

**THE VALUE OF APPLICATION (APP) GAMES IN ENTRPRENEURIAL
EDUCATION**

by

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and

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**Treatise submitted in partial fulfilment for the degree of
Bachelor of Commerce Honors
(Business Management)**

in the

Faculty of Business and Economic Sciences

at the

Nelson Mandela University

28 October 2019

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DECLARATION

I, **Odwa Masiza (214336387)** hereby certify that the treatise titled “**The value of Application (APP) games in entrepreneurial education**” is my own work and has not previously been submitted for assessment or completion of any postgraduate qualification to another university or for another qualification.

I attest that no form of plagiarism has been conducted in this study, and that we have provided references in all cases where we have quoted from the work of others or used other individuals' ideas or reasoning in this research study.

A handwritten signature in dark ink, appearing to read 'Odwa Masiza', is written over a horizontal line.

ODWA MASIZA

Date: October 2019

DECLARATION

I, **Morwakoma Moswane, (217690505)** hereby certify that the treatise titled “**The value of Application (APP) games in entrepreneurial education**” is my own work and has not previously been submitted for assessment or completion of any postgraduate qualification to another university or for another qualification.

I attest that no form of plagiarism has been conducted in this study, and we have provided references in all cases where we have quoted from the work of others or used other individuals' ideas or reasoning in this research study.

A handwritten signature in black ink, appearing to be 'MS', written over a horizontal line.

MORWAKOMA MOSWANE

Date: October 2019

ACKNOWLEDGEMENTS

I, Odwa Masiza, would like to thank the following people and institutions for their contributions towards this study:

- My supervisor, Prof. Shelley Farrington for her guidance, continuous encouragement and unconditional support throughout the duration of the study.
- My study partner, Morwakoma, for working with me throughout the year. I am grateful for his dedication and commitment which were pivotal in the completion of this study.
- The administration and staff of the Department of Business Management at Nelson Mandela University.
- My amazing parents, family and friends for their continuous love and support.

ACKNOWLEDGEMENTS (cont.)

I, Morwakoma Moswane , would like to thank the following people and institutions for their contributions towards this study:

- My supervisor, Prof. Shelley Farrington for her guidance, continuous encouragement and unconditional support throughout the duration of the study.
- My study partner, Odwa, for working with me throughout the year. I am grateful for his dedication and commitment which were pivotal in the completion of this study.
- The administration and staff of the Department of Business Management at Nelson Mandela University.
- My amazing parents, family and friends for their continuous love and support.

ABSTRACT

Entrepreneurship is the backbone of developing countries like South Africa. Therefore, it is important for educators to assess the various methods which can be used in entrepreneurship education. Entrepreneurship education seeks to provide students with the relevant knowledge required to start and grow a business. Various methods of entrepreneurship education exist and the effectiveness of each differs. Therefore, the primary objective of this study was to gain insight into the value of APP games in entrepreneurial education, ultimately seeking to understand whether playing APP games can enhance the entrepreneurial self-efficacy and entrepreneurial intention of students.

In order to achieve the objectives of this study, a comprehensive literature review was conducted in order to describe entrepreneurship education, the experiential learning theory, games in entrepreneurship education and the outcomes of entrepreneurship education. Following that, an empirical investigation was undertaken where a case study methodology was adopted. More specifically a single case study was used, namely the Hay Day game. The participants in the study played the Hay Day APP game for 2 months in order to determine whether this method of entrepreneurship education would bring value to entrepreneurship education.

From the empirical investigation it was observed that the players levels of entrepreneurial self-efficacy improved. The improvement was influenced by the many activities the players had to perform while playing the APP game. The players had to implement business related strategies in order for their fictional businesses to move through the different levels in the game. Throughout the game the players used different strategies and this may have influenced how they view business. Furthermore, the players learnt lessons that related to the eight business functions while playing the game. These lessons illustrated to the players the importance of the business functions when running a business. The lessons were not isolated in that when playing the game many lessons from business were learnt in one session. However, even though both players learnt lessons associated with the eight functional areas of business, one player was further ahead in the game than the other. The players had also recorded their negative and positive experiences relating to running

their virtual business. This ranges from the game being fun and easy to being too boring.

This study has contributed to the body of knowledge associated with playing games in the classrooms to enhance the learning capabilities of students. From both the literature and the empirical results, it is evident that playing games can enhance the learning capabilities of students. This study further suggests that educators should implement more non-traditional learning methods in the classrooms as students can gain a better understanding of the content of their studies through experiential learning. Furthermore, this study may be used by educators in order to further investigate whether playing APP games adds value in education.

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CHAPTER ONE

BACKGROUND AND RATIONALE TO THE STUDY

1.1 INTRODUCTION

According to Ayankoya (2016:2), entrepreneurship is the backbone of developing economies. This is the case because entrepreneurs create various job opportunities which have a rippling positive effect on the economy (Preisendorfer, Bitz & Bezuidenhout, 2011:1). Moreover, entrepreneurship has the ability to empower citizens and is an urgent need for emerging economies, like South Africa, to ensure that the economy will grow and integrate into the global economy (Fal, Sefolo, Williams, Herington, Goldberg & Klaasen, 2010:3)

Entrepreneurial firms make a large contribution to the economy. More importantly, they play a pivotal role in innovation that fosters change and growth in technology and products (Elmuti, Khoury & Omranand, 2012:83). The Global Entrepreneurship Monitor (GEM) mentions that South Africa generally has low levels of entrepreneurial activity, in contrast to other countries that participate in this survey (Herrington, Kew & Mwanga, 2017). However, although South Africa has one of the best performing economies, Gross Domestic Product (GDP) and the most developed infrastructure in Africa, entrepreneurial activity and entrepreneurial intentions prove to be relatively low in comparison to other African countries (Herrington, Kew & Mwanga, 2017). The GEM report of 2016/17 further states that South Africa's entrepreneurial intentions have had a considerable drop from 15.4% in 2013 to 10.1% in 2017 (Herrington *et al.*, 2017). Furthermore, it is evident that the early stage entrepreneurial activity in the country is also low and there is a large gap between South Africa and the rest of the continent (Ayankoya, 2016:7).

There are various reasons that contribute and play a role in the low levels of entrepreneurial activity in South Africa. According to a paper published by Endeavour South Africa, Ebrahim Patel, the minister of economic development has mentioned that South Africa has not created an environment that fosters growth for entrepreneurs (Fal, Daniels, Williams & Bantobetse, 2011:6). Above all, the South African economic

environment does not enable entrepreneurs to flourish. Moreover, results published by the GEM report reveal that a pertinent reason for the low levels of entrepreneurial activity is because the country has gone through several economic and political setbacks. These setbacks have had an adverse impact on entrepreneurial activity as individuals have encountered problems in accessing finance not only to start the business but also to sustain them into the future (Herrington *et al.*, 2017)

One of the most important reasons for the low levels of entrepreneurial activity in South Africa is the lack entrepreneurial education that provides knowledge and guidance on business start-ups, obtaining finance and ensuring sustainable business practices (Von Broembsden, Wood & Herrington, 2005:36; Chimucheka, 2014:408). According to Herrington and Wood (2003:11), one of the factors that hinder individuals from being entrepreneurs is education, as many young South Africans are not confident that they have the necessary skills to start a business. This suggests that the current entrepreneurial education methods are not adequately preparing individuals to become entrepreneurs. Moreover, it hinders these individuals from acquiring necessary skills and knowledge to become responsible, enterprising individuals who have the ability to take calculated risks, plan effectively and learn from past experiences (Bhenkele & Ndedi, 2010:5; Chimucheka, 2014:408).

It is against this background that the problem statement and the research objectives for this chosen study have been formulated.

1.2 PROBLEM STATEMENT AND PURPOSE

Despite the important role that entrepreneurship plays in transforming an economy from an emerging economy to a developed economy, entrepreneurial levels in South Africa are low. Inadequate and ineffective entrepreneurship education in South Africa is contributing to this problem (Chimucheka, 2014:408; Ayankoya, 2016:2). As a result students are ill prepared for pursuing entrepreneurial ventures. According to Fatoki and Garwe (2010:731), students do not feel like they are equipped with the knowledge that will assist them in establishing and managing their own business.

In light of these claims, it is imperative to gain deeper insight into the teaching and learning methods that can be implemented to ensure that students are adequately prepared to embark on entrepreneurial ventures. More specifically whether the use of application (APP) games can improve the ability of students to learn how to start and run their own business, and in turn improve their levels of entrepreneurial self-efficacy and entrepreneurial intentions.

Given the abovementioned, the purpose of this study is to explore the value of using APP games in entrepreneurial education. In addition, the purpose is to establish whether these games can improve the levels of entrepreneurial self-efficacy and entrepreneurial intentions of students. By having a clear understanding of the value that APP games add in educating students, this study may assist in creating new learning methods that can be implemented in entrepreneurial education to assist educators and learners to establish new learning experiences.

1.3 RESEARCH OBJECTIVES

Based on the problem statement and the purpose of the study, the primary, secondary, and methodological research objectives are presented in the sections to follow.

1.3.1 PRIMARY AND SECONDARY OBJECTIVES

The primary objective of this study is to explore the value of using APP games in entrepreneurial education. To achieve this primary objective, the following secondary research objectives are formulated:

- SO₁ To establish whether playing APP games provides students with real-life entrepreneurial lessons.
- SO₂ To establish whether playing APP games enhances the entrepreneurial self-efficacy of students.
- SO₃ To establish whether playing APP games enhances the entrepreneurial intentions of students.

1.3.2 METHODOLOGICAL RESEARCH OBJECTIVES

In order to address the primary and secondary objectives of this study, the following methodological research objectives are formulated:

- MO₁ To undertake a theoretical investigation into entrepreneurship education as well as the use and value of games in entrepreneurial education.
- MO₂ To determine the appropriate research methodology to address the identified research problem and research objectives.
- MO₃ To develop a reflective journal template to collect the necessary data.
- MO₄ To summarise, analyse and interpret that data collected from the reflective journals of participants.
- MO₅ Based on the empirical results of this study, to put forward recommendations on the use of APP games to both students and educators of entrepreneurship.
- MO₆ To suggest areas for future research in terms of using APP games as tools for entrepreneurial education.

1.3.3 RESEARCH QUESTIONS AND UNDERLYING THEORIES

Based the objectives of the study, the following research questions are posed:

- RQ₁ Does playing APP games provide students with real-life entrepreneurial lessons?
- RQ₂ Does playing APP games enhance student's entrepreneurial self-efficacy?
- RQ₃ Does playing APP games enhance student's entrepreneurial intentions?

In order to answer these research questions, the current study draws on the experiential learning theory. This theory states that the process of learning occurs because knowledge evolves through the process of experience (McLeod, 2013:1-4). The Experiential Learning Cycle includes four stages, namely: concrete experience, reflective observation, abstract conceptualization and also active experimentation (McLeod, 2013:1-4). The experiential learning theory is an excellent tool to explain why playing APP games will add value to a student's entrepreneurial self-efficacy and

also to their entrepreneurial intentions because students learn everything through active participation. By playing the game they are actively participating and thus developing their business acumen.

1.4 RESEARCH DESIGN AND METHODOLOGY

1.4.1 LITERATURE REVIEW (SECONDARY RESEARCH)

A literature review is done on the following: entrepreneurship education, teaching and learning methods used in entrepreneurship education and experiential learning theory as well as the various outcomes of entrepreneurship education, most notably entrepreneurial self-efficacy and entrepreneurial intention. This study uses a variety of different sources in order to undertake the literature review, including various internet sources and several online databases including Google Scholar, Research Gate and Emerald Insight. Furthermore, information is sourced from various books, publications and reports found in the Nelson Mandela University library, and elsewhere.

1.4.2 EMPIRICAL INVESTIGATION (PRIMARY RESEARCH)

In order to describe the methodological choices made in the study the model of Saunders's (2016), or the research onion, is used. In the paragraphs below the various layers of the onion is introduced. More details can be found in Chapter 3.

1.4.2.1 Research Paradigm (Philosophy) and Methodological Approach

The first layer of the research onion relates to the research philosophy or research paradigm. According to Kivunja and Kuyuni (2017:1-16), a research paradigm is a set of beliefs an individual has about the world around them and how they want that world to be. Chilisa and Kawulich (2012:2) suggest that what an individual will view as reality, along with what they know and do not know, influences how a philosophy is selected.

There are two main research paradigms, namely the positivistic paradigm, which focuses on a precise measurement of quantitative data, and the interpretivism paradigm, which uses qualitative research to gather and analyse information (Struwig

& Stead, 2013:5). The current study is positioned in the interpretivism paradigm. This paradigm is appropriate as the study makes use of qualitative data which will give information on human nature (Chilisa & Kawulich, 2012:3).

The next layer of the research onion refers to the methodological approach adopted for the study. There are two types of methodological approaches that can be used namely a deductive or an inductive approach. Deduction starts with information that is general such as a formulated hypothesis and ends with specific information such as whether the hypothesis is accurate or not (Burney & Saleem 2008:7). This means that hypotheses are made and experimentation is done to either support or deny these hypotheses (Soiferman, 2010:8). An inductive approach uses themes to build interconnectivity between observation and experience (Soiferman, 2010:2). This means that the inductive approach uses qualitative research which may be in the form of personal interviews or case studies (Soiferman, 2010:7).

For the purposes of this study an inductive approach is used. This is because the researches use a qualitative research method to collect the data.

1.4.2.2 Qualitative Research Method/Strategy

Qualitative research is associated with an inductive approach to theory development and involves a study into human nature (Struwig & Stead, 2013:5). Qualitative methods include focus groups, interviews, content analysis and case studies. Qualitative research methods need to be credible, transferable, dependable and confirmable (Wiid & Diggines, 2015:64).

The research method or strategy adopted in this study is the case study. A case study is an opportunity to study a phenomenon in context and also develop an understanding as to how a study relates to the context. There are two types of case studies namely, single or multiple case studies (Gustafsson, 2017: 3). A single case study looks at one case and develops conclusion whereas multiple case studies looks at a variety of scenarios to understand differences and similarities (Gustafsson, 2017: 3).

This study uses a single case study as one APP game will be played for the duration of the study. This method is considered suitable because it is fairly inexpensive to use a single case study and also this type of case study may give the researchers further understanding into the study (Gustafsson, 2017:11).

1.4.2.3 Data Collection

In the following section, the population and sampling is briefly described. Thereafter, a discussion of the various data collection tools and processes is given. This will be concluded by the data analysis.

