with personal advice on how to modify their behaviour to be able to save for retirement. It also allows the user to set goals that they feel they achieve to be able to improve spending behaviour to contribute more towards retirement (Arnold & Rhyne, 2016).

3) **Financial Jargon –** This is the third theme that was mentioned most frequently. Financial jargon, banking or financial terms/concepts were mentioned by participants of all income levels and education levels. Participant number one mentioned that seeing financial jargon made them feel "very demotivated" to learn about financial matters, and that it "just goes over my head". There needs to be education that is done that caters to individuals at a more basic level. If the terminology is not understood, then even simplifying the concept of saving or investing might not help. Alternatively, banks, financial institutions or the government should also consider using much more simple terminology that could assist in improving the understanding amongst individuals.

Grabmeier (2020) claims that even in industries such as technology and science, jargon or complex terms used hinder individuals' ability to understand and prevented interest in these areas. A study that was conducted on the effect of using jargon versus commonly used language showed that jargon prevented understanding of concepts. Furthermore, it made participants feel like they could not understand the jargon because they were not good at the concepts being written about (Shulman et al., 2020). Specifically in a money management context, Tan et al. (2019) showed that jargon negatively impacts knowledge and therefore negatively impacts individuals' willingness to invest.

Jargon can be described as a subset of a language that is used in a specific field (Brown et al., 2020; Malyuga et al., 2018). Therefore, one way in which gamification could help to overcome this challenge could be using similar gamification elements such as *Duolingo* that were mentioned when addressing the first challenge in this section, *"Lacking knowledge and education"*. Financial jargon and complex terms can be taught using the same principles that made *Duolingo* a fun, engaging and motivational platform (Hyunh et al., 2016). Other elements that could be brought in to assist with this challenge are "Hints" and "tool tips". Although not specifically gamified elements, hints and tool tips are a common feature in games and gamified solutions (Endramanto et al., 2021). Hints and tool tips can be effective in enhancing a gamified journey through clarifying difficult concepts and how to progress through a journey (Veinott & Whitaker, 2019; Yang et al., 2022).

4) **Lacking discipline –** 30% of participants claimed this as a challenge citing "social behaviour", "wanting to spoil ourselves" and "general poor planning" as a big reason for them overspending. Five out of the six participants that mentioned this are between the ages of 25 – 30 years old. Financial discipline is crucial in good money practices as studies have shown that it helps to improve "financial behaviour", short term and long term financial security (Ameriks et al., 2007; Mawad et al., 2022; Stromback et al., 2017) and improves financial well-being (Biljannovska & Palligkinis, 2014). A lack of financial discipline has also proven to increase the likelihood of taking out loans both from formal and informal lenders (Fernandez-Lopez et al., 2023).

In a survey conducted by *Zippia*, of over 500 employees, it was shown that 90% of their participants were more productive, and as much as 20% felt that they were not distracted and more focused on their tasks once gamification was implemented

(Boskamp, 2023). There are many examples of gamification helping with discipline. The first one is *EpicWin*, which allows you to input your tasks for the day and rewards you with points and higher levels as you accomplish each task. This app uses two core drivers, namely*, Development and Accomplishment*, and *Empowerment of Creativity and Feedback*. Another example of gamified discipline is the *Forest App* which encourages users to stay focused and disciplined while working. The tree grows while they are focused on a task and the tree dies if the person gets distracted and tries to use their phone. This app uses core drivers, namely, *Development and Accomplishments*, and *Loss and Avoidance*. Another example is *Beeminder* where users of the app are penalised by having $5 deducted from them if they do not complete specific tasks. This also uses *Development and Accomplishments*, and *Loss and Avoidance* as the core drivers (Chou, 2023a).

5) **Increasing prices/cost of living –** Participants mentioned that prices increase too often in South Africa. Participant number twelve mentioned that “prices are always increasing, but our salaries always remain the same”. This challenge aligns with numerous studies that identify either “increasing prices” or “cost of living” as a major factor that hinders individuals’ money management abilities (Gumbo et al., 2021; Munisamy et al., 2022; Sabri et al., 2022). Increasing prices and the high cost of living, coupled with a lack of financial literacy could also lead to an individual borrowing money at high interest rates and borrowing fees (Lusardi & Mitchell, 2014) which would further amplify the financial burden on the individual.

In South Africa specifically the cost of a number of items have become increasingly high, which aligns with the participants’ claims including fuel and electricity (Mntambo, 2023; Ndlovu, 2023; Opperman, 2023). The inflation for food and “non-alcoholic” beverages is at 14%, which is the highest it has been since 2009 (Gumbi & Anders, 2023).

This challenge could also have a negative impact on an individual’s physical and psychological health by having to cut back on food, increased smoking, and possible drug abuse (Broadbent et al., 2023; Khan, 2022; Mulrenan et al., 2023).

Applying gamification to this challenge might be difficult due to this challenge being external to the motivation of the individual. Increasing prices, especially due to inflation, are caused by economic policies set by governments, supply and demand within a country, and prices of imports and exports, among other financial and economic factors (Musarat et al., 2021; Oner, 2023) as opposed to individuals' decision-making. However, gamification could be applied to help individuals to manage increasing prices and cost of living by using different core drivers to make changes to their spending.

6) **Low salary or not having money to manage** – The issue of having a low salary or not enough money came up eight times on different questions. Participants indicated that their priorities were making ends meet and anything additional is saved. Participant number ten mentioned that "sometimes my salary gets finished, and I don't even know how". Participant number eleven mentioned that "because of the situation in South Africa, we are force into low paying jobs" and that the "salary cannot stretch". One participant mentioned that they "don't want to do more" in terms of money management because they already know that their salary is not enough. This point is something that was stressed in both the background and literature review sections of this research study, with 76% of South Africans not having enough money by the end of the month (Magubane, 2021) and 74.9% earning approximately R1800 less than is required for a decent standard of living (Frye et al., 2018). Having to manage a household with little to no money requires individuals to make "trade-offs" in their financial decisions that are commonly focused on the short term (Achtziger, 2022; Wentzel, 2014). Similar to the challenge of "*Increasing prices/Cost of living*", the negative effects of having a low salary or no income is not just related to limited money management opportunities, but also causes health (Chung et al., 2020; Finkelstein et al., 2022; Habibov et al., 2019) and psychological (Knifton & Inglis, 2020; Marbin et al., 2022; Sareen et al., 2011) issues as well.

Even though gamification can play a role in other areas as identified, gamification cannot help in increasing the money that individuals do not have to begin with. This is another external factor that is not related to gamification or motivation. Participant number five claimed, "I know I need to do more, but I am really not in a position to do more". Therefore, other elements might factor into this challenge more, such as the type of job the individual has, educational level, gender, type of company or industry that the individual works in and years of experience (Blau & Kahn, 2016; Shamki &

Shehemi, 2019). Therefore, gamification might not be able to address this challenge, however it could be used to maximise their salary.

7) **Taking care of family members –** 25% of participants mentioned that this challenge presents a barrier when it comes to taking care of their extended family members. Participant number eight claimed that "it's not just your wife and kids, it's about your extended family and the previous generation too". It is important to reiterate that even though participants claim that this did affect the way they managed their money, it is a responsibility that they welcomed. This is the only challenge mentioned that participants did not want to change or overcome. Rather than remove their responsibility of taking care of their families, participants preferred to find solutions to other challenges mentioned; to find solutions to be able to help their families better. A term that came out in this discussion was *"Black Tax"*. In the context of this study, *"Black Tax"* can be described as the financial responsibility placed on Black South Africans to be able to support their immediate and extended families (Chipp et al., 2019; Sibiya, 2018). The concept of "*Black Tax"* has been shown to come about due to previous racial inequality in South Africa driven by Apartheid laws (Mpisane, 2021; Msibi, 2020; Socikwa, 2021). The challenge of "*Black Tax"* is not something specific to South Africa and has been shown to exist in other countries as well, such as the United States of America and Malaysia (Magubane, 2016). Studies also show that the challenge of "*Black Tax"* is not just restricted to taking care of family members, but also the financial impositions in place on Black South Africans with regard to transportation and housing costs associated with being forced in live far away from "economic hubs" during the Apartheid era (Maluleke, 2021; Phaswana & Carpenter, 2020).

In South Africa there are numerous studies such as Phaswana and Carpenter (2020), Mangoma (2018) and Oppel (2023) that highlight what a big challenge this is for Black communities in the country. Mangoma (2018) has demonstrated that specifically taking care of extended family members could be an additional cost of approximately R32 847 a year or R2737 a month.

Again, with this being another external factor, it will be difficult to use gamification to improve this challenge, as the individual might not always have a choice in how many family members, they are taking care of (unless the family members are specifically their own children).

8) **Unexpected costs or emergencies –** 20% of participants also mentioned this as a challenge, as it derails their savings even if they may have a budget. Participant number three claimed that, “life really messes with your budget”. However, none of the participants put down an “emergency savings” category when describing how they budget. None of the participants indicated that they save specifically for “emergencies”. Participants in the lower end of the income levels suffered due to not having additional savings. Participants in the upper end of the income levels had additional income saved which they could use for emergencies or anything else they wished. Only 45% of participants indicated that they would have enough if an emergency occurred, most of whom earned in the top two income levels. Despard et al. (2020) claim that in the United States of America, only 29% of individuals actually save towards an emergency fund. Lee and Hanna (2022) claim that these unexpected costs or emergencies, such as the Covid pandemic, become more of a shock to individuals because they take an “optimistic view” of how much is enough to be saved for emergencies.

   For some individuals it may be another case of not having enough money to manage and therefore gamification may not be able to play a part. However, for individuals that do have extra money, a good way to tackle it could be to be better prepared for emergencies. For example, *Qapital* allows you to set up “triggers” where you are able to save small amounts of money each time you have to spend money on something such as a case where the app puts 50 cents into a savings account every time you buy groceries (Chou, 2023c). This could help the individual have an additional savings account that could be used as opposed to their monthly expense allocation.

9) **Fear of their current situation –** This was mentioned by participants, both in relation to managing their money currently as well as planning for the long term. Participant number one claimed, in relation to money management that “I am scared about what I don’t know, and I don’t address it because of that fear”. It becomes a “catch 22” situation because the more they did not focus on their finances, the worse their financial situation became, but the worse it became, the more they did not focus on it. This cycle has become more difficult for participants because they do know that they need to “budget” and “plan for the long term” but this “fear” has grown so strong that

they avoid doing anything about it all together. “Fear” does seem to be a common theme when discussing money management, as 25% of participants mentioned it when discussing retirement as well.

Bjajer-Golebiewska et al. (2018) term this “financial avoidance”, where people, through intention, avoid information that could possibly help. This is due to the information not conforming to their own views, or the information being negative which could make them anxious about their situation. Individuals also try to avoid information that is negative about their finances because it forces them to acknowledge that they may have made bad financial decisions, they may have to go through established “debt” processes or organisations, and lastly because they may suffer embarrassment if friends or family find out about their situation (Harkin, 2017). “Financial avoidance” is common when people do not have a lot of money which leads to more avoidance, which leads to more financial issues which leads to stress and health issues (Hilbert et al., 2022; Novak & Johnson, 2017).

Gamification could help to change a person's financial situation as mentioned in other examples in this section, but specifically to help with the avoidance, an example like *Monefy* could be used. *Monefy* uses visual cues like icons and vibrant colours to make the money management process much more engaging and light-hearted. *Monefy* uses the core driver of *Development and Accomplishment* (Chou, 2023c). Additionally, content and helpful tips could be added to these experiences to assist individuals to not just view their current situation, but to improve it as well.

10) **Lack of interest –** 20% of participants mentioned that they do not care about managing their money at all. This was reiterated throughout the questionnaire where participants indicated that “financial matters” is not something that interests them. They find it very “confusing” and not “interesting”. Participant number nine claimed “I know it’s an important topic, but it’s not a very interesting topic”.

In total there were four participants that mentioned this challenge. These participants fell into two different categories when mentioning this challenge. The first category includes two participants, participant number sixteen and participant number nine, that have no interest in making big financial decisions so would prefer to have an advisor make those decisions on their behalf. These two participants acknowledged that managing money, growing their money and building for the long term is important, but they do not want to delve into the details of it. They are happy to work and pay their bills and would be happy to leave the growth and long term decisions to someone else who could manage it for them. They do the basics because they have to. Both these participants mentioned that they do have savings and investments, but they just do it because it was recommended to them and it "seems like a good idea".

The second category includes two participants, participant number one and participant number ten, that also have no interest in managing their money, but they were not motivated to do anything about it. They are also happy to work and pay their bills, but have no concern about their financial growth and long term decisions. Both of these participants have savings but no investments.

Out of four participants that mentioned this challenge, only one participant, participant number ten, answered all three financial literacy questions correctly, and that participant fell into this category of not doing anything about money management. This means that this participant does understand, to some extent, savings, interest and investments, but still has no interest in doing anything about it.

However other studies have shown that a lack of motivation or interest in managing has a negative impact on financial knowledge and financial well-being (Di Domenico et al., 2022; Putri & Simanjuntak, 2020).

Gamification has proven successful for industries or causes in which people may lack interest or have the necessary drive to make changes. One example of this where people lack an inclination towards it is "sustainability" causes. "Sustainability" is defined as "equitable, ethical and efficient use of natural resources for fulfilling the needs of current and future generations of human beings and enhancing their wellbeing" (Sakalasooriya, 2021). Given that it is an on-going process, it is not always at the forefront of the mind for individuals, especially when changes are required in their daily lives. In a study conducted in the United States of America that was published in the Harvard Business Review, 65% of people want to buy from brands that promote sustainability, but only 26% actually do so (White et al., 2019). One gamification example that has been helping to improve interest is *OPower,* a company that has partnered with utility companies to show customers details on how they are using their electricity, how and when to use certain appliances efficiently, how much they can save by doing this more effectively and how they match up against neighbours and friends on lowering their energy consumption. This uses core drivers, namely *Development and Accomplishment*, *Empowerment of Creativity and Feedback*, *Social Influence and Relatedness*, and *Loss and Avoidance*. Another example of gamification being applied well in sustainability is *RecyleBank*, a company that promotes recycling by rewarding customers with points for recycling and saving energy. *RecycleBank* has over 3 million customers. This initiative uses *Development and Accomplishment* as the primary core driver (Chou, 2023b).

Another area where people may know it is important but may lack interest or drive to make the necessary changes is healthcare, whether it is exercising more, losing weight or attempting to quit smoking (Patel et al., 2019). Due to the success of gamification in healthcare, it is estimated that by the year 2030 the market size will reach $15.9 billion (ResearchAndMarkets.com, 2023). One such success story is *Aygo*, an app that introduced gamification to ensure that patients develop habits that are important for them to improve their conditions through daily reminders, gamified tasks and surveys. Patients are rewarded for their behaviour and new, improved habits start developing. This app uses *Empowerment of Creativity and Feedback* and *Development and Accomplishment* as the primary core drivers (Chou, 2023d). Another successful example is Nikes Run Club, which has attracted over 15.4 million app downloads (Naidu, 2020) through gamified elements such as challenges and rewards (GrowthEngineering, 2023).