1.4.2.3.1 *Population and sampling*

The target population for this study consists of all business APP games that are used in entrepreneurship education. In addition, Asiamah, Mensah and Oteng-Abayie (2017:1613), define the accessible population as the remainder of participants (business APP games) from the target population which cannot be accessed due to various constraints. The accessible population, for the purpose of this study are all accessible business application game that are used in entrepreneurial education.

For the purposes of this study, the population consists of all business APP games that are used in entrepreneurship education. The sampling technique is used is a non-probability sampling technique. This sampling technique is used because it is relatively inexpensive, it takes less time to complete and it is more convenient to use (Wiid & Diggines, 2015:191). More specifically, convenience sampling is the sampling method used because the “sample is drawn from a section of the population that is readily accessible or available to the researcher” (Wiid & Diggines, 2015:191).

1.4.2.3.2 *Data collections tools and process*

The data analysed in the current study is collected from two sources. Firstly, the entrepreneurial lessons learnt from playing the selected APP game was recorded in reflective journals by the reseachers themselves while playing game. Reflective journals are also known as reflection or reflective writing and occur during and after

situations with the primary purpose being to gain a deeper understanding of an individual and the situation at hand (Kathpalia & Heah, 2008:301). Reflective journaling or writing involves the contemplation of thoughts, feelings and happenings that relate to a given situation and writing these down (Naber & Markley). According to Kathpalia and Heah (2008:31), reflective writing allows writers to examine and clarify all thoughts that would be floating in their mind. More importantly, reflective writing assists students to combine their experience with their knowledge, in order to apply theory to practice (Kathpalia & Heah, 2008:301).

For a period of two months, the two researchers played the selected APP game in 24 hour sessions. During this time they completed a reflective journal for each time period of playing the game. A time period started when they started playing the game at any given time on any specific day and ended when they stopped playing on that day. When completing the journal they documented their thoughts, feelings and happenings, as well as experiences and decisions made during the time period of playing the game. Insights and lessons learnt about starting and managing an own business were also recorded.

Prior to playing the game each participant responded to several questions measuring their entrepreneurial self-efficacy and entrepreneurial intentions. These questions have been proved to be valid and reliable in previous studies. After the period of playing the game, the participants once again completed these questions. The aforementioned is the second source of data for the current study and gives insights into the value of playing the game.

1.4.2.4 Data Analysis

The data collected from the reflective journal was analysed by making use of content analysis. According to White and Marsh (2006:3), content analysis is a research technique that makes valid inferences from texts. Elo and Kyngäs (2007:107) further add that content analysis is a method of analysing written or verbal data. The researchers analysed the text presented in the reflective journals. In addition, the data collected from the questions measuring entrepreneurial self-efficacy and entrepreneurship intention was summarised and tabulated.

1.5 TRUSTWORTHINESS AND ETHICAL CONSIDERATION

1.5.1 TRUSTWORTHINESS

According to Cox, Kersbamer and Neurer (2015:197), trustworthiness is how reliable or credible a source is. To ensure trustworthiness in a research paper certain criteria needs to be looked at namely: credibility, transferability, dependability and confirmability (Shenton, 2004:64-73). For the purposes of this study, to ensure trustworthiness, the participants recorded everything they did in reflective journals and gave an accurate account of their experiences.

1.5.2 ETHICAL CONSIDERATIONS

According to Resnik (2013:1), ethics are values instilled in an individual that enable them to critically evaluate what is right and what is wrong. These principles instilled in an individual may be their level of honesty, objectivity, confidentiality and respect for intellectual property (Resnik, 2013:2-3).

This study takes into consideration the honesty of the researchers playing the APP game. This is because over the two month period the game needed to be played consistently and records needed to be kept. These records reveal if the participants were honest about the APP game and their experiences.

1.6 SCOPE AND DELIMITATION OF THE STUDY

As discussed in the literature section there are different learning methods and learning theories that can be adopted by different individuals. The learning method that will be investigated in this study will be that of experiential learning through using an APP game. Although there are many other business simulation APP games the participants will only focus on one game throughout the study. There are also several outcomes of entrepreneurship education but this study will only focus on the entrepreneurial self-efficacy and entrepreneurial intention.,.

1.7 KEY CONCEPTS

The key concepts that will be used in this study are clarified in the section that follows.

1.7.1 ENTREPRENEURSHIP

Entrepreneurship is an activity that entails individuals to take calculated risks when creating or reviving a product or service which will add value, through discovery and exploitation of market opportunities while making profit (Amiri & Marimaei, 2012:151; Mbhele, 2011:94).

1.7.2 ENTREPRENEURSHIP EDUCATION

Entrepreneurship education refers to teaching that enhances an individual's ability to recognise commercial opportunities, while equipping them with the necessarily skills, knowledge and expertise to act on them (Chimucheka 2014:406).

1.7.3 GAMES

A game is a voluntary fictional activity consisting of one or more players which is interactive and is constrained by rules, time and space (Stenros, 2017:501).

1.7.4 APPLICATION GAMES

Application or APP games are technological based games that can be downloaded and stored on a smartphones, handheld devices and other electronic devices (Mayra, 2015:2).

1.7.5 ENTREPRENEURIAL SELF-EFFICACY

Entrepreneurial self-efficacy is the perceived confidence that individuals have in terms of their capabilities and skills to start and successfully run a business (Shahab, Chengang, Arbizu & Haider, 2019:264).

1.7.6 ENTREPRENEURIAL INTENTIONS

Entrepreneurial intentions refer to the personal orientation that lead individuals to create a new firm or a value adding product or service (Remeikiene, Startiene & Dumciuviene 2013:300).

1.8 SIGNIFICANCE OF THE STUDY

As mentioned in the background to this study, having an environment that stimulates and promotes entrepreneurship is important for economies especially in developing countries like South Africa. Therefore it is a necessity to develop students and educate them to become entrepreneurs. This study aims to illustrate how playing an APP game can influence the entrepreneurial self-efficacy and the entrepreneurial intention of an individual. By investigating how the entrepreneurial self-efficacy and entrepreneurial intention of an individual increases or decreases by playing APP games and having a system of reflecting on it, this study may influence further research on entrepreneurial education. This study is of relevance because it will reveal whether or not playing APP games will provide real-life entrepreneurial lessons and thus open doors for further research on business simulation games.

1.9 STRUCTURE OF STUDY

The structure of the research is set out below.

Chapter 1 provided the introductory chapter of this study. It commenced with the background of the study followed by the problem statement and purpose of the study. Furthermore, it revealed the research objectives, which are split into primary, secondary and methodological objectives. In addition, the research design and methodology and the trustworthiness and ethical considerations of the study were briefly be described. In addition, the scope and delimitations of the study was highlighted, and key concepts were clarified. This was followed by the significance of the study and structure of the study.

Chapter 2 will provide an overview of the literature relevant to the topic at hand. The chapter will begin with an overview of entrepreneurship education. Thereafter,

teaching and learning methods used in entrepreneurship education will be discussed. This will be followed by a conceptualisation of external learning theory and the use of games in entrepreneurial education. Thereafter, the outcome of entrepreneurship education will be discussed, and entrepreneurial self-efficacy and entrepreneurial intention will be elaborated on in detail.

Chapter 3 will deal with the research design and methodology which will be used to address the objectives of this study. The chapter will begin with a description of the chosen research paradigm and the methodological approach. Thereafter, a detailed description of data collection will be given. This will be followed by the data analysis and finally, the trustworthiness and ethical considerations of the study will be given,

Chapter 4 will present the empirical findings relating to the entrepreneurial lessons learnt as well as the player participation, experiences and performance. In addition, the levels of entrepreneurial intentions and entrepreneurial self-efficacy will be reported prior to and after playing the game.

Chapter 5 is the final chapter of this study and will provide an overview of the study as a whole. The findings will be discussed and related to the research questions. Finally, the contributions and limitations of the study will be highlighted.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

In Chapter 1, an introduction and background to this study was provided. In addition, the problem statement and research objectives were outlined. In this chapter, Chapter 2, the underlying theories and literature relevant to achieving the research objectives are discussed.

What follows is firstly a discussion on entrepreneurship education and the nature thereof. Following that, the experiential learning theory and how it applies to entrepreneurship education, will be elaborated on. Thereafter, a discussion on games in education and the nature thereof will take place. Chapter 2 will conclude with a discussion on the outcomes of entrepreneurship education, namely entrepreneurial intentions and entrepreneurial self-efficacy.

2.2 ENTREPRENEURSHIP EDUCATION

2.2.1 THE NATURE OF ENTREPRENEURSHIP EDUCATION

According to Byun, Sung, Park and Choi (2018:2), entrepreneurship education assists volatile societies in their development as it provides future entrepreneurs with knowledge for managing their own businesses, and ultimately to create jobs. Gautam and Singh (2015:24) suggest that entrepreneurship education aims to develop a society of individuals with entrepreneurial intentions. Furthermore, entrepreneurship education develops skills such as innovation and creativity in individuals so that they can be productive members of society (Gautam & Singh, 2015:24).

According to Fayolle (2008:199), entrepreneurship education involves motivating learners about becoming enterprising individuals, becoming an entrepreneur and becoming an entrepreneurial academic. The first learning type in entrepreneurship education is learning how to become an enterprising individual. This form of learning

seeks to motivate students to become more entrepreneurial and also to grow their knowledge of business (Fayolle, 2008:199). Learning how to become an enterprising individual focuses on the learner's state of mind and develops that state of mind by influencing their actions. Fayolle (2008:200) suggests that to find out if a learner wants to become an enterprising individual, the self-efficacy (term developed by Bandura) of the individual needs to be looked at. Self-efficacy may be looked at in four ways namely, cognitive, motivational, affective and selection process (Bandura, 1994:72). Cognitive refers to the belief that humans behave in a purposeful manner. If goals are set, individuals will be consistent in trying to achieve them. Motivational suggests that individuals are self-motivating and may develop a belief system about what they can and cannot do. Affective refers to the process that looks at the psychological processes of an individual. It is the self-analysis of how an individual manages stressful situations and how their thought processes have an effect on their decision making. Selection process is the belief that views people as products of their environments. The beliefs that are in individuals will influence the type of activities and environments they are involved in (Bandura, 1994:72).

Fayolle (2008:201) describes the second learning type as learning to become an entrepreneur. According to Cowdrey (2012:12), an entrepreneur is someone who has a clear and achievable vision, is confident and willing to take on calculated risks. In learning to become an entrepreneur, business-related education needs to be emphasised so that an entrepreneurial mind-set can be built (Fayolle, 2008:201). The business-related education needs to create real-life situations where individuals can establish whether or not they have what it takes to build their own businesses. It is further suggested that learning to be an entrepreneur is not how to manage a business but instead it is to learn to deal with situations as they emerge (Fayolle, 2008:202).

The third learning type involves learning to become an academic in entrepreneurship. According to Kaur (2011:10), academics are those individuals with an intention to teach, transmit information to students verbally, analyse how the information has been received and establish whether their students have been successful in what they have learned. Fayolle (2008:203) suggests that when learning to become an academic in entrepreneurship, focus should be put on the theory of the subject more so than

obtaining practical experience. Theory learned by academics may then be transferred to students in the form of experiential learning.

According to Lackéus (2015:10), education for entrepreneurs is categorised using three approaches. These approaches include teaching individuals “about” entrepreneurship which focusses on giving students a theoretical understanding of entrepreneurship. Lackéus (2015:10) states that a second approach for educating entrepreneurs is teaching “for” entrepreneurship which is the development of skills and knowledge required to become an entrepreneur. Finally, education for entrepreneurs is teaching “through” which puts students through experiential learning in entrepreneurial environments (Lackéus, 2015:10). Furthermore, Gautam (2015:24) suggests that there is a need for education about entrepreneurs as this indicates to students many different strategies in becoming enterprising individuals.

2.2.2 TEACHING AND LEARNING METHODS USED IN ENTREPRENEURSHIP EDUCATION

In order for entrepreneurship education to be effective, educators need to understand different teaching methods to administer work to students effectively (Samuel & Rahman, 2018:1809). According to Samuel and Rahman (2018:1809), entrepreneurship education can take place by giving students’ academic literature on entrepreneurship on the one hand, and by exposing them to real-life venture start up and practical experience on the other. Samuel and Rahman (2018:1809) contend that being exposed entrepreneurship education in the manner of academic literature and practical experience may increase the entrepreneurial intentions of students.

The teaching methods used in entrepreneurship education can be classified as traditional and innovative. Traditional methods are those that occur in classrooms and involve students getting lectured, whereas innovative methods involve the participation and sharing of ideas of both students and lecturers (Samuel & Rahman, 2018:1809). According to Arasti, Falavarjani and Imanipour (2012:5), traditional methods are less effective because students become “dormant participants” in the learning process. Traditional learning methods teach students to become employees

working for entrepreneurs, whereas Arasti *et al.* (2012:5), contend that they should be learning to become entrepreneurs themselves.

Innovative methods require an active environment that stimulates learning and encourages students to use their interests and abilities to learn about a topic (Samuel & Rahman, 2018:1809). Such methods include the development of business plans, team based learning where students are involved in group discussions and business competitions, presentations by entrepreneurs who give talks about their real-life business experiences, case studies which are a “bridge between theory and practice” and develops skills such as time-management and problem solving, and problem based learning where learning is focussed on a specific issue that entrepreneur may have and the management of it (Samuel & Rahman, 2018; Arasti *et al.*, 2012).

2.2.3 THE CHALLENGES FACING ENTREPRENEURSHIP EDUCATION

Although entrepreneurship education is a necessity for societies, this field of education faces several challenges. These include both teaching and research challenges (Vanevenhoven, 2013:466-467). Teaching challenges faced are that all students do not acquire information in the same way, and that different teachers have different learning experiences, which are not always in line with entrepreneurship education (Vanevenhoven, 2013:467). Research challenges include students not having an interest in the topic of entrepreneurship and not being motivated to pursue such topics (Vanevenhoven, 2013:466).

According to Arasti *et al.* (2012:5), when using traditional methods of teaching entrepreneurship, students are not motivated to become entrepreneurs. Furthermore, when using traditional methods students do not learn the skills that they need to develop their entrepreneurial self-efficacy (Samuel & Rahman, 2018:1809). As such when students are taught entrepreneurship using traditional ways, they are more likely to look for work than start their own businesses (Arasti *et al.*, 2012; Samuel & Rahman, 2018)

Although preferred, innovative methods of teaching entrepreneurship also have several drawbacks. For example, simulation games and visits by established

entrepreneurs can be quite costly (Samuel and Rahman, 2012:1809). According to Samuel and Rahman (2012:1809), “entrepreneurship education demands experiential learning styles”, to attract a student’s interest in the learning process. However, Vanevenhoven (2013:466) details that students do not acquire information in the same way. The issue then becomes that if students do not acquire information in the same way, the experiential learning process becomes different and may be costly in settings such as universities.

According to Samuel and Rahman (2012:1809) experiential learning is needed to attract students to the learning process. The theory underlying experiential learning is elaborated on below.

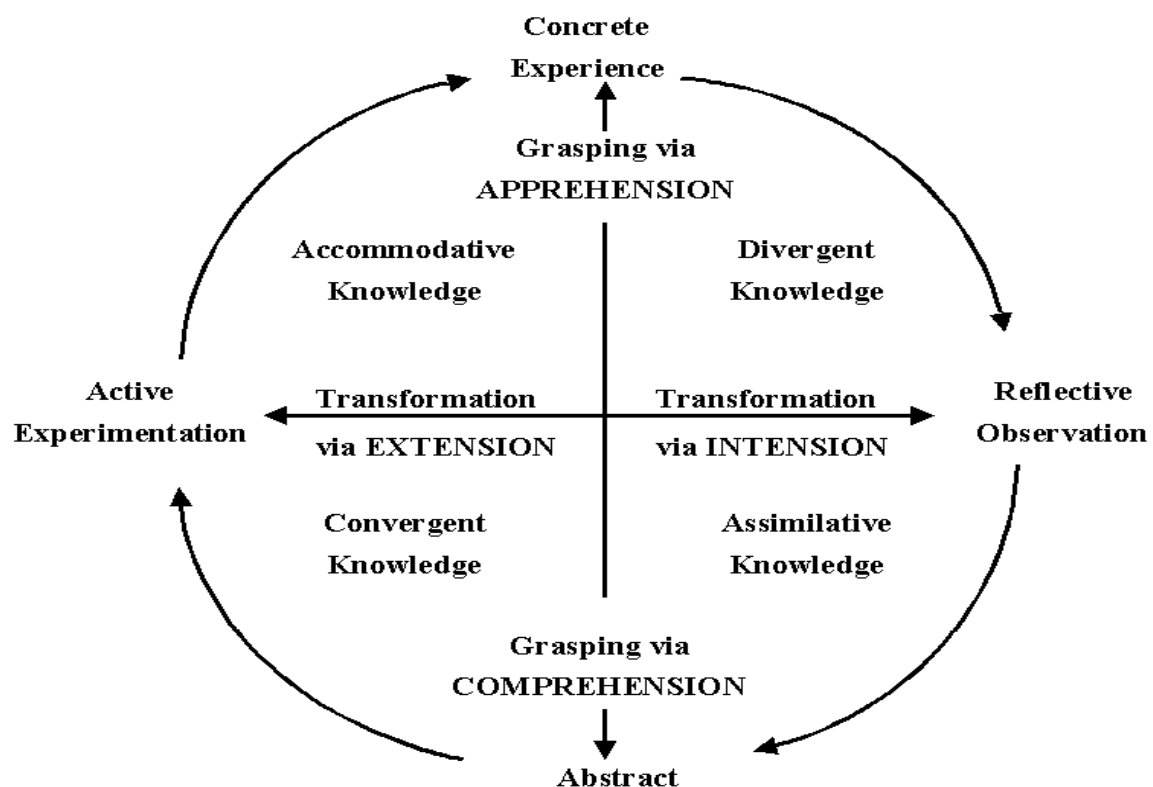
2.3 EXPERIENTIAL LEARNING THEORY

According to Kolb, Boyatzis and Mainemelis (1999:2), the experiential learning theory gives insights into how individuals develop through different learning techniques throughout their lives. The emphasis of this theory is on explaining how practical experience plays a role in learning experiences (Kolb *et al.*, 1999:2). In addition, experiential learning theory operates on two planes (see Figure 1.1) namely, the experiential learning cycle and the different learning techniques (McLeod, 2013:1).

The *experiential learning cycle* describes the learning experience in terms of “grasping and transforming”, each of which is divided into two experiences (Kolb & Kolb, 2011:44). Grasping and transforming is how knowledge in learning is created. Concrete experience falls under “grasping experiences” and this occurs when new information is learned, or pre-existing information expounded in a different manner. Abstract conceptualisation also falls under “grasping experience” and is the conclusion and recommendations that an individual will give after receiving the learning experience. This may be audits of how the students viewed the learning experience. Reflective observation is a “transforming experience” and involves a review of the new learning experience and also an indication of any problems or misrepresentations that may have occurred during the time of learning. Active experimentation is also a “transforming experience” and occurs when individuals go into the real world and acts out what they have learned into practice (McLeod, 2013:1; Kolb & Kolb, 2011:44).

According to Kolb and Kolb (2011:46-47), the experiential learning cycle is interrelated with *different learning techniques* which are namely: diverging, assimilating, converging, and accommodating. Diverging learning techniques are used by individuals who are receptive and intuitive, meaning that they learn better through concrete experience and reflective observation. Assimilating learning techniques are adopted by individuals who learn by observation and logical reasoning; they use abstract conceptualisation and reflective observation as preferred learning methods. Converging learning techniques are used by those individuals who learn by being physically and consciously involved in the learning experience. These students' experiences are based on concrete experience and active experimentation. Finally, accommodating learning techniques are used by individuals who prefer to learn by experimentation and intuition, these individuals learn from concrete experience and active experimentation (Kolb & Kolb, 2011:46-47). Figure 2.1 depicts the experiential learning cycles and different learning techniques.

FIGURE 2.1: EXPERIENTIAL LEARNING CYCLES AND LEARNING TECHNIQUES



Source: Kolb and Kolb, 2011:44

According to McFarland (2017:271), “little research has been done focussing on the intersection of both experiential learning and the use of technology to teach entrepreneurial literacy to youths.” McFarland (2017:269) notes that entrepreneurs generally learn less from traditional methods of education and that learning from practical business simulations would be more beneficial. Learning from experience plays a role in entrepreneurship education as it helps “managers” put into practice what they have learnt (Mukuthy & Williams, 2015). In the context of entrepreneurship education, experiential learning is beneficial as students gain concrete experience and are thus more likely to perform better in real-life situations (Mukuthy & Williams, 2015).

2.4 GAMES IN ENTREPRENEURSHIP EDUCATION

2.4.1 THE USE AND VALUE OF GAMES IN EDUCATION

According to Backland and Hendrix (2013:1), the use of games for educational purposes has become increasingly popular in recent years and there is an abundance of games designed specifically for education. In addition, the use of games as an educational tool has attracted the interest of many scholars in diverse fields of study (Breuer & Bente, 2010:7). Furthermore, as they become aware of the educational benefits, educators around the world are increasingly using games in their classrooms (Sandford & Williamson, 2005:1; Ulicsak & Wright, 2010:14). Today a variety of games are available on the market and educators have several options that suit their teaching needs (Schrier, 2016:21). Furthermore, Noemí and Máximo (2014:232) mention that gaming for educational purposes is inclusive as games can be used by individuals of all age groups, starting from the age of six.

Many examples of educational games exist. *Word search* is such a game that was developed for educational purposes (Zirawaga, Olusanya & Maduku, 2017:58). This is a word search game, where words can be placed horizontally or vertically (Zirawaga *et al.*, 2017:59). Word search requires the player to conduct intensive searches, and to further utilise information obtained from this search effectively. Another type of game which is used for educational purposes is that of *puzzles* (Zirawaga *et al.*, 2017:61-62). Zirawaga *et al.* (2017:61) states that the concept of puzzling requires an individual to rearrange the dispersed pieces into its original format. The use of puzzling

enhances the problem-solving skills of individuals. According to Noemí and Máximo (2014:232), other types of games used for educational purposes are games that enhance vocabulary and numeracy skills. An example of a game that enhances vocabulary is *Tik Tak* and a game that improves numeracy skills is *Tik Tak zenbakiak*.

The use of games as an educational tool presents numerous advantages. Playing games allows students to be more hands-on which ensures that they are more engaged in the learning activity. Being more engaged assists with remembering critical learning points (Zirawaga *et al.*, 2017:55). Zirawaga *et al.* (2017:56) contends that because games are considered a fun way of learning, many students tend to be more interested in and taking parting in the associated learning activity. The enhancement of problem-solving skills, critical thinking and imagination is another advantage of using games in education (Zirawaga *et al.*, 2017:57). Games also heighten an individual's motivation and desire for self-improvement (Gozcu & Caganaga, 2017:128). For instance, an individual always attempts to beat their highest score to so that they can proceed to the next level (Ulicsak & Wright, 2010:17). The perseverance to beat a high score can teach students very important principles such as resilience which can be directly transferred to reality (Ulicsak & Wright, 2010:17). Several studies and books have to date investigated the use of games in education in general, these are summarised in Table 2.1.

TABLE 2.1: THE USE AND VALUE OF GAMES IN EDUCATION

Title and authors	Aim of study	Main findings
Educational games - are they worth the effort (Backland & Hendrix, 2013)	"To make a meta-analysis of scientific studies on the educational effectiveness of game, to reveal what types of studies they are and what they conclude".	Increase in knowledge; change in behaviour; problem solving skill enhanced; better learning and motivation.
Creating significant learning experiences: An integrated approach to designing college courses (Fink, 2003)	"To offer ideas that can improve the way teaching is normally practiced in higher education."	Assisting educators in significant learning, integrated course design, and better organizational support may create significant learning experiences.
Experiential learning theory: A dynamic, holistic approach to management learning, education and development (Kolb & Kolb, 2011)	"To develop a dynamic, holistic model of the process of learning from experience and a multi-linear model of adult development."	Different individuals learn in different ways and it is good to teach individuals according to their own learning style.
The educational benefits of video games (Griffiths, 2002)	"Brief overview of some of the educational benefits of videogame playing".	Important skills may be built or reinforced by videogames; equalizing individual differences in spatial skill performance.
The serious game: what educational benefits (Mouheb, Fahli, Moussetad & Eljamali, 2012)	"Verification of assumptions would allow for a possible integration of this type of game in classrooms".	The game motivated students intrinsically; provided solid construction of knowledge; provided an eventual transfer in acquired skills.
Introduction to using games in education: A guide for teachers and parents (Moursund, 2007)	"Learning to learn; learning about one's strengths and weaknesses as a learner; becoming better at solving challenging problems and accomplishing challenging tasks; transfer of learning from game-playing environments to other environments; intrinsic motivation."	Many individuals do not have adequate problem-solving capabilities. The research suggests it is good to build these capabilities

Source: Self constructed

TABLE 2.1: THE USE AND VALUE OF GAMES IN EDUCATION (cont.)

Teaching with games: Using commercial off-the-shelf computer games in formal education (Sandford, Ulicsak, Facer & Rudd, 2006)	“To offer a broad overview of teachers’ and students use of computer games and attitudes towards computer games in school; to identify key factors which impact upon the incorporation of computer games into existing school practices, including institutional, curricular, technical and cultural activities; to describe the processes by which teachers plan and implement games-based learning in extra-curricular activities.”	It is evident that using games in learning is motivational. Many obstacles were overcome when using games in the school context.
Learning through games: Essential features of an educational game (Amr, 2012)	“To find out whether instructional games support effective learning, and secondly to determine whether the factors of challenge and fantasy in instructional games impact learning outcomes.”	The game that was played encouraged students to learn better and playing games motivated the students and also gave students enjoyment.
Computer games in education project (BECTA, 2001)	To investigate “what aspects of games may contribute to education.”	Gaming may provide a society where strategic thinking is encouraged and may also enhance memory and visualisation.
The effect of games and simulations on higher education: A systemic literature review (Vlachopoulos & Makri, 2017)	“To develop a framework to allow educators across disciplines to better understand the advantages and draw backs of games and simulations specific to their pedagogical goals.”	Many studies show improved learning capabilities in students while some games show positive effect compared to traditional learning methods.

Source: Self constructed

Backland and Hendrix (2013) undertook a study which aimed “to make a meta-analysis of scientific studies on the educational effectiveness of game, to reveal what types of studies they are and what they conclude”. The study was conducted using previous literature from 2002-2012, using scientific journals and was also limited to formalised education systems namely pre-schools, primary schools, secondary schools and universities. Backland and Hendrix (2013) found that learning through using games led to an increase in the learning motivation of students. They also found that students showed an increase in knowledge and that their behaviour towards different situations changed when playing games. Their study further revealed that limited research on using games as a learning tool exists (Backland & Hendrix, 2013).

Fink (2003) authored a book titled “Creating significant learning experiences: An integrated approach to designing college courses”. This book aimed “to offer ideas that can improve the way teaching is normally practiced in higher education.” Fink (2003) wrote this book for educators to suggest new and improved ways of teaching. Fink (2003) concluded that there are many ways to encourage learning among students and that these ways can improve the way lecturers teach a certain topic and also the way students acquire information. These methods include significant learning (which encourages teachers to set new objectives for their learning material), integrated course design (which facilitates new and existing teaching methods that improves the way education is absorbed by learners), and better organizational support (teachers need support from the institutions they are employed in for the facilitation of the new teaching methods) (Fink, 2003).

According to Kolb and Kolb (2011), experiential learning is a form of concrete experience, reflective observation, abstract conceptualization and active experimentation. For students to understand their coursework better and gain knowledge faster, programs need to be set in place to view what motivates them to learn. In their study Kolb and Kolb (2011) proposed an experiential learning cycle and learning techniques to illustrate how different students learn and acquire information. Their study aimed “to develop a dynamic, holistic model of the process of learning from experience and a multi-linear model of adult development” (refer to Section 2.2). Griffiths (2002) conducted a study to show a “brief overview of some of the educational benefits of video game playing”. This study was conducted among children and

adolescents to investigate the impact of playing video games. The study revealed that skills such as goal setting, language skills, mathematical skills and social skills to name a few are developed when playing video games. Furthermore, the findings suggest that learning through games stimulates the motivation of students to learn (Griffiths, 2002).

Mouheb *et al.* (2012) conducted a study to verify whether their assumptions “would allow for a possible integration of “the serious game” classrooms”. The study was undertaken by the four researchers themselves who played a game called Virtual University. A game which involves the governing of a virtual university to better understand management practices in a real-life university. The study revealed that the researchers were more motivated intrinsically, they gained valuable sources of knowledge and the game provided an eventual transfer in acquired skills. Furthermore the researchers found that playing the game resulted in a knowledge transfer which potentially increases flexibility in terms of cognitive skills of students in real-life situations (Mouheb *et al.*, 2002).