Gamification can be effective with this challenge because, as seen from examples above, even if people were not interested in sustainability or healthcare, the gamified elements added to each experience ensured that people were still engaged. Even if it was only done for the reward, feedback, or competition – sustainability and healthcare still improved. It could be the same with financial literacy and money management.

11) **Having an overview of their finances –** Participants mentioned that it was difficult to manage their money as they did not have a holistic view of it. Their income and expenses could be viewed on their banking application but did not include a view of the growth on their investments or types of financial products. This made it difficult to make decisions as they had to view multiple platforms to gather insights. Studies have shown

that the best decisions are made when all of the available data can be analysed (Krava et al., 2021). Having a holistic view of one's finances is important, as it allows the individual to have a more comprehensive view of their financial situation, provides more data to show the consequences of decisions, helps create and align to financial goals, provides a view of how short term decisions impact long term plans, helps to make adjustments due to unforeseen changes to financial circumstances, and helps understand and fill in gaps in one's financial planning (Davies, 2021; Lim & Gandini, 2022; Wastler, 2022).

This challenge has already been gamified with much success. The first example is *Mint*, an app that allows users to link their financial accounts, helps you budget, tracks your expenses, helps you save towards goals and helps you see where you have improved financially or where financial improvements are needed. Users are rewarded for good financial habits and for reaching their goals. Mint uses core drivers such as *Development and Accomplishment*, and *Empowerment of Creativity and Feedback* (Chou, 2023c).

12) Lack of trust or comfortability with banks or financial institutions – As much as 20% of participants mentioned this as a cause for not trying to gather more information about financial matters or taking up any financial product. They felt that they were going to be scammed. This could be a result of bad past experiences, a lack of trust generally or the perception of banks and financial institutions currently. Participants claimed that they "can't trust anyone" with their money, that "there are too many scams these days" and that "it is very difficult to differentiate between what is "true" and what is "relevant"". One participant, participant number ten did mention, however, that they trust the banks more than other sources of information.

Distrust of banks and financial institutions is not just a challenge in respect to money management but a general perception that consumers have (Saiedi et al., 2020). Trust in banks and financial institutions is not just crucial for gamification, but more importantly for a country's economy to function (Bijlsma et al., 2022). Fungacova et al. (2019) found that individuals that earn more, have higher levels of education and are young, trust banks more. Studies also found that when there is a crisis, people have more distrust in banks and financial institutions (Bijlsma et al., 2022; Brychko et al., 2020; Knell & Stix, 2015). It will be detrimental for any gamified solutions being implemented if consumers see any financial organisation as being “opportunistic” or wanting to take advantage of them (Saiedi et al., 2020).

Studies have shown that gamification can have a positive impact in improving trust in sectors such as eCommerce (Hall & Toke, 2018), Crowd funding (Anim & Omar, 2019) and even human-robot interaction (Funk et al., 2020). Trust is also an important factor in creating “customer loyalty” (Cardoso et al., 2022). Companies that build a sense of trust with customers, ensure that these customers are more likely to use their brands and products over a long term, take up new products and become brand advocates (Cardoso et al., 2022; Mosavi & Ghaedi, 2012; Sun & Lin, 2008). Participants interviewed in India (Jain et al., 2020), Indonesia (Gandasari & Mauritsius, 2023) and Portugal (Rodrigues et al., 2016) claim that gamification does improve customer loyalty towards banks. A good example of gamification creating customer loyalty is *Monzo bank*. *Monzo* has acquired over 5 million customers through their gamified app that rewards customers for completing challenges and referring friends and family to the bank (Walker, 2022). Monza uses the core drivers of *Development and Accomplishment* and *Social Influence and Relatedness*.

4.4.1.1 Summary of Insights

The examples above show that despite there being a number of serious challenges to financial literacy and money management, gamification has proven to be successful in directly helping to solve eight of the twelve challenges stated. Therefore, it can be claimed that gamification can play a part in improving money management in South Africa. However, given the challenges that it cannot solve, “*Increasing prices/cost of living”, “Low salary or not having money to manage”* and *“Taking care of family members”,* it is clear that gamification can only play a role in money management provided that individuals have enough money to manage to begin with. It can also be proposed that gamification in relation to money management might be better suited to the middle to higher income brackets in South Africa.

4.4.2 What contributes towards financial literacy and the way they manage their money?

As stated in Section 4.3.2, participants indicated that the following themes contribute to an individual's financial literacy:

1) **Information from family and friends** – This theme was mentioned the most in terms of how participants gathered more financial information. They feel comfortable with their friends or family members due to trust, as well as them having knowledge about their specific circumstances and situations. Participant number two mentioned "I don't understand any of it but I trust my dad". Another participant, participant number sixteen, mentioned that "all of my financial decisions are guided by my parents, if it wasn't for them I would not know what to do. I am not motivated to do it myself". Another participant, participant number six, claimed that this way is "easier" because they do not have to "take the time" to do it themselves. Out of the seven participants that mentioned that they consult their friends or family members, only two mentioned that the person they consult used to be a banker. The remaining five participants just consulted their friends or family members because they trusted the person's opinion or because they worked in a finance related job.

   This source of financial literacy can be a good one because as mentioned friends and family would understand participants' needs better than information online. Another benefit of this is that the information could possibly be free. However one participant did mention that relying on friends and family "could go either way" as they may not always be reliable or have the right information.

   There are numerous studies on how families and friends are an important source of financial literacy for individuals (Alekam et al., 2019; Magro et al., 2018; Sharif & Naghavi, 2020; Shi et al., 2021). This source of financial literacy can be helpful, especially in disadvantaged communities, as it is easily accessible and available for free (Dan & Sheng-nan, 2023; Leone & Thompson, 2023). It can also be helpful in circumstances where it is not taught in schools (Magro et al., 2018). However, studies have shown that more financial information provided by families does not guarantee a higher level of financial literacy in individuals (Calamato, 2010). There are cases where higher levels of education amongst parents show a higher level of financial literacy (Bohm et al., 2023; Lusardi & Mitchell, 2017). However these studies reinforce the point that as much as it in an important source of financial information, it might not always be accurate or be applied in the same context (Hellstrom et al., 2013). It is dependent on the financial literacy level of the individual providing the information. This could be beneficial if the information is accurate, but could have negative effects if the information is incorrect or misleading (Williams, 2010).

2) **Information from Financial Advisors and Bankers –** Interestingly, when asked to rate the statement *"I reach out for help when it comes to managing my money",* nine participants mentioned either a financial advisor or banker. However, when asked the open-ended question (Question 19), *"How do you currently learn more about managing your money?",* only five participants mentioned either a financial advisor or broker. A possible cause for this is that the financial advisor or banker is reached out to specifically for help when something is wrong or understood, and not necessarily to generally learn more about concepts**.** Out of the nine participants that mentioned this theme as how they gather information, two earn between R400 000 - R600 000, four earn between R600 000 to R800 000 and three earn between R800 000 and R1 million.

   Using financial advisors and bankers can be a good way to learn more about finances, financial management and products, as well as to ensure good financial behaviour (Mustafa et al., 2023; Panos & Wilson, 2019). Using financial advisors and bankers is also advantageous as it can be used to supplement existing knowledge and help individuals verify and consult on big financial decisions, thus eliminating risks and relieving stress (Rabbani et al., 2021; Schepen & Burger, 2022). Mustafa et al. (2023) also claim that having a financial advisor or bank can help individuals align to their financial goals or their personal circumstances, which is a direct solution to a challenge that was identified in this study.