Moursund (2007) authored a book with the aim of “learning to learn; learning about one’s strengths and weaknesses as a learner; becoming better at solving challenging problems and accomplishing challenging tasks; transfer of learning from game-playing environments to other environments and intrinsic motivation.” This book is aimed at individuals who are interested in helping children learn through and about games. According to Moursund (2007), games have characteristics such as “pleasure (students enjoy the games they play), passionate involvement structure (students are deeply involved in the game and may develop problem solving skills), motivation (students are motivated to accomplish gaming levels to improve their scores), doing (gaming may motivate students to do more physical activity), flow and spark creativity (games have a strategic element to them and this may spark creative and analytical thinking in the students).” Furthermore, Moursund (2007) suggests the aforementioned skills all need to be developed by students.

Sandford *et al.* (2006) conducted a study “to offer a broad overview of teachers’ and students’ use of computer games and attitudes towards computer games in school; to identify key factors which impact upon the incorporation of computer games into

existing school practices, including institutional, curricular, technical and cultural activities; to describe the processes by which teachers plan and implement games-based learning in extra-curricular activities.” Their study revealed that 53% of the teachers noticed that games motivated their students in classrooms. Games developed the students problem solving and analytical capabilities, and thus have a positive effect on brain development. Furthermore it was evident that using games in learning is motivational. Many motivational obstacles were overcome when using games in the school context (Sandford *et al.*, 2006).

Amr (2012) conducted a study “to find out whether instructional games support effective learning, and secondly to determine whether the factors of challenge and fantasy in instructional games impact learning outcomes.” The study was conducted among 254 students from high schools with only 202 completing all the data collection steps. The study found that a challenging game will positively impact learning, a fantasy game positively impacts learning and a game that has both challenge and fantasy will be highly positive on learners rather than a game without those features (Amr, 2012).

BECTA (2001) investigated, “what aspects of games may contribute to education.” The study was conducted among young males who are defined as the “majority user group” for this study. The study saw drawbacks and advantages of using games as an educational tool. The drawbacks include the games being too easy or too difficult which led to a decrease in interest in playing the games. However, the advantages outweighed the drawbacks as the study revealed that gaming may provide a society where strategic thinking is encouraged and may also enhance memory and visualisation (BECTA, 2001).

Vlachopoulos and Makri (2017) developed a “framework to allow educators across disciplines to better understand the advantages and drawbacks of games and simulations specific to their pedagogical goals.” The study was conducted by the two authors undertaking literature review independently. Following that the literature was analysed by both parties to determine whether or not it met the requirements of the objectives laid out. The study revealed that games improve learning capabilities in

students and some games show a positive effect compared to traditional learning methods.

In summary the main findings with regard to the use and value of games in education as a whole are as follows: games play an important role in educating students and increasing their knowledge in certain topics; games develop problem solving and analytical skills in students; students learn differently so teaching methods should be adjusted in order to attract and maintain the learners attention; learning through games should have a degree of complexity in order to motivate students to achieve goals; and students grasp the importance of real life simulated knowledge and how to apply it to real life situations. As such these studies suggest that using games in education plays a role in the development of learning capabilities and knowledge transfer among students.

2.4.2 THE NATURE OF APPLICATION GAMES

According to Esposito (2005:2), a game is a voluntary fictional activity with rules, time and space limits. Stenros (2016:501) mentions that a game is an art where players attempt to manage their resources in pursuit of a goal. An application (APP) game is a game that is linked to an application. An APP is a software program that can be used on several electronic devices (Campbell, 2015). An application is also referred to as a downloadable, as it can be stored on any compatible device (Mobile Marketing Association, 2008:1).

More specifically an APP game is defined as an interactive software programme that can be downloaded and stored on a mobile device, based on fiction and confined by a set of rules. Niket (2017:5) mentions that application games are available for download on mobile application stores either for free or by paying to acquire them. Moreover, an application game can be stored on any compatible device (Campbell, 2015; Esposito, 2005:2). Niket (2017:5) further states that application games, also known as digital games, are technology aided activities which can be played on consoles, computers, mobile phones and other digital devices (Niket 2017:5). According to Ulcsak and Wright (2018:17), as well as Grace (2005:4), there are many types of APP games exist on the market.

Mobile and online APP games are examples of such APP games (Mobile Marketing Association, 2008:1). Mobile games can be defined as games that are embedded into the mobile device system, downloaded, or network orientated and are conducted on a handheld device (Jeong & Kim, 2009:290). According to Nuryanti and Prasetya (2015:10), mobile games are played on a mobile phone, smartphone and can be further developed for various handsets such as Symbian OS, Android OS and Microsoft. Furthermore, these devices can also access the internet wirelessly by making use of the built-in internet connectivity (Shiratuddin & Zaibon, 2010:57). Consequently, mobile games have begun making use of this feature, and location awareness function to maximize the experience of the user (Kim, 2013:44). This had led to online application gaming. Online APP games are games that are conducted on a handheld device which has network functionality (Jeong & Kim, 2009:290). Furthermore, Kim (2013:44) adds that online APP games are games that make use of the various advanced technological features embodied in a device. These includes features such as the high-speed internet transmission, the high-resolution cameras and screens, global position systems (GPS) and touch panels (Kim, 2013:44). Today, many thousands of mobile APP games are uploaded on the different APP stores every month (Mäyrä, 2015:1). These APP games differ in various aspects.

Ulicsak and Wright (2010:17) mention that APP games can be in the form of virtual reality or simulation. Kim (2013:45) mentions that these types of games can also be referred to as augmented reality games. Virtual reality games are reality-based games which places the player into a temporary, but fictional simulation of real-world experience (Kim, 2013:45). According to Grace (2005:20) simulations provide entertainment through enactment. Other types of APP games include hybrid reality games, which are based on a combination of location awareness and internet connectivity (Kim, 2013:44). These games require players mobility in urban spaces to progress in the game.

Other examples of APP games include treasure hunts, urban adventure and multiplayer games which integrate both the mobile and online platform (Mäyrä, 2015:4), as well as puzzle or strategy games (Mobile Marketing Association, 2008:1). An example of these games is Tetris, chess and any mobile base board game. Solitaire, Blackjack and poker are examples of card or casino type APP games (Mobile

Marketing Association, 2008:2). Lastly, Grace (2005:3) mentions that a relatively popular type of game includes the sporting and racing codes. These include games such as soccer, basketball and on and off-road racing. Examples of these are the FIFA and asphalt series.

The variety of APP games and the interest that gaming has generated has led to a growing use of APP games within education. This growth will be discussed below.

2.4.3 THE GROWING USE OF APP GAMES IN EDUCATION

The rapid developments in technology can be used as an effective tool to enhance the welfare of society (Sudrajat, Rahman, Guzman, Ricky, & Sasongko *et al.*, 2018:1). For example, technology as a tool can be used to provide authentic learning experiences at all levels of education (South & Stevens, 2017:3). It is also revealed that the use of modern technology has a positive relationship with student interaction in the classroom (Raja & Nagasubramani, 2018:33). This is because technology has the ability to make work easier and can consume less time (Raja & Nagasubramani, 2018:33). The ways in which technology has influenced and has been incorporated into education will be discussed in the following sections.

As early as 2001, revenues generated from mobile games were approximately \$830 million (Davidsson, Peitz & Björk). The increase of technological resources has led to a spike in technology driven games. Yannakakis and Togelius (2018:11) state that the gaming industry has gradually turned into a multi-billion-dollar industry. According to Davidsson *et al.* (2004:4), dating back to 2007, industry optimists had predicted the gaming market to grow to \$4.5 billion. In addition, the technology games industry is predicted to have revenues of approximately \$129 billion in 2019 (Yannakakis & Togelius, 2018:18).

With the increase in technological driven games so has the use thereof in education. According to Belloti, Berta, De Gloria, Lavagnino, Dagnino, Ott, Romero, Usart and Mayer. (2012:176), from as early as 1994, over 200 business games were being utilised by more than 900 educators in the United States. Furthermore, a survey conducted by Futerelab shows that 35% of the sample of the teachers in the UK have

already used computer games in their teaching while 60% of teachers would consumer using games in their teaching (Williamson, 2009:2).

2.4.4 THE USE AND VALUE OF GAMES IN ENTREPRENEURSHIP EDUCATION

The use of gaming within entrepreneurship is becoming an emerging topic amongst many educators and institutions (Zirawaga *et al.*, 2017:55). Bellotti *et al.* (2012:176) states that there are many high-level business games and simulations that are being utilised for different features in many business schools. These games are also referred to serious games because their primary goal is not only for entertainment but also for the purpose of education (Almeida, 2017:2). There are many advantages associated with making use of educational games in entrepreneurial education. According to Bellotti *et al.* (2012:179), the benefits of incorporating games in entrepreneurship education is that they enhance an individual's motivation. Moreover, games have the ability to enlighten individuals on many aspects of management and further allow students a hands-on experience through simulations (Bellotti *et al.*, 2012:179). As such the use of games gives individuals an experience in a simulated format before, they apply the principles in reality (Kim, 2013:45). Another advantage of using games in entrepreneurship education is that they enhance the decision-making abilities of students (Bellotti *et al.*, 2012:180). In addition, Sinkovec and Cizelj (2013:6) contend that the use of games enhances the personal attitudes and skills required for an entrepreneurial mind-set and behaviour. Moreover, games allow students to gain awareness of the possibilities of self-employment and entrepreneurship options (Sinkovec & Cizelj, 2013:6).

Several studies have to date investigated the use of games in entrepreneurship education, these are summarised in Table 2.2.

TABLE 2.2: THE USE AND VALUE OF GAMES IN ENTREPRENEURSHIP EDUCATION

Title and authors	Aim of study	Main findings
Innovation of entrepreneurship learning with business model canvas game (Sudrajat <i>et al.</i> , 2018)	“To produce entrepreneurship learning model using a game to enhance the entrepreneurial learning process.”	Majority of students interested in making use of games as a tool for learning about entrepreneurship.
Designing a Course for Stimulating Entrepreneurship in Higher education through Serious Games (Bellotti <i>et al.</i> , 2012)	“To analyse value added by serious games as a tool to familiarize students with entrepreneur concepts and company management.”	Reveals how serious games develop and enhance an entrepreneurial mind-set.
Learning Entrepreneurship with Serious Games – A Classroom Approach (Almeida, 2017)	“To evaluate how the use of educational games can inspire the learning environment and stimulate accusation of knowledge.”	Games provide potential of improving learning process and develop entrepreneurial skills.
A Game based Learning Model for Entrepreneurship Education (La Guardia, Gentile, Dal Grande, Ottaviano & Allegra, 2013)	“To prove how games in entrepreneurship education enhance skills & knowledge crucial for an entrepreneur. “	Students enjoy the game while improving educational results and learn concepts of company management.
Game-Based Entrepreneurship Education: Identifying enterprising personality, motivation and intentions amongst engineering students (Mayer, Kortmann, Wenzler, Wetters and Spaans, 2014)	“To show how games contribute to entrepreneurship and learning related to entrepreneurship.”	Personality traits and motivations influence entrepreneurship, especially after training.
Impact of business simulation games in enterprise education (Dina, 2011)	“To assess how students are impacted by simulation games”	Shows that simulation games generate more energy and encourages more participation from students than traditional classes.
Simulations in entrepreneurship education serious games and learning through play (Fox, Pittaway & Uzuegbunam, 2018)	“To expand knowledge and understanding of the educational practice needed in entrepreneurship.”	Games have pragmatic value; furthermore, prove to be a great way to engage students.
From Rhetoric to Reality: Business Games as Educational Tools (Ben-Zvi & Carton 2007,)	To discuss and investigate business games as tools for educating in management science.	Games have potential to exchange new ideas on teaching and further enhance management knowledge.
BIZZY - A social game for entrepreneurship education (Fonseca, Gonçalves, Nunes, Teixeira, Paredes, Morgado & Martins, 2014)	“To investigate the effectiveness of the game BIZZY in enhancing entrepreneurial education.	The game, BIZZY can enhance entrepreneurial skills of students.
Experience with entrepreneurship using serious games (Almeida, 2017)	To evaluate how serious games assist students experiences in education.”	Students tend to develop better problem solving and risk management skills after playing games.

Source: Self constructed

Sudrajat *et al.* (2018) conducted a study with the primary purpose of producing an entrepreneurship learning model using business model Canvas Games. This was done with the purpose of improving information and communication technology content in the entrepreneurial learning process. The participants of the study consisted of students registered for the Binus Game Application Program. The survey consisted of a total of 34 students who had attended the entrepreneurial courses. Furthermore, Sudrajat *et al.* (2018) states that the study makes use of research and development methods. The results show that 76,5% of the students find it interesting to learning entrepreneurship using the concept of games while 17,6% found it unattractive and the remainder refused to comment.

Bellotti *et al.* (2012) conducted a study to analyse the added value of serious games. Furthermore, the authors had the aim of assessing whether these technology games enabled students to familiarise themselves with the various concepts of entrepreneurship and business management. The data was obtained through surveying entrepreneurs, teachers and students as well as consulting various literature sources. The study reveals that the use of serious games can provide a conceptual basis for entrepreneurship and can support the development of an entrepreneurial mindset (Bellotti *et al.*, 2012).

La Guardia *et al.* (2013) conducted a study with the primary aim of describing a blended model for entrepreneurship education using a serious game. Furthermore, the study aimed to prove how games can contribute to the development of an entrepreneurial mindset. This study was conducted among several schools in Italy, Finland, Spain and Slovenia. The target consisted of approximately 200 students between the ages of 17 and 20 years old. The study revealed that the use of games in entrepreneurial education allows students to move from basic scenarios to more complicated ones by familiarising themselves with the basic concepts of business management. Lastly, the study also shows that these games can improve the decision-making of students.

Almeida (2017) conducted a study with the aim of assessing whether the use of educational games can lead to the acquisition of new knowledge. The sample, for the purpose of their study was the Entrexplorer game. Almeida (2017) further undertook

a literature study which was sourced from various authors between the years 2003 and 2016. This study reveals that serious games have the potential of improving learning processes by providing attractive, motivating and effective tools. In addition, the study also shows that due to entrepreneurship involving multidisciplinary skills, serious games are an ideal model to enhance problem solving skills and reasoning stimulation (Almeida, 2017).

A study conducted by Mayer *et al.* (2014) aimed at investigating the extent to which the use of serious games can contribute to entrepreneurship and its related factors. This study was conducted in 2012, where three different games were played. The study involved a total of 28 international MSc students studying engineering, who were registered specifically for entrepreneurship over a year. Results from this study reveal that the personality traits and motivations can be affected by playing serious games. The study further reveals that serious games are relevant for entrepreneurship education. More importantly, personally traits and past experiences play a role in entrepreneurship intentions (Mayer *et al.*, 2014).

Dina (2011) conducted a study with the aim of assessing the impact of using business games in entrepreneurial education to develop enterprise skills. The game used for this study was SimVenture. The game was played among undergraduate student in management studies. This study reveals that the game SimVenture has the ability to stimulate and engage learners. Furthermore, this study reveals that the use of simulations forces students to make actual decisions based on facts or data. Furthermore, the study revealed that the game has had a significant impact on entrepreneurial skills (Dina, 2011).

A study conducted by Fox *et al.* (2018) aimed at expanding the knowledge and understanding the impact of serious games, specifically computer simulations which model entrepreneurship. The study was conducted by means of a literature review to collect data on games. The study revealed that games provide immense value in the educational process, as they allow students to engage in fun learning. Furthermore, the use of simulations games places the students in interactive virtual environments that allows them to build entrepreneurial attributes in a safe and risk-free environment.

Ben-Zvi and Carton (2007) conducted a study with the primary purpose of investigating the use of business games in management science. The game played in the study was the International Operations Simulation Mark/2000 (INTOPIA). This game is designed to direct students into an entrepreneurial mindset, which will ensure they can make effective decisions. The game was used for 12 semesters with about 1000 advanced MBA candidates participating. This study revealed that business games can help students to reason clearly and logically, enhance decision-making and also forces students to learn to think independently (Ben-Zvi & Carton, 2007).

The purpose of this study was to describe the experience of students making use of serious games in entrepreneurship classrooms. To gather the necessary data survey was administered. This was done with the purpose of measuring various students experience when making use of games to learn entrepreneurship. The study reveals that the experience of students allows them to develop various entrepreneurial skills. These skills include innovation, leadership and strategic thinking, as well as problem solving and risk management. Lastly, these games allowed students to experience real-life decision-making difficulties as would be experienced by real entrepreneurs (Almeida, 2017)

Fonseca *et al.* (2014) conducted a study with the aim of investigating the effectiveness of BIZZY, a serious game implemented as a Facebook application which enables young kids to learn entrepreneurial skills progressively. Further, the aim was also to investigate the ability of BIZZY to enable and guide young people between the ages of 12 and 18 to transform an idea into an actual business plan. For the purpose of this study, a total number of 38 interviews were carried out by national experts. The study conducted by Fonsesca *et al.* (2014) reveals that games, specifically BIZZY, will assist students in creating a business model, business plan and further fine-tune their business idea. In addition, the study revealed that this game can enhance the entrepreneurial skills of young students.

The study conducted by Almeida (2017b) reveals that educational games can introduce new ways of teaching and foster an interactive learning environment. The study further revealed that there are various types of games which can be used in a learning environment. Games also provide attractive and motivating tools which can

create positive environments for both the students and the educators (Almeida, 2017b). Lastly, Almeida (2017b) states that entrepreneurial education is a pillar of society as it has a strong impact on future economic developments. The study also mentions that games used in entrepreneurial education have many benefits such as problem solving, business launch, risk management, leadership and strategic thinking.

In summary, these studies reveal that students think that the use of games in entrepreneurial education is interesting and effective as it encourages more participation. Several studies also reveal that the use of games in entrepreneurial education fosters an entrepreneurial mindset and enhances skills, such as decision making, risk management and problem solving, among many. Lastly, the use of games proves to be extremely fun as students enjoy it. This further leads to improvements in educational outcomes which will enhance the entrepreneurial mind-set and lastly, encourages entrepreneurship. Outcomes associated with entrepreneurial education will be elaborated on in the section that follows.

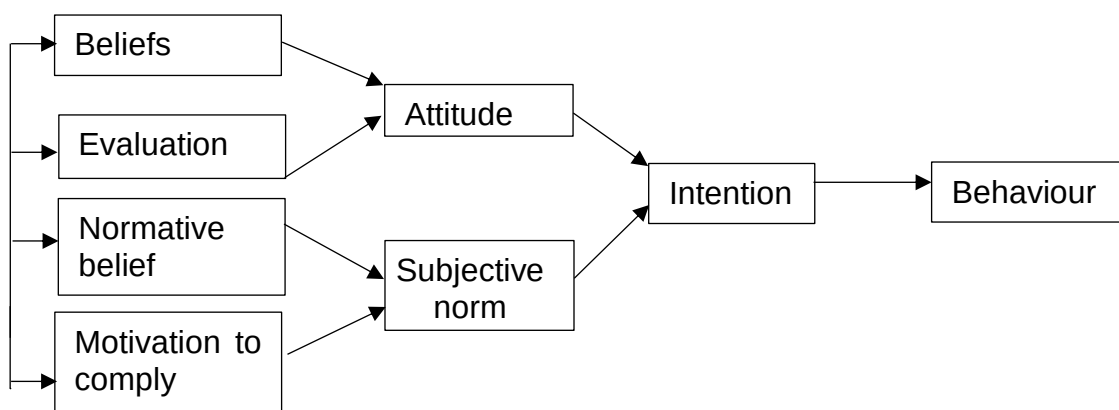
2.5 OUTCOMES OF ENTREPRENEURSHIP EDUCATION

Efficient and effective entrepreneurial education can result in several positive outcomes. Grecu and Denes (2017:3) state that entrepreneurial education enhances students' understanding of finance, marketing, accounting and other business-related functions. Furthermore, another outcome of entrepreneurial education is that it encourages the creation and founding of new businesses and equips graduates with the ability to be successful in the not only the marketplace but also as aspiring entrepreneurs (Grecu & Denes, 2017:3). In addition, entrepreneurship education creates a solid link between academic institutions and business communities. Among many, the enhancements of entrepreneurial self-efficacy and entrepreneurial intention are outcomes of effective entrepreneurial education (Bakar, Ramli, Ibrahim & Muhammad, 2017:122). It is these two outcomes of effective entrepreneurial education through playing APP games that will be investigated further in the current study. The theories underlying each of these outcomes will be elaborated on below.

2.5.1 THE THEORY OF PLANNED BEHAVIOUR

The theory of planned behaviour (TPB) is derived from the theory of reasoned action (TRA) (Ajzen & Fishbein, 1977:483; Southey, 2011:44; Zhang, 2018:76). The TRA has the potential to predict the intention to perform a particular behaviour based on two variables (Ajzen & Fishbein, 1969:765). The first variable is a behavioural or attitudinal variable (Vallerand *et al.*, 1992:98). This variable is the individuals' subjective belief that a certain behaviour will have a specific outcome and furthers the evaluation of that specific outcome (Lange, Kruglanski & Higgins, 2012:4400). The second variable is the social or normative belief (Lange *et al.*, 2012:441; Southey, 2011:44; Vallerand *et al.*, 1992:98). This normative belief determines an individual's subjective norms, which include the individual's perceptions of what important others think about a certain behavioural action (Trafimow, 2009:506). The theory of reasoned action is depicted in Figure 2.2 below.

FIGURE 2.2: THEORY OF REASONED ACTION



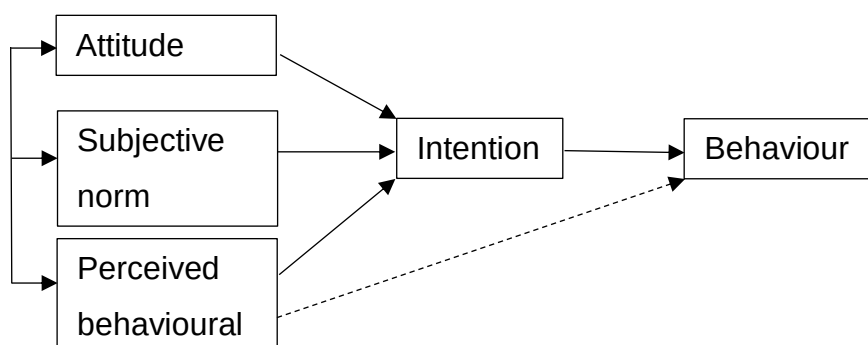
Source: Ajzen and Fishbein (1977:884)

The TRA proposes that an individual's intention is a result of their attitude towards performing the behaviour and their subjective norm (Ajzen & Fishbein 1977:884) and that actual behaviour is ultimately determined by the intention to perform the behaviour.

The variables in the TRA were further developed and the model was named the TPB (Ajzen, 1991:182; Southey, 2011:44). According to Davids (2017:9), the TRA had a limitation in that it only explained behaviour under the control of an individual.

According to Zhang (2018:76), Ajzen's (1991) maintained that the actions of individuals are not only controlled by their will, but that their behaviour is largely influenced by external factors and objective circumstances. Consequently, Ajzen added a third variable to the two already evident in the TRA (Zhang, 2018:76). The third variable was named perceived behavioural control (Lange *et al.*, 2012:445; Zhang, 2018:76). Modifying the TRA saw the theory evolve into the TPB which lead to strengthening the power of prediction on human behaviour (Ajzen & Fishbein, 1977:454). The theory of planned behaviour is shown in Figure 2.3 below.

FIGURE 2.3: THEORY OF PLANNED BEHAVIOUR



Source: Ajzen (1991:182)

According to Iakovleva and Kolvereid (2009:69), this theory was designed with the primary purpose of predicting and explaining the behaviour of humans. The TPB assesses the behaviour of an individual at a specific time, which is guided by a certain context and objective, rather than general behaviour (Zhang, 2018:78). The TPB is a diverse theory which can be used and applied in several fields; however, it has a strict scope of application (Davids, 2017:9; Zhang, 2018:78). In addition, the theory is aimed at understanding the factors that influence an individual's behaviour that are not under his or her control (Davids, 2017:9). Moreover, the TPB aims to explain the behavioural decision-making processes of individuals (Zhang, 2018:78).

The TPB contends that the behaviour of an individual can be predicted by their intentions (Cameron, Ginsburg, Westhoff & Mendez, 2012:2). These intentions are in turn predicted by three variables, namely the attitude towards the certain behaviour, the subjective norm and the individual's perception of their control over that behaviour (Cameron *et al.*, 2012:2; Zhang, 2018:77). According to Iakovleva and Kolvereid

(2009:69), attitude towards the behaviour relates to the level to which the individual has positive and negative appraisals of the behaviour. Zhang (2018:77) states that this variable tends to be the most powerful predictor in human behaviour. The second variable that plays a role in an individual's intentions is the subjective norm. This variable refers to any pressures rising from society associated with performing a certain act (Zhang, 2018:77). It is evident that this is an external variable, as it is largely influenced by pressure groups. The third, and last variable which plays a role in intentions is perceived behavioural control. This variable focuses on the ease or difficulty associated with performing a certain act (Iakovleva & Kolvereid, 2009:69).

The perceived behavioural control is also affected by three variables, namely capabilities, resources and opportunities (Zhang, 2018:76). The more capacity, resources and opportunity an individual think they possess prior to performing a certain act, the stronger the perceived behaviour of control (Zhang, 2018:77). This means that the intention to perform the behaviour is higher. The exact opposite effect on behaviour occurs when individuals have less capacity, resources and capabilities.

The TPB can be applied to explain and predict both entrepreneurial intentions and entrepreneurial self-efficacy which are discussed in detail in the sections that follow.

2.5.2 ENTREPRENEURIAL INTENTIONS

An individual's entrepreneurial intentions predict their entrepreneurial behaviours (Peng, Lu & Kang, 2012:95). According to Remeikene, Startiene and Dumciuvėne (2013:300), entrepreneurial intention is a state of mind that people have to create or start up a new business. Fini, Grimaldi, Marzocchi and Sobrero (2009:5) further add that entrepreneurial intention is defined as the "mental representation of the actions that need to be performed by an individual to either create or add value within existing firms or develop new ideas". In addition, entrepreneurial intention is also defined as the "intention to engage in any form of entrepreneurial behaviour and carry out entrepreneurial activities, which can be affected by a number of factors" (Paul, Hermel & Srivastava, 2017:4).

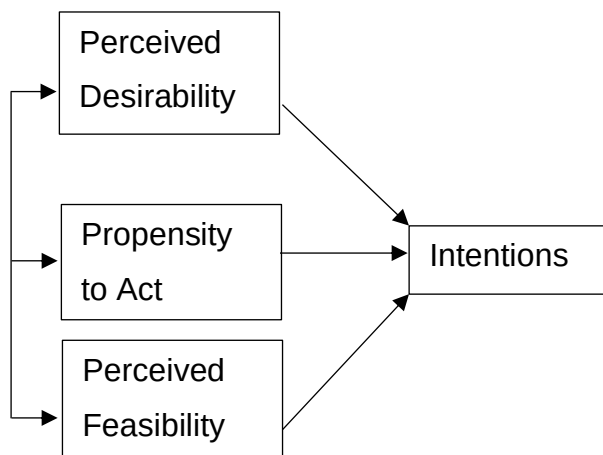
Remeikene *et al.* (2012:301) asserts that the intention to start a business is based on Ajzen's theory (1991) of planned behaviour (discussed in detail in the above section) and Shapero and Sokol's (1982) model of entrepreneurial event. The prior mentioned theories are essential in the explanation of personal behaviour in respect to entrepreneurship and the latter will be discussed briefly in the section to follow.

As proposed by the TPB, the immediate variable that has an effect on a certain behaviour is the intention to perform that given behaviour (Ajzen, 2015:125). In the context of entrepreneurial intentions, the TPB propose that actual entrepreneurial venture creation is influenced by the intention of someone to create a venture. Furthermore, the three antecedents that influence the intention to become an entrepreneur are the attitude towards the behaviour, the subjective norm and perceived behavioural control (Ajzen, 1991:69). The first antecedent, attitudes towards behaviour, refers to the attitudes towards becoming an entrepreneur. This also refers to the level which an individual has favourable or unfavourable evaluations of becoming an entrepreneur (Ajzen1991:188). The TPB further suggests that intention may increase based on knowledge and experience gained through past behaviour, such as formal education or experience (Sabah, 2016:97). The second predictor, subjective norms refers to the perceived social pressure relating to becoming an entrepreneur. This refers to the pressures from society associated with becoming an entrepreneur. Lastly, perceived behavioural control refers to the ease or ability of performing behaviour, such as becoming an entrepreneur, which immediately affects, and influences the intentions of becoming an entrepreneur (Ajzen, 1991:188).