   A possible disadvantage is that some advisors may be less trustworthy than others and may promote certain financial products due to their biases or for personal gain, rather than assisting their clients' financial goals (Baker et al., 2017; Monticone, 2011). This may prove to be a problem for certain individuals, such as participants who claimed in the interview that they do not want to bother about money management and would prefer for a financial advisor or banker to do it on their behalf. Participant number sixteen claimed that they "just go along with what the banker says even though I don't understand it". This highlights a need for individuals to at least have some level of financial literacy to understand whether or not products are right for them, even when advice comes from a "knowledgeable source". Another disadvantage is that this may not be an accessible option for everyone. Some financial advisors require certain fees (Du Preez, 2022) and banks require you to earn over a specified amount to qualify for a private banker (Rangongo, 2021). Given that on average working population in South Africa earns R62 500 annually (Frye et al., 2018), it might be too expensive.

3) **Life experiences –** Participants mentioned life experiences as a source of financial literacy with participants claiming that financial literacy and habits are just picked up as you go**.** Participant number ten claimed, "I don't learn, I just carry on with life". This could lead to an imbalance between an individual's perceived level of financial literacy versus their actual level of financial literacy, as some individuals might not know that there are gaps in their knowledge. Perceived levels of financial knowledge have proven to be an important part of an individual's money management (Kumar et al., 2023; Voros et al., 2021). However, a high level or perceived level of financial literacy coupled with a low level of actual financial literacy could lead to bad financial decisions (Ameer & Khan, 2020; Balasubramnian & Sargant, 2020). This was also reflected in the data collected in the interviews, as 60% of participants felt that they were "financially savvy" due to the way that they current managed their money and the level of financial knowledge they felt that they had. However, only 30% of participants answered all three financial literacy questions correctly.

Studies have shown that learning through experience can be more effective than learning through traditional learning methods (Abel et al., 2021). This can be effective in improving financial literacy as it gives the individual the ability to know exactly which forms of money management work for them, what interests them and the ability to integrate the theory with the practical knowledge gained (Rahim et al., 2021). An issue with this source is that people have different lived experiences, and therefore may not learn certain aspects of financial literacy or possibly learn bad habits (Hastings et al., 2013; OECD, 2014; Rahim et al., 2021). Research shows that the first financial habits that are "picked up" are from parents (Gravier, 2023; Khawar & Sarwar, 2021), and as discussed earlier in this section, these financial habits may not always be beneficial to their children (Drever et al., 2015).

4) **Information gathered when a trigger or life event occurs -** 40% of participants indicated that they only try to learn about financial matters when something happens in their life that requires them to understand something. Participant number six mentioned that "I don't actively pursue financial information, it's only when I need to do something important, I read more about it". Participant number one mentioned that "I don't read more generally, but if someone says something that triggers an interest, I do read about it". A benefit of this is that it is specific to what the individual is going through at that particular time, and it will be easier to learn as the concepts are more practical and immediate. The issue with this is firstly, that money management does not happen in isolation, all concepts of saving, spending and investing are interrelated. So having some knowledge of financial management requires you to unlock money for other "triggers" or "life events". For example, if you do not have a good credit score or enough cash, you may never arrive at the life event of buying a house. Secondly, if the person does not have that trigger, they may never be able to learn about other aspects of financial literacy and money management. For example, if the "trigger" is when someone speaks about investing, they may never learn about investing if no one ever speaks to them about it. A massive indicator of this was that eight participants got into contact with the researcher after the interview to show how thankful they were for being a part of the study. They mentioned that the concepts being raised about financial literacy, money management and gamification had not even occurred to them. They will now take a more structured approach to improving their financial literacy and money management now that they see the need.

5) **Searching online/Online articles –** 30% of participants mentioned that they search online or read online articles, which is surprising given that globally there are over 5.9 million searches occurring on Google per minute, and 8.5 billion per day (Duarte, 2023). However, participants did mention that information from online articles can be "unreliable" and misleading". Participants were wary of this source as they felt that they might be "scammed" or being sold a product.

   This can be a very effective way to improve financial literacy, given that the information is free, easily accessible to anyone with access to the internet and information is up to date (Hoffman & Otteby, 2017). However, participants gave no indication that searching for and reading information was constant, it seemed triggered when the participant needed specific information which is related to the other source of financial literacy mentioned: "*information gathered when a trigger or life event occurs*". Therefore, it does not seem that these participants are consistently improving their financial literacy.

However, studies have shown a positive correlation between individuals searching online for financial information and their level of financial literacy (Hoffman & Otteby, 2017; Leung et al., 2022).

6) **Social Media –** Only 15% of participants mentioned social media as a source of financial information. However social media is quite a popular medium for financial content (Akmese et al., 2016; Widyastuti & Hermanto, 2022). The benefit of this is that it is freely available and the majority of South Africans, at least 35 million individuals, are on social media (Statista, 2023). Certain platforms such as Twitter, Instagram, Facebook and TikTok allow for interactivity between social media "financial experts" and individuals (Chiki, 2021). One participant mentioned that they do actively look to follow "financial experts" on social media.

   Multiple studies including Cao et al. (2020), Ostermann et al. (2023) and Yanto et al. (2021) show the information received from social media to have a positive effect on financial literacy and overall financial outcomes. A negative however is that most content is not verified or factual (Filipek et al., 2019; Khan & Ahmad, 2023). There may be a chance that biased or false content is provided and gathers more attention, gains more followers or because they have been paid to do so, as opposed to actually being beneficial (Balaban et al., 2022; Ermey, 2022; Safitri et al., 2021). In addition, the importance of social media as a tool for financial literacy can be amplified if it is backed by a verified source of financial information such as a bank or other financial institutions (Kuchciak & Wiktorowicz, 2021).

7) **Learning through their jobs –** 15% of participants mentioned that this is how they became financially literate, with one individual being an accountant and the other two working at a bank. Participant number two mentioned that "I deal with the cash management of the company, so I apply that thinking to my life as well". This is a very beneficial way to learn about financial literacy, especially as you are exposed to the inner workings of financial institutions and being able to interact with colleagues that have financial information. However, the one issue is that this isn't a guarantee of

financial literacy, in fact only one out of the three participants that mentioned that they learned through their jobs answered all three financial literacy questions correctly. This was aligned with a study by Mbarire and Ali (2014), who show that job “status and type” do not have an impact on financial literacy. Another issue is that this is not a sustainable solution, as individuals in the country have different types of jobs in other types of industries. Studies in Malaysia (Rahman et al., 2021) have shown that specific jobs, namely entrepreneurs and those in government positions have better financial literacy.

8) **Banking or other financial applications –** It is surprising that only 15% of participants indicated that they use banking or other financial applications to learn more about financial matters, given that banking and other financial applications are so popular worldwide (Panos & Wilson, 2019). Participant number twelve mentioned that they do not trust their bank more due to how often people get “scammed”. Participant number eighteen mentioned that they use their banking app for “saving” and “budgeting”, but do not use the “investing options” because they do not understand them. This participant also mentioned that they use their banking app because you can manage your money “even while watching TV”. Smart phones are also commonly used in the country with over 22 million people in the country owning one, which represents a third of the total population (Taylor, 2023). This could be linked to other themes mentioned as challenges in Section 4.4.1 above, including financial jargon in banking or financial apps and information on these platforms not being relevant to the individual. One participant mentioned that “banks do have a lot of stuff, but it is not specific to me”. This was also claimed byT. A. N. Nguyen (2022) who proposed that financial technology companies (FinTechs) and financial institutions like banks need to improve their *“user experience”* and make information more *“simple”* and *“convenient”* in order to make their applications more accessible.