According to Iakovleva and Kolvereid (2009:68), Shapero's (1975) model of the entrepreneurial event (EE) is an intention model that is aimed at describing the various influences on entrepreneurial intentions. There are three elements that influence the intentions of an individual. Shapero (1975) explains that both perceived feasibility and perceived desirability are a sufficient indication of entrepreneurial intention, however, the propensity to act has a direct effect on entrepreneurial intentions. Krueger and Carsrud (1993) made several modifications to the original EE model. These modifications states that behavior depends on the credibility of the behavior of the specific individual (Krueger & Carsrud, 1993:322). Credibility requires that the behavior should not only be desirable, but it should be feasible (Krueger & Carsrud,

1993:322). In the newly modified, and simplified model, entrepreneurship is viewed as an event caused by some form of displacement (Krueger & Carsrud, 1993:322; Rai, Prasad & Murthy, 2017:2). The modified entrepreneurial events model is depicted in Figure in 2.4 below.

FIGURE 2.4: SHAPERO-KRUEGER MODEL



Source: Shapero (1975:84); Krueger and Carsrud (1993 320)

According to Shapero and Sokol (1982), the first aspect that has an impact on intentions refers to the perceived desirability. According to Iakovleva and Kolvereid (2009:68), perceived desirability refers to an individual's personal attractiveness of pursuing a certain behavior. This includes both intrapersonal and extrapersonal impacts (Krueger *et al.*, 1993:232). Krueger *et al.* (1993:322) add that the second element, namely perceived feasibility refers to the level that an individual's feels that they have the relevant capabilities to carry out the intentions of pursuing a certain behavior. The propensity to act, refers to the willingness to act on the intentions of pursuing a certain behavior (Iakovleva & Kolvereid, 2009:68)

In summary, perceived desirability refers to the individual's perceptions of the relative attractiveness associated with starting a business (Iakovleva & Kolvereid, 2009:68). Perceived feasibility refers to the individual's self-belief in the ability to start and run a business (Davids, 2017:18). Perceived feasibility is positively influenced by an individual's self-efficacy (Davids, 2017:19). As such the higher the individuals' perception of the attractiveness of starting a firm and the higher their belief in their own capabilities to do so, the stronger the influence on their intentions to start a business.

In conclusion, the propensity to act refers to an individual's willingness to act on their decisions (Davids, 2017:19). This refers to acting on their decision of becoming an entrepreneur.

2.5.3 ENTREPRENEURIAL SELF-EFFICACY

Perceived behavioural control as highlighted in the TPB and perceived feasibility as highlighted in the SEE model, are important variables influencing intention. Perceived behavioural control refers to the relevant beliefs about resources and the obstacles that can assist or hinder performance of certain behaviour (Ajzen, 2015:129). These beliefs can influence self-efficacy, as positive perceptions of behavioural control will yield a higher level of self-efficacy while the opposite will occur for lower perceptions of behavioural control (Ajzen, 2015:130). Perceived feasibility refers to an individual's belief in the ability to carry out certain behaviour (Davids, 2017:19). Both are related to an individual self-efficacy. Self-efficacy refers to an individual's ability to perform something and achieve their desired outcome (Sadriwala & Khana, 2018:10). Davids (2017:19) states that perceived feasibility is positively related to self-efficacy. According to Botha and Bignotti (2016:4), the concept of self-efficacy was first established by Bandura (1977) and describes an individual's level of self-belief in their ability to achieve their desired outcomes. Zulkoksy (2009:94) contends that individuals with low levels of self-efficacy tend to have lower levels of esteem and become negative about their achievements and personal growth. On the contrary, individuals with high levels of self-efficacy have different ways of dealing with challenges. According to Zulkoksy (2009:94), a person with high levels of self-efficacy tends to approach difficult tasks directly and rarely avoid them. Consequently, individuals with high levels of self-efficacy are inclined to become entrepreneurs at a later stage in their life (Oyeku, Oduyeye, Kabouh, Elemo, Karimu, & Akindoju, 2014:96).

When applying the concept of self-efficacy to entrepreneurship, entrepreneurial self-efficacy refers to a person's belief about their capabilities, while having resilience in solving business related problems (Sadriwala & Khana, 2018:11). As suggested by the TPB and the SEE, entrepreneurial self-efficacy, which is associated with both perceived behavioural control (TPB) and perceived feasibility (SEE) leads to an individual having entrepreneurial intentions and this relationship has been verified by

many authors (Peng *et al.*, 2012:96). For example, Sadriwala and Khana (2018:11) point out that entrepreneurial self-efficacy can be used as a predictor or indicator of an individual's entrepreneurial intentions. Moreover, entrepreneurial self-efficacy also has an effect on the recognition of opportunities and further influences the persistence to capture a given opportunity (Bakar *et al.*, 2017:122). In essence, self-efficacy refers to a person's state of mind and the willingness to work hard and ensure that they achieve their desired outcome (Davids, 2017:19).

2.5.4 THE RELATIONSHIP BETWEEN ENTREPRENEURSHIP EDUCATION AND ENTREPRENEURIAL INTENTION AND SELF-EFFICACY

According to Malebana and Swanepoel (2014:5), entrepreneurship education has a strong relationship with entrepreneurial self-efficacy and entrepreneurial intention. Silangen (2016:82) found that entrepreneurship education has the ability to shape the entrepreneurial intention of students and reported that students who took part in entrepreneurship education are more likely to have intentions of pursuing their own business (Silangen, 2016:82). A study done by Khalifa and Dhiyf (2016:125) revealed that although the impact of entrepreneurship education on entrepreneurial intentions isn't confirmed, entrepreneurial intentions generally results from three variables, namely attitudes towards entrepreneurship, subjective norms and perceived behavioural control. Mahendra, Djatmika and Hermawan (2017:66) found that the entrepreneurial intention of students is not directly affected by entrepreneurship education, however entrepreneurship education can enhance students' motivation and attitude. The higher the motivation and attitude as a result of entrepreneurship education, the higher the intention to start a new business (Mahendra *et al.*, 2017:66).

The core purpose of entrepreneurship education is to develop the entrepreneurial attributes of students by providing an opportunity for them to experience and practice contextual learning which in turn enhance their confidence in the achievement of entrepreneurial pursuits (Mahendra *et al.*, 2017:66). According to Malebana and Swanepoel, sources of entrepreneurial self-efficacy can be developed through entrepreneurship education. A study conducted by Malebana and Swanepoel also shows that entrepreneurship education that equips students with the skills to perform entrepreneurial tasks has the ability to stimulate and improve entrepreneurial self-

efficacy. Furthermore, Puni, Anlesinya and Korsoku (2018:493) found that when students have exposure to entrepreneurship knowledge and entrepreneurship recognition skills through entrepreneurship education it positively affects entrepreneurial self-efficacy.

It is against this literature review supporting the relationship between entrepreneurship education and entrepreneurial outcomes that the value of playing APP games in entrepreneurship education is explored.

2.6 SUMMARY

In this chapter a literature review was provided. The chapter began by describing the nature of entrepreneurship education and elaborated on the different teaching and learning methods used in entrepreneurship education. A discussion on the challenges facing entrepreneurship education was also presented. Thereafter a discussion on the experiential learning theory commenced. Following that, games in entrepreneurship education were discussed focussing on the use and value of games in education in general and in entrepreneurship education in particular. The nature of application games and the growing use of them were also discussed. Chapter 2 concluded by describing the outcome of entrepreneurship education, namely entrepreneurial self-efficacy and entrepreneurial intentions.

In Chapter 3 that follows the research design and methodology adopted to achieve the objectives of the current study will be described.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

In Chapter 2 a literature review for the present study was conducted. Chapter 3 will discuss the research design and methodology adopted to achieve the objectives of the present study. The literature review, which involved the secondary research, will be elaborated on. The empirical investigation, which is the primary research in the current study, will be described. More specifically the research paradigm and methodological approach as well as the adopted methodology will be explained. Thereafter, a discussion on the data collection and analysis methods used will be described. The chapter will conclude with a discussion on how the trustworthiness of the process and data was ensured, as well as the ethical considerations in the current study.

Parveen and Showkat (2017:2) mention that primary and secondary data are the two types of data used in research. The primary and secondary research undertaken to collect these two types of research will be described in the sections that follow.

3.2 LITERATURE REVIEW (SECONDARY RESEARCH)

According to Curtis (2008:1), secondary data is the information that has been collected by other researchers, and is further made available to the public. Furthermore, primary research data that has been collected for a specific study becomes secondary data and is utilised for different study (Parveen & Showkat, 2017:3). Generally, researchers source secondary data by consulting school or public libraries or by making use of various technological resources to access such data which has been compiled by other researchers (Johnston, 2014:623). Secondary data is also sourced by consulting scholarly and trade journals, technical reports, computerised databases, and official statistics and records (McCaston, 2005:2).

The secondary research in the current study involved undertaking a comprehensive literature review on entrepreneurship education, looking specifically at its nature, the teaching and learning methods used as well as the challenges faced. Following that experiential learning theory and how it relates to entrepreneurship education was researched. The secondary research also involved searching for literature and existing studies on games in entrepreneurship education, specifically the use and value of games in education, the nature of application games, the growing use of games in education and the use and value of games in entrepreneurship education. The literature review also investigated the outcomes of using games in education. The theory of planned behaviour and entrepreneurial intention as well as the relationship between entrepreneurship education, entrepreneurial intention and entrepreneurial self-efficacy were specifically investigated.

This study used a variety of different sources in order to undertake the literature review, including various internet sources and several online databases including Google Scholar, Research Gate and Emerald Insight. Furthermore, information was sourced from various books, publications and reports found in the Nelson Mandela University library, and elsewhere.

3.3 EMPIRICAL INVESTIGATION (PRIMARY RESEARCH)

Primary research collects primary data which is data that has been collected first-hand, and which has not been published elsewhere (Kabir, 2016:204). Furthermore, Hox and Boejie (2005:593) mention that primary data is data that is obtained for a specific research problem, while utilising the necessary collection procedures that will ensure achievement of the research objective. Primary data sources include questionnaires, interviews, surveys, experiments and observations (Kabir, 2016:205). Unlike secondary data, primary data cannot be accessed, it can only be collected (Curtis, 2008:2). However, once primary research has been conducted, the data is made available and then it is called secondary data (Hox & Boejie, 2005:593).

In order to describe the methodological choices made and how the primary investigation was undertaken in this study, the model of Saunders, Lewis and Thornhill (2009:169), or the research onion, is used.

FIGURE 3.1: THE RESEARCH ONION

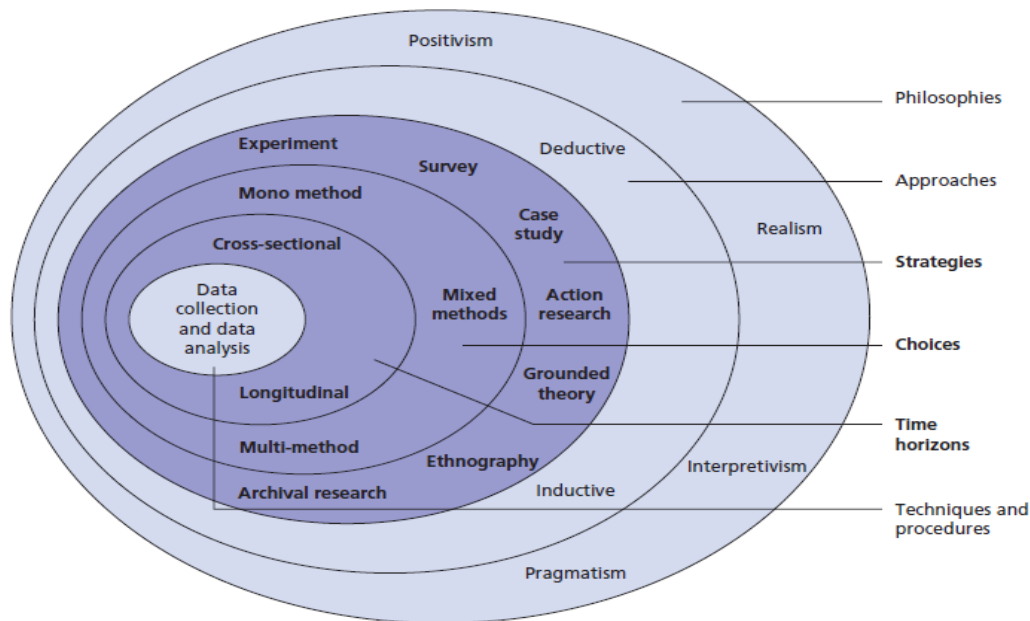


Figure 5.1
The research 'onion'
Source: © Mark Saunders, Phillip Lewis and Adrian Thornhill 2008

Source: Saunders *et al.* (2009:169)

The research onion illustrates the techniques performed in the form of layers while conducting the research. These layers are philosophies, approaches, strategies, choices, time horizons and techniques and procedures. Through the layers of the onion the data collection methods and philosophies are discussed and also the research methods and techniques that will be used in conducting the research (Saunders *et al.*, 2009:169).

3.3.1 RESEARCH PARADIGM (PHILOSOPHY) AND METHODOLOGICAL APPROACH

The first layer of the research onion refers to the research philosophy or research paradigm. According to Kivunja and Kuyuni (2017:2), a research paradigm is a set of beliefs an individual has about the world around them and how they want that world to be. Chilisa and Kawulich (2012:2) suggest that what an individual view as reality, along with what they know and do not know, influences how a philosophy is selected.

There are two main research paradigms (philosophies), namely the positivistic

paradigm, which focuses on a precise measurement of quantitative data, and the interpretivism paradigm, which uses qualitative research to gather and analyse information (Struwig & Stead, 2013:5). According to Saunders *et al.* (2009:113), the positivistic paradigm relies on observable events for the data collected to be considered credible. This process involves the use of previous literature to develop a hypothesis and these hypotheses are tested in order to promote or refute the literature (Saunders *et al.*, 2009:113).

According to Thanh and Thanh (2015:26), when using the interpretivist paradigm researchers seek to gain insight into their participants' intuition rather than statistical information. This allows for participants to have more freedom when constructing their opinions about certain topics (Yen, 2012:360). Furthermore, the interpretivism paradigm is associated with qualitative research and thus allows the researchers to collect more data from their participants on a more personal level (Yen, 2012:362).

The interpretivist paradigm has several assumptions associated with it and these are categorised as ontological, epistemological, and axiological assumptions. These assumptions are described in Table 3.1 below.