Banking and other financial applications will be crucial in implementing any gamified strategy as all existing examples of the effectiveness and success of gamification mentioned above in Section 4.4.1 are digital solutions implemented on applications.

9) **Reading books –** Only 10% of participants indicated that they read books on financial management by verified authors. Both participants, participant numbers four and fifteen, answered all three financial literacy questions correctly. It seems that both participants are driven by the mission to actively try to improve their financial literacy constantly and make more money by using multiple sources. Reading books to improve financial literacy has proven to be effective amongst both adults (Sallie, 2015) and children (Cetinkaya et al., 2023).

   However, a negative with books as a source of financially literacy is that it is *"static"* and cannot be updated frequently with the changes in finance, laws or technology (Faulkner, 2016).

10) **Online podcasts/Videos –** The growth of technology and its ability to reach a larger global audience has increased the usage of online videos and podcasts (Goldman, 2018; Kurniawan & Damayani, 2022). This is highly beneficial because accessible technology such as smart phones and basic recording equipment can be used to produce and distribute this form of media and allows viewers of this media to consume this content easily and sometimes for free (Moore, 2022). Studies have also shown that online videos and podcasts are more positively received as forms of financial literacy due to their shorter formats, which means that individuals are more attentive and content can be consumed in the individual's own time as opposed to strict schedules (Hendrickson et al., 2010; Zureck et al., 2019). A study by Kurniawan and Damayani (2022) tested the effectiveness of YouTube videos increasing financial literacy through "*Entertainment value", "Information value"* and *"Source legitimacy".* The study concluded that consuming YouTube videos for financial literacy and improving financial behaviour was effective due to the *"Entertainment value"* and *"Information value"* variables, but results were inconclusive about *"Source legitimacy".* This is echoed by Chhabra and Gupta (2023) who acknowledge that despite the amount of information that is available through online media, credibility of the source is always a danger.

4.4.2.1 Summary of Insights

The biggest issue with the way in which participants currently improve their financial literacy as listed in the themes above is that it is not sustainable and may result in a lot of gaps in knowledge for individuals. The reasons it could be seen as not sustainable and result in gaps in knowledge is, besides participants that use banking or financial apps, or read books, the participants that use the rest of the options might not always have accurate or verified information or only encounter information by the time it is too late. This could leave individuals open to be scammed, making incorrect and costly financial decisions or lastly, missing out on possible financial opportunities. The results shown above prove that there need to be more central and organised methods to improving financial literacy and money management that are accurate, accessible and cater for different needs.

Another issue is that the majority of these sources are reactive, namely *information from friends and family, information from financial advisors and bankers, life experience, information gathered when a trigger or life event occurs, searching online/online articles, learning through their jobs,* and in some cases *banking or other financial institution applications.* Most participants, all but five, do not make a concerted effort to improve their final literacy by proactively trying to learn more or going out to seek more information to be more financially literate. These participants do expand their knowledge on financial matters, but it is only when the need arises. Their relationship with financial literacy is dependent on specific circumstances, it is not first on the list. The key in this issue is how to create more awareness of the benefits of financial literacy and enthusiasm around the topic, so that individuals are more proactive about improving their knowledge and able to make sound financial decisions based on that knowledge.

Lastly, it seems that financial literacy is also dependent on the resources that are available to them. For example, some participants have access to financial advisors and bankers and others have family members that are knowledgeable, while other participants may have life experiences that may lead them to a point where more financial literacy is needed. Some participants have banking or financial institution applications that have information on financial literacy. With a lack of a centralised mechanism to teach financial literacy across the country, individuals' financial literacy is dependent on whatever resources are available. Therefore, there will be different levels of financial literacy.

Gamification can certainly play a role in the second issue raised which is related to creating awareness and enthusiasm around gamification as identified in the literature review and Section 4.4.1. In fact, some of the best examples of gamification identified in this study are related to educating individuals on complex topics. Given the issues raised with regard to the “gaps in knowledge” and the “resources available”, gamification cannot work on its own. It needs to be backed by a government or a large financial organisation that is trustworthy, provides reliable information and makes financial literacy accessible to South Africans of all levels of income.

4.4.3 What core drivers of gamification could be used to motivate people to become more financially literate and manage their money better?

This section looks at answering the main research question based on feedback provided by individuals interviewed in this research study, which was to understand whether gamification can play a role in helping people to manage their money better and if so, what core drivers of gamification would play a role in better money management.

The graph shows in Section 4.3.4 that *Core Driver 3: Empowerment of Creativity and Feedback* was the most chosen core driver. The fact that 90% of participants (18 out the 20) chose this option, showed that people feel that it can be key in motivating them to manage their money better. This is reinforced by participants, throughout the study, claiming that they do need to have relevant feedback that is catered to their circumstances. When discussing this core driver, participants mentioned they do not want to know about “what works for other people”. They claimed that feedback would only work if the “feedback is catered to me” or “takes my personal circumstances into account”. Two participants that were in the highest income categories also chose this core driver as they mentioned that “there is always room to grow” with regard to financial literacy and money management. Explanations provided when selecting this core driver also relate to SDT, especially the *“Competence”* and *“Autonomy”* components. The *“Competence”* component which refers to an individual’s need to grasp and become an expert in subjects or tasks (Kam & Umar, 2018) and feeling empowered aligns with participants’ claims of needing guidance and contextual feedback. These needs that these participants have speaks to the fact that they feel that current or available feedback is not sufficient to add to their “competence”. The *“Autonomy”* component of SDT also aligns with the explanation in this core driver. *“Autonomy”* describes an individual’s need for having control, making their own decisions and knowing that their individual decisions will lead to a positive outcome

(Rutledge et al., 2018). The "*Creativity*" part of this core driver was important to participants, as it spoke to the autonomy of making their own decisions. Participants expressed the need for *"Autonomy*" by claiming that they want to "try different options", "do it in my own time", "try my own methods" and "feel empowered". The *"Relatedness"* component of SDT was also expressed, to a lesser extent when discussing this core driver. *"Relatedness"* describes the feeling of learning through engagement, which can be achieved through support, tips, social sharing or competition (Rutledge et al., 2018). Some participants did express their motivation due to competition, as discussed later in this section. However, specifically for the core driver of *"Empowerment of Creativity and Feedback",* participants claimed that the support through "mentorship" or "professional" advice would be beneficial and motivating. Therefore, "*Relatedness*" does also play a part in this core driver, however not through the social aspects but rather through expert support. Participants want to know that the financial information provided is verified and accredited before they are motivated to adopt it in their financial behaviour.

A solution could be implemented that provides users with feedback on their current financial journey and shows the benefits of implementing proposed feedback. Any solution, importantly, needs to incorporate the user's personal circumstances, needs and wants, possibly through a wizard that captures existing data or a goal setting option that allows the user to have control over their journey and where they want to be. The second part of the core driver which is "*Creativity*" should also allow users to implement the feedback in a way that they see fit.

The core driver that was selected second most frequently (80%) was *Core Driver 2: Development and Accomplishment.* Participants mentioned that they chose this option due to the reward component that this core driver brings. This core driver appeals to them because they "like to win", "want to be recognised for my hard work" or because they want to see "something tangible" or the "value" for the way they improved their financial literacy or money management abilities. Participants mentioned "money", "points", "discounts" and "badges" as a reward that appeals to them. Two participants mentioned that this appeals to them because they like the "challenge" and overcoming that challenge makes them feel "good". Participants also mentioned that is important because they enjoy the feeling of "working hard". This core driver is quite popular in games, sport, and any type of competition, where a reward in the form of money, points, badges or trophies is provided to the competitors (Balci et al., 2022; Hellberg & Moll, 2023; Koivisto & Hamari, 2019).

Therefore, it is not a surprise that participants chose this option. If they are required to put in hard work, either through learning about money management or making financial decisions, they would like to be rewarded for it. Solutions could be implemented to reward users for doing well when learning more about financial topics through points, badges or trophies. These rewards could be taken further by showing individuals how financial education combines with the good financial decisions to help them make more money.

Based on the numbers, the core drivers mentioned above seem to be key in implementing any successful solution that involves attempting to help people to improve their financial literacy and money management, as they were the only two that were selected frequently by participants.

The remaining core drivers differed by a very small percentage, by one or two participants. Starting with *Core Driver 4: Ownership and Possession* with only six participants (30%), followed by *Core Driver 1: Epic Meaning and Calling* and *Core Driver 8: Loss and Avoidance* both being chosen by five participants (25%) each. This was followed by *Core Driver 5: Social Influence and Relatedness* and *Core Driver 7: Unpredictability and Curiosity* with both being chosen by four participants (20%) each. The least chosen core driver was *Core Driver 6: Scarcity and Impatience* which was only chosen by two participants (10%).

4.4.3.1 Summary of Insights

Judging from the statistics above and the interaction with the participants, it seemed that these remaining core drivers were selected by the individuals' personality type. For example, if the person was competitive, they chose *Core Driver 5: Social Influence and Relatedness;* if the person was impatient, they chose *Core Driver 6: Scarcity and Impatience;* if the person wanted to feel important, they chose *Core Driver 1: Epic Meaning and Calling.* With the most frequently chosen core drivers, *Core Driver 3: Empowerment of Creativity and Feedback* and *Core Driver 2: Development and Accomplishment,* it was based less on personality and more on the needs that people had i.e. the lack of information, the lack of personal circumstances being acknowledged, the need for acknowledgement that the money management education and decision-making is working and the need to grow their money. However, with the remaining six core drivers, it was specific to the individual and the type of person that they are.

This leads to the point that gamified solutions around money management need to also account for the individual's personality as well. There needs to be a combination of drivers or motivators to keep most of their audience engaged. If the solution focuses only on competition, then just competitive people are engaged. If the solution focuses only unpredictability, then just the curious people are engaged. Therefore, understanding and addressing a specific target market would be important. To be successful, organisations implementing a gamified solution need to look at who they are implementing this solution for and what possible personality traits they may have.

4.5 CONCLUSION

This section comprised of four sections. Section 4.2 described how the data was collected using interviews and provided a summary of the questions posed to participants. Section 4.3 provided a detailed view of the data collected from the participants and a detailed explanation of their responses. Section 4.4 summarised all of the challenges that participants highlighted that prevented them from managing their money. Gamification examples were provided in eight of the twelve challenges that participants highlighted to show that gamification can be impactful in improving money management. Ten factors were highlighted as sources for financial literacy from participants and the positives and negatives were outlined for each of them. Lastly, this section showed that participants would be most motivated by the core drivers of *Development and Accomplishment* and *Empowerment of Creativity and Feedback,* however other core drivers need to be considered as well to cater for differences in personality.

5 CONCLUSION

5.1 INTRODUCTION

This chapter details a summary of this research study as well as possible opportunities for future research and a summary of the contributions of this study.

5.2 SUMMARY OF FINDINGS

The aims of this research study were to understand to what extent can gamification play a role in helping people to improve their financial literacy and manage their money better. To do this, three sub-questions were identified: 1) What are the challenges that affect the way in which people manage their money? 2) What contributes to financial literacy? and 3) What core drivers of gamification can be used to motivate people to improve their financial literacy and management of their money?

To answer these questions a thorough literature review was conducted to understand gamification and it's uses, financial literacy and money management, why it is important and the current state of affairs in South Africa and globally.

Interviews were conducted with participants to understand financial behaviour, their levels of financial literacy and what core drivers of gamification would be motivating for them. A summary of the findings is found in the sections below.

5.2.1 Sub-question One: What are the challenges that affect the way people manage their money?

In section 4.4.1, this study identified twelve challenges that affect the way in which people manage their money. Out of those twelve, this study provided examples of how gamification can positively impact eight of them. These eight are: 1) *Lack of knowledge and education*, 2) *Personal circumstances or goals not catered for*, 3) *Financial jargon*, 4) *Lacking discipline*, 5) *Fear of their current situation*, 6) *Lack of interest,* 7) *Having an overview of their finances,* and 8) *Lack of trust or comfortability with banks or financial institutions*.

Gamification cannot directly prevent the challenge of *unexpected cost or emergencies but* has been successful in helping individuals plan better and save towards these situations.

Lastly, the three challenges of 1) *Increasing prices/cost of living*, 2) *Low salary or not having money to manage,* and 3) *Taking care of family members* cannot directly be solved through gamification, as all three challenges are as a result of external factors and not directly related to an individual's financial motivation. Gamification can provide assistance, possibly through gamified mentorship, financial communities, and hints or nudges to help individuals to cope with these three challenges and their effect on their finances but cannot assist to directly remove it altogether.

5.2.2 Sub-question Two: What contributes towards financial literacy and the way they manage their money?

Firstly, only 30% of participants answered all three financial literacy questions correctly as shown in section 4.3.5. Most participants answered the questions on saving correctly, but most participants struggled with the question on investing. This was in line with responses to many questions in this study where participants claimed that they are comfortable with saving and the basics of managing their money but lack knowledge on investing and other advanced topics. Some participants do however feel that this is enough and have no intention of wanting to expand their financial knowledge. There is also a gap between how financially literate participants thought they were versus how financially literate they actually were.

In section 4.4.2, it was identified that the following factors that contribute towards financial literacy: *1) Information from family and friends, 2) Information from financial advisors and bankers, 3) Life experiences, 4) Information gathered when a trigger or life event occurs, 5) Searching online/online articles, 6) Social media, 7) Learning through their jobs, 8) Banking or other financial institution applications, 9) Reading books,* and *10) Online videos and podcasts.*

All of the factors mentioned have positive and negative consequences, as outlined in Section 4.4.2. The main points of discussion around participants' current sources of financial literacy are: 1) The way in which participants currently receive financial information might leave many gaps in their knowledge, they do not use a variety of sources, and their sources could be unverified and inaccurate. 2) Most participants do not proactively look for financial information. They only learn more when there is a specific need. This leaves them open to having information too late or missing out on financial opportunities. 3) Financial literacy is dependent on the resources available. This causes there to be a gap in financial literacy levels, due to the fact that some individuals have more access to resources than others.

5.2.3 Sub-question Three: What core drivers of gamification can be used to motivate people to improve their financial literacy and management of their money?

As stated in Section 4.4.1, most of the challenges that affect the way in which people manage their money that were listed by the participants in the study have been solved by gamification in other industries. If applied the right way, and the right triggers are used, gamification can be successful in financial literacy and money management as well. Some of the challenges such as “unexpected items/emergencies”, “fear of current situation” and “having an overview of my finances” are already being addressed successfully in financial literacy and money management.