TABLE 3.1: ASSUMPTIONS ASSOCIATED WITH INTERPRETIVISM

Ontology	Ontology asks the question “what assumptions do we make about the way in which the world works?” What is the nature of reality? There are two aspects to ontology namely objectivism and subjectivism. Objectivism views aspects of reality as similar and subjectivism seeks to understand the attachment of individual to a specific phenomenon (Saunders <i>et al.</i> , 2009:110-111).
	Under the interpretivism paradigm reality is seen as complex and rich. It is socially constructed through culture and language and acknowledges that there are multiple meanings, interpretations and realities. (Saunders <i>et al.</i> , 2009:110-111).
Epistemology	Epistemology asks the question “what is acceptable knowledge in a particular field of study?” this is the process of researchers considering what is important in a research study. Epistemology can be described as what the researcher considers real and unreal. For example a researcher may see a computer as real but the feelings of the researcher towards the computer are not real (Saunders <i>et al.</i> , 2009:112-113).
	Under the interpretivism paradigm epistemology is viewed in a subjective context. The focus is on the details of the situation and viewing the world around at face value (Saunders <i>et al.</i> , 2009:112-113).

Axiology	Axiology asks the question “what roles do our values play in our research choices?” This element explains how the researcher chooses what to study and also how they go about a study. Furthermore, the values and ethics of the researchers is examined to understand their thought processes throughout a study (Saunders <i>et al.</i> , 2009:117-118)
	Under the interpretivism paradigm the researched cannot be separated from what is researched, thus there will be some subjectivity within a study (Saunders <i>et al.</i> , 2009:112-113).

Source: Saunders *et al.* (2009:110-118)

Given the underlying assumptions of the researchers and the primary objective of this study, the interpretivism paradigm is considered most appropriate in which to position the study. This paradigm is appropriate as the study makes use of qualitative data which will give information on human nature (Chilisa & Kawulich, 2012:3). Furthermore, this paradigm will allow the researcher to gain a deeper understanding of phenomena of interest as they will be able to express their own subjective opinions. This paradigm will also reveal how the researchers deal with situations as they occur through the use of a case study.

The next layer of the research onion refers to the methodological approach adopted for a study. Saunders *et al.* (2009:108), also refers to this as the approach to theory development. There are two types of methodological approaches that can be used, namely a deductive or an inductive approach. According to Soiferman (2012:2), the deductive approach analyses theories and tries to prove or disprove them. As such hypotheses are made, and experimentation is done to either support or deny these hypotheses (Soiferman, 2010:8). Burney and Saleem (2008:5) describes deduction as a “top-down” approach. Deduction starts with information that is general such as a formulated hypothesis and ends with specific information such as whether the hypothesis is accurate or not (Burney & Saleem, 2008:7). Furthermore, Creswell (2014:74) states that using a deductive model will require extensive definitions in the proposal section of the study in order to explain the developed hypotheses effectively.

An inductive approach uses themes to build interconnectivity between observation and experience (Soiferman, 2010:2). As such an inductive approach uses qualitative research, which may be in the form of personal interviews or case studies (Soiferman, 2010:7). Burney and Saleem (2008:5) describes induction as a “bottom-up” approach

which means that information moves from the specific to the general. For example, a specific study is made and once the study is completed, theories are developed from the study (Burney & Saleem, 2005:7). According to Creswell (2014:74), an inductive approach may produce many themes in a study through data analysis and this may include or remove themes discussed in existing literature. Furthermore, Zalagi (2016:25) states that new theories of a topic may be developed when concluding an inductive study.

For the purposes of the current study an inductive approach will be used. This is because the researches will use a qualitative research method to collect the data. The researchers will also gather information by making use of a case study. This approach will make it possible for the researcher to achieve the objectives of the study through the use of a case study.

The methodological approach adopted for a study can also be described as quantitative or qualitative. A quantitative methodological approach is associated with a deductive approach to theory development (Struwig & Stead, 2013:5). Quantitative research is a method used to “quantify the problem” by making use of numerical data or data that can be used as statistics (DeFranzo, 2011). According to DeFranzo (2011), quantitative research uses information that is measurable such as the number of online surveys completed to formulate facts and establish whether patterns exist. A qualitative methodological approach is associated with an inductive approach to theory development and involves a study into human nature (Struwig & Stead, 2013:5). According to DeFranzo (2011), qualitative research gathers information from the opinions, reasons and motivations of individuals to draw conclusions and also create theories to uncover trends.

According to Creswell (2014:234), qualitative research has characteristics such as a being undertaken in a natural setting, the researcher being a key instrument, the use of multiple sources of data, an inductive and/or a deductive data analysis, participants’ meanings, emergent design, reflexivity and holistic account. Table 3.2 elaborates on these characteristics.

TABLE 3.2: CHARACTERISTICS OF QUALITATIVE RESEARCH

Natural Setting	A natural setting allows for the participants to be in a place of comfort when they are being interviewed. Instead of testing participants in laboratories, qualitative research allows for individual to be interviewed where they are most comfortable. (Creswell, 2014:234).
Researcher as key instrument	The researchers gather information themselves. Information required is collected by the researcher actively going to participants and engaging with them about the research topic. (Creswell, 2014:234).
Multiple sources of data	Qualitative researches acquire data from many sources and then sift through it to find common themes among those who participated in the research. (Creswell, 2014:234).
Inductive and deductive data analysis	The inductive approach requires researches to work through different themes and databases to establish a comprehensive set of themes. Following that researchers use a deductive approach to establish whether themes can be support or if additional information is required for the study to be completed. (Creswell, 2014:234).
Participants' meanings	The researcher tries to get a clear understanding of what is meant by the participants of the research study without influencing their answers. (Creswell, 2014:234).
Emergent design	Qualitative research requires flexibility which means that questions may change, data collection methods may alter, and participants of the study may have to be changed as well. (Creswell, 2014:234).
Reflexivity	Researchers need to understand their own background as it may shape the direction of the study. (Creswell, 2014:234).
Holistic account	Researchers try developing what the problem is by looking at previous literature, "identifying the many factors involved in a situation and gaining an understanding of the real issue at hand. (Creswell, 2014:234).

Source: Creswell (2014)

A qualitative methodological approach is adopted for this study and the chosen methodology is elaborated on below.

3.3.2 QUALITATIVE METHODOLOGY/STRATEGY

According to McMillan and Schumacher (1993:479), qualitative research is the "process of organising data into categories and identifying patterns among categories." Furthermore, Astalin (2013:118) suggests that there are four major research designs associated with qualitative research, namely: phenomenology, ethnography, grounded theory and case studies. Table 3.3 elaborates on these research designs.

TABLE 3.3: RESEARCH DESIGNS OF QUALITATIVE RESEARCH

Phenomenology	Describes events, experiences and situations that an individual may experience. This type of research design seeks to explain why certain experience or situations happen and the effect they have on people's lives (Astalin, 2013:119).
Ethnography	Described as a "branch of anthropology" and this research design studies individuals and the societies that they are a part of. The research is analysed through the social characteristics of individuals and this may be a geographic, religious, life style of even a shared experience analysis (Astalin, 2013:120).
Grounded theory	This research design relies on data collection in order for theories on a study to arise. This process includes collecting data, analysing and coding the data and finally connecting to data to discover what new theories are built from it (Astalin, 2013:121).
Case study	Are used to analyse individuals, decisions, periods and systems that are in use to draw conclusions. They offer in-depth information about a situation and give recommendations on how to improve a situation. Several form of data collection methods can be used (Astalin, 2013:122).

Source: Astalin (2013:119-122)

The specific research methodology or strategy adopted in this study is the case study. According to Yin (2009:55), a case study is "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident." A case study can help develop theories around a single concept so as to understand a certain phenomenon better (Creswell, 2009:185). Furthermore, Baxter and Jack (2008:545) suggest that a case study enables researchers to study a compound situation within its parameters.

There are two types of case studies namely, single and multiple case studies (Gustafsson, 2017: 3). A single case study looks at one case and develops conclusions whereas multiple case studies look at a variety of scenarios to understand differences and similarities (Gustafsson, 2017: 3). According to Gustafsson (2017:9), multiple case studies enable a researcher to acquire information from a variety of sources which can result in the research being expensive. Multiple case studies offer a research study several different sources of information. This allows the researcher to understand and interpret similarities and differences and thus draw theories from that which is studied (Gustafsson, 2017:9). Furthermore, multiple case studies provide

researchers with an assortment of literature to clearly understand similarities and differences of the topic being studied (Gustaffsson, 2017:9).

According to Lobo, Moeyaert, Cunha and Babik (2017:187), a single case study provides as much relevant information as multiple case studies do. Gustafsson (2017:9) suggests that single case studies are relatively inexpensive to conduct, and are quicker than multiple case studies to complete. Lobo *et al.* (2017:188) further state that single case studies may be manipulated to have strong internal validity, which is ensured by a continuous process of studying the relationship between what is being done and the results of the study (Lobo *et al.*, 2017:187).

For the purpose of this study a single case study will be used. A single case study is relatively inexpensive and allows for the information needed to achieve the objectives of this study to be acquired much faster than multiple case studies would. A single case study will give the researchers the information that is required in order to meet the objectives of the current study.

3.3.3 TECHNIQUES AND PROCEDURES (METHODS)

The techniques and procedures adopted for a study refer to the manner in which the data was collected and analysed, each of which will be described below.

3.3.3.1 *Data collection*

Data collection is at the heart of the research design and involves the process of gathering information on specific variables of interest in order to answer stated research questions with the purpose of monitoring and further evaluating the results (Kabir, 2016:202; Parveen & Showkat, 2017:3). For the purpose of this study, data will be collected with the purpose of exploring the value of using APP games in entrepreneurial education. In addition, data will be collected with the purpose of establishing whether playing APP games can provide students with real life entrepreneurial lessons while enhancing their entrepreneurial self-efficacy and intentions.

In order to describe the process of data collection the following will be elaborated on, namely the population and sampling process, the sample, the data collection tools and the data collection process.

3.3.3.2 *Population and sampling*

Asiamah *et al.* (2017:1610) state that the general population can be defined as the largest group of potential participants that could be in a study. For the purposes of this study, the population will consist of all application games that are used in education. Furthermore, the target population can be defined as the potential participants (APP games) that fit the specific attributes of the study (Alvi 2016:10; Asiamah *et al.*, 2017:1612). It is evident that the target population is more refined than the general population. The target population for this study consists of all business application games that are used in entrepreneurship education. In addition, Asiamah *et al.* (2017:1613) define the accessible population, as the remainder of participants (business APP games) from the target population which cannot be accessed due to various constraints. The accessible population, for the purpose of this study are all accessible business application game that are used in entrepreneurial education.

There are several sampling techniques that can be used to select the sample or in the current study the business APP game that will serve as the case study. According to Taherdoost (2016:20), sampling techniques can be divided in two types, namely probability or random sampling and non-probability or non-random sampling techniques. In probability sampling, each individual has an equal chance of being present in the sample (Etikan & Bala, 2017:1; Showkat & Parveen, 2017:3). Furthermore, probability sampling further specifies that each segment has an equal chance because of random unbiased selection (Adwok, 2015:95).

In contrast, non-probability sampling makes use of a non-random method to select the sample (Showkat & Parveen, 2017:7). In addition, units of the population are not given equal chances to represent the sample (Alvi, 2016:13). This is the case, because selection of the sample is based primarily on the subjective judgment of the researcher (Alvi, 2016:13). Given that the choice of business APP game that serves as the case study is based on the subjective judgement of the researchers, the sampling technique

adopted in this study is a non-probability technique. This sampling technique will be used because it is relatively inexpensive, takes less time to complete and it is more convenient to use (Wiid & Diggines, 2015:191). The various types of a non-probability techniques are described in Table 3.4.

TABLE 3.4: NON-PROBABILITY SAMPLING TECHNIQUES

Sampling technique	Description
Snowball sampling	This technique is also known as chain referral sampling, and the sample is collected in a number of stages (Showkat & Parveen, 2017:8). In addition, the researcher obtains more participants by using networks and existing participants (Etikan & Bala, 2017:1).
Convenience sampling	In this technique, the participants are selected on the basis of ease of availability (Taherdoost, 2016:22). Furthermore, participants are selected because they are willing to participate and are easily accessible (Etikan, Musa & Alkassim, 2016:2).
Quota sampling	The type of method is applied when desired participants possess different characteristics (Alvi, 2016:31). Furthermore, this technique can be further split into proportionate quota sampling and non-proportionate sampling (Etikan & Bala, 2017:1).
Purposive sampling	The participants are selected deliberately to provide information that can't be derived from other options. (Taherdoost, 2016:24). This is also known as judgmental sampling (Etikan <i>et al.</i> , 2016:2).

Source: Self constructed

More specifically, convenience sampling will be the sampling method used because the “sample is drawn from a section of the population that is readily accessible or available to the researcher” (Wiid & Diggines, 2015:191).

3.3.3.2.1 *Sample business APP game*

The sample business APP game that served as the case study in the current study was that of Hay Day, the logo of which is displayed in Figure 3.2 below.

FIGURE 3.2: HAY DAY LOGO



Source: <http://haydaygame.com/>

Hay Day is a fictional game from Supercell, which was developed by a developer based in Finland (Angeline, 2016:23). Hay Day was released on the 21st of June 2012, and within a week of its launch, the game entered the top ten most downloaded game by users of iPad (Angeline, 2016:23). Hay Day is a farming game which can be played on Android and iOS compatible devices. In addition, players grow, build and customise their farms and towns, trade crops and fresh goods, facilitate orders and repair docks (Angeline, 2016:23). According to Strauss (2013), Hay Day attracts approximately four million players every day, of which 69 per cent of the players are women. Hay day consist of four core actions. Firstly, players plants and harvest crops and ingredients required for the manufacturing process and the feeding of animals (Koistilla, 2014). The players are the required to collect manufacturing resources. Players can then sell the manufactured resources to earn points and coins, which is the currency of the Hay day (Koistilla, 2014). Players also purchase manufacturing equipment to expand their farm (Koistilla, 2014).

A qualitative study on Hay Day conducted by Angeline (2016) is summarised in the Table 3.5 below.

TABLE 3.5: ANGELINE'S STUDY ON APP GAME: HAY DAY

Element	Description
Aim	To discover how Hay Day can change patterns of social interaction and what factors made Hay Day popular (Angeline, 2016:23).
Sample	A total of 10 players were selected for a period of 6 months. Within the 10 individuals, two were men and the rest were women. Five were private company employees, one was self-employed and the remainder were college students (Angeline, 2016:25).
Research Method	The data was collected by making use of a snowball technique. The interviewed game player would recommend other players willing to be part of the interview. Furthermore, literature sources from previous studies were consulted. (Angeline, 2016:25).
Results	The respondents found new acquaintances both online and offline, which proves that the game can change the patterns of social interaction. In addition, the interactive concepts, simulations and imaginary concepts are the reasons for making the game popular. Furthermore, the average respondent played about ten times a day with a total of 2 hours per day (Angeline, 2016:25).