In section 4.3.6, *Core Driver 3: Empowerment of Creativity and Feedback* and *Core Driver 2: Development and Accomplishment were* identified as the key core drivers for participants. This is directly related to the challenges identified in this study, and one of the biggest challenges was that people lacked relevant information on how to manage their money and how to grow it. This was stated by the majority of participants and reflected in *Empowerment of Creativity and Feedback* being chosen 90% of the time and *Development and Accomplishment* being chosen 80% of the time. All core drivers were selected but the next core driver (*Core driver 4: Ownership and Possession*) was selected by at least 50% fewer participants than the predominantly chosen core drivers. This was due to the remaining core drivers being selected depending on the personality of the participant, as opposed to a money management need. That is not to say that a gamified financial literacy and money management solution needs to have all of the gamified core drivers, but a key target market should be identified, and their personality traits would be important.

5.2.4 Primary Question: To what extent can gamification play a role in helping people to improve their financial literacy and therefore manage their money better?

This study has identified that gamification can have a positive impact in helping people to improve their financial literacy and manage their money better. The literature review conducted in Section 2.2 and examples provided in Section 4.4 show that in some cases gamification already plays a role in improving financial literacy or plays a role in combating the challenges that participants identified in Section 4.3 in other industries. The interviews conducted and analysed in Section 4.3.4 provided a more detailed explanation of what individuals in South Africa would find motivating in a gamified solution to financial literacy and money management. Gamification solutions predominantly need to ensure that feedback provided needs to be specific to them and not general financial information. This feedback should also provide the individual with the opportunity to try out different options in their own ways to understand what works and what does not. Individuals also want to be rewarded for their efforts or given a level of recognition for overcoming their challenges. Financial rewards would work best as this would provide the individuals with more of an incentive to do well. It would show that their efforts are working well and that the gamified solution is effective.

However, gamification alone cannot completely eradicate the problems of financial literacy and money management on its own. As shown in Section 4.4.1, some of the challenges that individuals face, namely: 1) *increasing prices/cost of living*, 2) *low salary or not having money to manage,* and 3) *taking care of family members* are not within the control of the individual. It has been shown in Section 4.4.1 that advice can be provided on how to cope with these problems, but ultimately if individuals have little or no money to manage well or invest, gamification cannot play a role in managing money. In this case, gamification and gamified tools for money management may only be relevant for individuals in the middle to upper income brackets in South Africa.

Gamification can be more useful in specifically teaching financial literacy and providing financial knowledge to individuals in all income levels in South Africa. Individuals can still learn about financial concepts even though they do not have the money to practically apply their learnings yet, provided that the information is free. However, information needs to be developed and disseminated in a way that individuals feel that it is relevant to them and takes their circumstances into account. These solutions need to cater for an individual's current circumstances and levels of financial literacy before providing relevant content so that the individual feels understood and catered for. Gamification has proven to be popular worldwide because it is “fun” and “engaging” and can be a powerful tool in financial literacy and money management, especially for individuals that do not have these topics at the forefront of their minds, do not find it interesting, or only become engaged with it reactively.

Therefore, gamification can be effective, however it needs be part of a larger collaborative journey to centralise, verify and formalise financial literacy and money management.

5.3 SUMMARY OF CONTRIBUTIONS

The first contribution which this research study makes is a detailed understanding of which core drivers of gamification would motivate South Africans to become more financially literate and manage their money better, and why these core drivers would motivate them. Banks, financial technology companies, other financial institutions or possibly the government would be able to improve financial education with this information. This study is one of the first that looks at how gamification can improve financial education, specifically in South Africa, with other studies taking place internationally, such as (Bayuk & Altobello, 2019) which looked at gamification and financial literacy in the United States of America, and (Inchamnan et al., 2019) which looked at a similar topic in Thailand. South African research has looked at gamification in other industries such as healthcare (Devar, 2020), skills development (Henning et al., 2017) and education (Adukaite et al., 2017), but not specifically at gamification in respect to financial literacy and money management.

This study also identifies the challenges faced by South Africans in managing their money and sources that contribute towards an individual’s financial literacy. The challenges identified outline the factors that prevent South Africans from managing their money well and can be used by financial institutions or government organisations to assist the general public in solving those challenges, even in the absence of gamification. The sources that contribute towards financial literacy highlight the need for standardisation of information, however they can be used by organisations to improve their financial literacy solutions using the sources that were popular amongst participants.

The second contribution of the study is that it adds to the pool of research that exists regarding gamification, as well as financial literacy and money management in South Africa.

5.4 FUTURE RESEARCH

As the gamification field is growing, its application in various research fields also grows. Particularly in the financial literacy and money management context, the same research that was conducted in this study can be conducted in other countries to understand whether the results may differ.

Research can also be conducted to understand how gamification can be used to motivate children to become more financially literate and manage their money well. Small businesses could possibly be another angle that can be researched, whereby gamified methods to manage money might be different when making decisions on behalf of a business as opposed to being an individual.

Gamification research could also apply to other industries, including what core drivers of gamification could help to improve: 1) overall education in schools and universities, 2) productivity in workplace environments, 3) online and social media behaviour, or 4) caring for the environment and other sustainability programmes.

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7 APPENDICES

7.1 APPENDIX A – INTERVIEW QUESTIONS

Section One: General/Profile Questions

1) Age
   - (18 – 25)
   - (25-35)
   - (35-45)
   - (45-55)
   - (55+)
   - I prefer not to say
2) Gender
   - Male
   - Female
   - Non-binary
   - I prefer not to say
3) Level of Education
   - Did not complete school
   - Matric
   - Diploma
   - Bachelors degree
   - Post graduate degree
   - PhD
   - I prefer not to say
4) Current Employment Status
   - Unemployed
   - Part time
   - Freelance
   - Full time
   - I prefer not to say
5) Salary range
   - R0 – 200 000
   - R200 001 – R400 000
   - R400 001 – R600 000

- R600 001 – R800 000
- R800 001 – R1 000 000
- R1 000 000+
- I prefer not to say

6) Number of dependents
    - 0
    - 1
    - 2
    - 3
    - 4
    - 5+
    - I prefer not to say

Section Two: Financial Behaviour Questions

These statements were read out to the participant and the participant was asked to state their answer based on the scale below. Follow up questions were asked as to why the chose the answer they did.

Please state the answer that most corresponds to your answer on a scale of 1 to 5 where:
1 = I strongly disagree
2 = I disagree
3 = I am neutral
4 = I agree
5 = I strongly agree

1) I have all the information I need to know how to manage my money well.
2) I read more on how to manage money.
3) I reach out for help when it comes to managing my money.
4) I would say that I am financially savvy.
5) I need help with managing my money and making financial decisions.
6) I save a portion of my income every month.
7) I create a budget every month.
8) I am always able to spend less than I earn.
9) I am always put money into a savings account, property, or other types of investment.
10) When I retire, I will be able to continue my current lifestyle on the money that I saved.
11) I am able to withstand the increasing prices in the country including interest rates, fuel, electricity and other increases.
12) If there is an emergency, I have at least 3 months of income saved.

13) I am able to prioritize buying just the items I need.
14) I always consider whether I really need an item before buying it.
15) I always compare prices before buying an item.
16) I use digital platforms like websites and apps to help me learn more about money management.
17) Information online is sufficient to help me learn more on how to manage my money better.

- What are the biggest challenges that impacts your ability to manage your money in the best possible way you can?
- Can you talk about the process that you go through to manage your money?
- How do you currently learn more about how to manage your money?

Section Three: Financial Literacy Questions

1) Suppose you had R100 in a savings account and the interest rate was 2% 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 R100
    - Exactly R102
    - Less than R102
    - Do not know
    - I refuse to answer
2) Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?
    - More than today
    - Exactly the same
    - Less than today
    - Do not know
    - I refuse to answer
3) Please tell me whether this statement is true or false. “Buying a single company’s stock usually provides a safer return than a stock mutual fund.”
    - True
    - False
    - Do not know
    - I refuse to answer

Section Three: Gamification Questions

I first explained what Gamification is and how it's used throughout the world. I then explained each of the core drivers of Gamification and provided examples of each core driver, first generally and then how it could be used in a Money Management context.

Based on the explanation, I then asked them to choose 3 of the core drivers, listed below, that would be the most motivating and helpful to them in learning more about money management and in managing their money better.

1) **Epic Meaning and Calling –** Where you are the doing something that feels greater than just yourself. By doing something, either for yourself or for others, you feel like you are the "Chosen one". You feel like you are gifted.

   In a money management context, it could be having sharing money management knowledge that only you have access to. For example, only you had access to knowledge on how to trade and grow your money.

2) **Development and Accomplishment –** You are challenged, and you overcome that challenge to win a financial reward, points, badges, trophies, or other types of rewards.

   In a money management context, it would be where you could get more money, other financial rewards, badges, or trophies for improving your financial literacy and managing your money better.

3) **Empowerment of Creativity and Feedback –** With this core driver, it's made up of 2 key concepts; firstly, it's about learning and getting feedback on what you have done so you can improve. Secondly, it's also it's about being creative and trying different things to be able to express yourself.

   In a money management context, it would be where you could get valuable feedback on how to manage your money better or also use that feedback to try different things to be able to improve.

4) **Ownership and Possession –** This deals with being able to own things and show that it is yours. You are able grow it and make it better. This could be related to the accumulation of wealth, virtual currency, avatars or just hobbies like collecting stamps or toy cars.

In a money management context, this could be owning and possessing more money, assets or just anything that can be owned or collected.

5) **Social Influence and relatedness –** This driver is also made up of 2 key parts: firstly, competition – being better or having more than someone else. Knowing that you are doing better and having people envy you. Secondly, it's being part of a mentorship, community, partnership, or peer group that makes you feel connected. It makes you feel inspired and want to do better.

   In a money management context, this would involve competing with others, knowing, and feeling that you know more than them or have more than them or being able to relate to others that are on the same financial journey that you are.

6) **Scarcity and Impatience** – This driver motivates people by playing on the fact that people want what they can't have. The fact you can't have something or that there's very few of it, makes you want it more.

   In a money management context, this could involve having knowledge about money management that others do not have or being able to acquire money that others would not have access to.

7) **Unpredictability and Curiosity –** This driver motivates people by tapping into the parts of our psychology that makes us want to know what's happening next. It's when things are intriguing. It's why people enjoy mystery novels or play games like "Spin the wheel".

   In a money management context, this would be learning and managing your money better because you feel intrigued about what it might bring.

8) Loss and Avoidance – This is when people do something because they might lose out on something or be punished for not doing something.

   In a money management context, it would be because you want to avoid losing out on more money and wanting to avoid debt.

Once the participant chose their 3 core drivers, I followed up by asking why they chose the answers that they did and to substantiate more on why the feel the way they do.

7.2 APPENDIX B – ETHICAL CLEARANCE

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

RESEARCH ETHICS COMMITTEE

Faculty of Economic and Management Sciences

Approval Certificate - Conditional

25 May 2023

Department: External department

Dear Mr T Devar

The application for ethical clearance for the research project described below served before this committee on: 2023-05-12

Protocol No:	EMS022/23
Principal researcher:	Mr T Devar
Research title:	THE USE OF GAMIFICATION IN IMPROVING MONEY MANAGEMENT
Student/Staff No:	29218099
Degree:	Masters
Supervisor/Promoter:	Prof MJ Hattingh
Department:	External department

The decision by the committee is reflected below:

Decision:	Conditionally Approved
Conditions (if applicable):	Conditional approval: Update the Gender Category which include (male, female, non-binary, prefer not to say).
Period of approval:	2023-04-03 - 2023-09-30

Sincerely

pp PROF JA NEL
CHAIR: COMMITTEE FOR RESEARCH ETHICS

7.3 APPENDIX C – RESEARCHER DECLARATION FORM

Hereby I, Thaverson Devar, in my capacity as the researcher, that

1 Research subjects will be informed, information will be handled confidentially, research subjects reserve the right to choose whether to participate and, where applicable, written permission will be obtained for the execution of the project (example of permission attached).

2 No conflict of interests or financial benefit, whether for the researcher, company or organization, that could materially affect the outcome of the investigation or jeopardize the name of the university is foreseen.

3 Inspection of the experiments in loco may take place at any time by the committee or its proxy.

4 The information I furnish in the application is correct to the best of my knowledge and that I will abide by the stipulations of the committee as contained in the regulations.

5 Signed: _____ T Devar ______ Date: 30 September 2023

7.4 APPENDIX D – CONSENT FORM

Combined Letter of Introduction and Informed Consent

Department of Informatics

The use of Digital Gamification to improve Money Management

Research conducted by:
Mr T Devar, 29218099, 0844725553

Dear Participant

You are invited to participate in an academic research study conducted by Thaverson Devar, a Masters student from the Department of Informatics at the University of Pretoria.

The purpose of the study is to understand how digital gamification can be used to help people in South Africa manage their money better. Digital gamification is the use of game like elements such as rewards, points, badges, competitions, and leaderboards to motivate people in real life scenarios. Further explanation of these elements will be provided in the interview.

As a participant, I require you to answer questions related to your understanding of financial concepts, your feelings towards your current financial situation and, after I explain each Gamification element, tell me which of these, if any, would motivate you.

There are no risks. All names and other personal information will be confidential.

Please note the following:

- This is an anonymous study, and your personal information will not appear on any transcript. The responses you give will be treated as strictly confidential as 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.
- I understand that all data collected for this study will be stored on a safe and secure platform as governed by the University of Pretoria's Research Data Management Policy.
- The nature, objective, possible safety and health implications have been explained to you and you understand them.
- You understand that no loss or penalty will be involved should I wish to not participate in the study.
- Please answer the questions in the interview as completely and honestly as possible. This should not take more than 60 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 study leader, Dr M Hattingh (marie.hattingh@up.ac.za) if you have any questions or comments regarding the study.
- The audio of this interview will be recorded for documentation purposes and to help the researcher clarify any points made in the interview.

In research of this nature the study leader may wish to contact respondents to verify the authenticity of data gathered by the researcher. It is understood that any personal contact details that you may provide will be used only for this purpose and will not compromise your anonymity or the confidentiality of your participation.

Please sign the form to indicate that:

- You have read and understand the information provided above.
- You give your consent to participate in the study on a voluntary basis.

Participant's signature **Date**

7.5 APPENDIX E – LANGUAGE EDITING CERTIFICATION

KNG LANGUAGE EDITING SERVICES
"Say It With Style"

K.N. Groenewald
22 Marais Street
Bailey's Muckleneuk
Pretoria
0181
0829366250

20 October 2023

To Whom It May Concern

CONFIRMATION OF LANGUAGE EDITING OF A MASTERS DISSERTATION:

THE USE OF GAMIFICATION IN IMPROVING MONEY MANAGEMENT

Herewith confirmation that the abovementioned dissertation, by Mr Thaverson Devar, has been language edited.

Yours sincerely

K.N. Groenewald