Source: Angeline (2016)

The study found that Hay day can influence the patterns of social interactions. Angeline (2016:26) highlights that there are various reasons for the changing patterns of social interactions. Firstly, the formations of a community, which enables players to assist each other is a factor contributing to social interactions. Secondly, the added feature of neighbourhood chats within the game, allowed players to chat with friends in the game. This played a role in heightened social interactions of the game (Angeline, 2016:26). Lastly, the integration of social media within the game also impacted the patterns of social interactions. It has achieved this by allowing the formation of communities within the game in order to help each other (Angeline, 2016:27). In addition, the game allows you to find acquaintances both offline and online. In addition, due to the game being interesting, it becomes the topic amongst players, furthermore,

The update which includes *neighbour chat* has also been a contributing factor to the game changing social interactions.

The study also identified the factors that made Hay Day so popular. The main factor that has made Hay Day popular is its high retention state. The retention rate refers to players wanting to play the game again on the second day and beyond (Angeline, 2016:26). There are two factors that contribute to this high retention rate. Firstly, participants revealed that it is a game that refers to everyday life, it is casual and there

are no pressures in playing it. Lastly, the game was also popular because players enjoyed its interactive concepts, simulations and imaginary technology.

Koistilla (2014) wrote an article on Hay Day which is summarised in Table 3.6 below. The table will discuss the various retention techniques used in Hay Day.

TABLE 3.6: HAY DAY RETENTION TECHNIQUES

Technique	Description
Tutorial phase	The tutorial of the game is well designed to ensure the new players will learn and will continue playing the game (Koistilla, 2014).
Notifications	Message notifications such as “Eggs are ready to be collected” keep popping up which draw the player into the game (Koistilla, 2014).
Limited time offers	Time offers on sales in newspapers and various daily specials make the player want to go back into the game and constantly check (Koistilla, 2014).
Achievements	Regardless of the playing time, small or big achievements are gained throughout the game (Koistilla, 2014).
Item unlock	Items unlocking at certain levels keeps the players curious in order to continue playing to see the unlocked items ahead (Koistilla, 2014).

Source: Koistilla (2014)

According to Koistilla (2014), many of the retention techniques use are based on the theories of persuasion and human psychology.

Hay Day was is considered a suitable sample case study for the current study as it will constantly draw students into the game, which will further improve their understanding of management concepts. Hay day is also easy and inexpensive to access.

The research instrument used to collect the data when playing Hay Day will be described below.

3.3.3.3 Data collection tools

The data in the current study was collected from two sources. The first was a reflective journal (see Annexure A for template). The entrepreneurial lessons learnt from playing the Hay Day application game were recorded in reflective journals by the researchers

themselves while playing game. Reflective journals are also known as reflection or reflective writing which takes place during and after situations, with the primary purpose being to gain a deeper understanding of an individual and the situation at hand (Kathpalia & Heah, 2008:301). Reflective journaling or writing involves the contemplation of thoughts, feelings and happenings that relate to a given situation and writing these down (Naber & Markley). According to Kathpalia and Heah (2008:31), reflective writing allows writers to examine and clarify all thoughts that would be floating in their mind. More importantly, reflective writing assists students to combine their experience with their knowledge, in order to apply theory to practice (Kathpalia & Heah, 2008:301).

The second source of data are two measuring scales (see Annexure B), one measuring entrepreneurial intentions and the other entrepreneurial self-efficacy.

To measure entrepreneurial intentions, a twelve item scale was sourced from previous studies (Fatoki, 2010; Kakkonen, 2018 & Gupta, 2009). Entrepreneurial intentions was measured based on the researcher's self-reported perceptions, and operationalised as the researcher's preference to become an entrepreneur and the intention to someday start their own business. They were required to indicate their extent of agreement with each statement by means of a six-point Likert scale. The scale was interpreted as 1 = strongly disagree, 2 = moderately disagree, 3 = slightly disagree, 4 = slightly agree, 5 = moderately agree and 6 = strongly agree.

To measure entrepreneurial self-efficacy, the 19 items scale of McGee, Peterson, Mueller and Sequira, 2009) was used. The researchers had to indicate their level of confidence concerning each statement. The number 1 denoted very confident in their ability to perform the entrepreneurial task where at the other end of the scale, 6 denoted no confidence in performing the task.

To better understand these phases a brief description will be given in the section to follow.

The *searching* phase involves the creativity and the innovative ability of the entrepreneur. Furthermore, this phase entails the exploitation of identified

opportunities (McGee *et al.*, 2009) According to McGee *et al.* (2009), the *planning* phase entails various activities which will require the entrepreneur to evaluate the business and give it substance. The entrepreneur will further need to convert this idea into a business plan (McGee *et al.*, 2009). At this stage, the entrepreneur needs to estimate the market size, business location, the start-up costs and marketability of the firm's products or service (McGee *et al.*, 2009).

The fourth phase, *marshalling*, consists of various activities in order to mobilize the required resources in order to bring business into existence. This stage further requires the entrepreneur to gather all the resources such as capital and labour in order for the business to sustain itself (McGee *et al.*, 2009). The final phase of measurement is *implementing*. This phase is further split into *implementing people* and *implementing financials*. At this stage, the entrepreneur has the responsibility of developing the business past the early stages. At this stage, the entrepreneur needs to apply sound management skills and principles in the management of the firm's stakeholders and financials (McGee *et al.*, 2009).

The aforementioned scale has been proved to be valid and reliable in the previous study which was conducted by McGee *et al.* (2009).

3.3.3.4 Data collection process

Prior to playing the game the researchers and their supervisor laid down the ground rules for playing the game. Ground rules were set so that both researchers played the game according to the same set of rules. The ground rules for playing the business APP games were as follows:

- The game "Hay Day" had to be downloaded onto a mobile device.
- The game was to be played from the 4th of June until the 31st of July 2019.
- The players would stop at level 35.
- No "real" money could be spent on buying diamonds or any other aspects of the game.

- The researchers had to keep notes, in their reflective journals, of their feelings as well as the insights and lessons learnt as they moved up the levels,
- After each playing session, the researchers would record their performance
- One session will last for a period of 24 hours.
- The researchers had to record the time spent during each playing session.

Once the ground rules for playing the game were established and prior to playing the game each the researchers responded to the questions measuring their entrepreneurial self-efficacy and entrepreneurial intentions. Their responses were stored by for later use. Thereafter, the researchers commenced with playing the game.

From the 4th of June until the 31st of July 2019, the two researchers played the Hay Day APP game. During this time, they completed a reflective journal after each time period of playing the game. A playing session started when they started playing the game at any given time on a particular day and would end when they stopped playing on that same day. When completing their journals, they documented their thoughts, feelings and happenings, as well as their experiences and decisions made during the time period of playing the game. Insights and lessons learnt about starting and managing an own business were also be recorded. After playing the game for a period of 3 days and again after two weeks, the researchers met and adapted the template for the reflective journals and to reconsider the ground rules.

After the period of playing the game and the agreed upon level had been reached, the researchers again complete the questions measuring their entrepreneurial self-efficacy and entrepreneurial intentions.

3.3.3.5 Data analysis

The data collected from the reflective journals was analysed by making use of content analysis. According to White and Marsh (2006:3), content analysis is a research technique that makes valid inferences from texts. Elo and Kyngäs (2007:107) further add that content analysis is a method of analysing written or verbal data. The researchers analysed the text presented in their reflective journals.

According to Elo and Kyngäs (2007:109), content can be analysed in an inductive or deductive way. For purpose of this study, inductive content analysis was used. The process of inductive content analysis included three main phases namely; preparation, organizing and reporting (Elo & Kyngäs, 2007:109). The process of inductive content analysis undertaken in this study, is described in the section to follow.

The *first step* when using an inductive approach is the preparation phase (Elo & Kyngäs, 2007:110). This step involves collecting the data required for the content analysis (Elo, Kääriäinen, Kanste, Pölkki, Utriainen & Kyngäs, 2014:3). For the purpose of this research, data was collected from the reflective journals which were compiled by the researchers while playing the Hay Day APP game. The content was analysed by making use of a combination of words and themes. This requires that the researchers read the data in order to make sense, familiarise themselves with and have gain deep insight into the data (Elo & Kyngäs, 2007:110; Erlingsson & Brysiewicz, 2017:96). The researchers read the text to identify words similar or relating to the various business management functions which are outlined in the coding framework (see Table 3.7).

The *second step* when undertaking an inductive content analysis is organization (Elo *et al.*, 2014:3). The process of organising the data into meaningful units included coding, grouping and abstraction (Elo & Kyngäs, 2007:109). For purpose of this study, the text from the reflective journals was first organised by the researchers, which enabled them to become familiar with the data.

Coding is defined as the method of organizing the data in order to ensure that the underlying messages of the data are highlighted (Theron, 2015:4). Furthermore, Theron (2015:4) states that a code is a descriptive construct that is designed by the research in order to capture the essence of the data. Within this process, some codes may appear more often than others, which is an indication of a pattern which will fall under a certain category. Theron (2015:4) emphasises that coding also includes labelling and linking the ideas presented to the data to a certain category. For the purpose of this research, the chosen coding method is open coding. Open coding is the process of breaking down the data into two distinct parts and coding using *In vivo* coding, process coding and other coding methods. A detailed description of the aforementioned will be given in the following section.

When using *in vivo* coding, the researchers use exact words or phrases that will serve as a code (Theron, 2015:5). In addition, this coding method requires the researchers to look out for words or phrases that stand out (Theron, 2015:5). For the purpose of this research, words relating to the various management functions and activities were identified. Process action refers to words or phrases that capture a certain action (Theron, 2015:5). Process coding is useful when researchers seek to identify an action as a response to a situation, to handle a problem or to reach a goal (Theron, 2015:5). In the case of this study, the researchers made use of process coding by identifying the various actions which they performed while playing the APP game. The actions relating to responses to different situations in the game were recorded in the reflective journal. To conclude open coding, notes and heading were written while reading the text (Elo *et al.*, 2007:109). To incorporate the above, a coding framework was prepared and is tabled (see Table 3.7) below.

TABLE 3.7: CODING FRAMEWORK

Category	Description
General Management	Involves the organisations top, middle and lower level management. Their function in an organisation is to plan, organise, lead and control the daily operations of a business (Learn Xtra Live, 1-4).
Purchasing and logistics	Involves the management and control of cash and credit stock. The organisation manages resources through the purchasing function in order to have enough stock to make sales (Learn Xtra Live, 1-4).
Financing	Involves, the different types of capital investments a company may make, the different types of finances, budgeting and investments that an organisation makes (Learn Xtra Live, 1-4).
Production	Looks at the quality of the organisations resources. The organisation needs to produce in an efficient manner in order to meet the demand of the organisations clients (Learn Xtra Live, 1-4).
Marketing	The process of advertising, selling and researching the consumer needs and wants in order to provide the consumer with the products that they require (Learn Xtra Live, 1-4).
Public relations	Describes how an organisation interacts with the public. This could be through the media, brochures or direct contact with the clients of the organisation (Learn Xtra Live, 1-4).
Human Resources	Refers to the relationship between the business functions and how they connect with one another in the organisational context (Learn Xtra Live, 1-4).

Administration	A business function that handles and manages information of an organisation. This involves the management of computers and information technology and how much resources are distributed throughout the different functions of the organisation (Learn Xtra Live, 1-4).
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Source: Learn Xtra Live (2019)

They players organised the data by reading the text carefully, in order to have a better understanding of its content and to find more meaning in the data. Consequently, this enhanced the depth and richness of the data. Once this had been done, the researcher further organised the data.

The next step in the organisation of data is grouping. The aim of this is to reduce the context in order to prepare for effective categorisation of data (Elo & Kyngäs, 2007:111). The purpose of grouping data is to reduce the information to make the interpretation and analysis of the information easier. For purpose of the study, the researchers grouped the data according to the various business management functions. The business management functions served as the various categories which allowed the researcher to bring similar or related data together that would belong to a specific category (Elo *et al.*, 2007:111). Elo *et al.* (2007:111) states that the researcher, through interpretation, must come to a conclusion on which chunks of data to put together into the same category. The researchers did so by grouping the concepts, actions and ideas recorded in their journals into the various business management categories. Abstraction is defined as providing a description of the topic by generating categories (Elo *et al.*, 2007:111). In addition, abstraction entails creating categories which are named using content characteristics words (Elo *et al.*, 2007:111). This was applied by generating eight different categories, namely the business functions. These functions are general terms and served as the general categories. Within each category several themes emerged.

Once the researchers have finishing organising the data, the *third step* is to analyse and report on the information (Elo *et al.*, 2007:110). The researchers further analysed the information in order to identify and report on the various entrepreneurial lessons learned by playing the game.

In addition, the data collected from the questions measuring entrepreneurial self-efficacy and entrepreneurship intention was summarised and tabulated. The mean score for self-efficacy and entrepreneurship intention for each researcher was established – before and after playing the Hay Day APP game. This was done with the purpose of evaluating the value added by playing the Hay Day APP game.

3.4 TRUSWORTHINESS

According to Cox *et al.* (2015:197), trustworthiness refers to how reliable or credible a source is. For the purposes of this study, to ensure trustworthiness, the researchers recorded everything they did in reflective journals and gave an accurate account of their experiences. Furthermore, to ensure trustworthiness in a study, certain criteria need to be considered namely: credibility, transferability, dependability and confirmability (Shenton, 2004:64; Wiid & Diggines, 2015:64). The aforementioned criteria and how they were applied in the current study will be described in the section that follows.

Credibility refers to the confidence that can be placed in the truth of the respective research findings (Anney, 2014:276). To ensure the credibility of a study, various strategies such as prolonged and varied field experience, member checking, peer examination, establishing authority and structural coherence (Anney, 2014:276) can be implemented. For the purpose of this study, the following strategies were used to ensure credibility, namely prolonged field experience, and member checking.

According to Anney (2014:276), extended time refers to when the researcher has a prolonged engagement in the fieldwork, and thus improves the trust others have in the study. To ensure trustworthiness in the data, the researcher is required to immerse themselves in the participant's world in order to gain insight into the context of the study (Anney, 2014:276). Having prolonged and varied experienced will mitigate the possible distortions that could arise in the observation of information (Anney, 2014:276). Anney (2014:276) further states that the researcher would be required to stay in the field for a few months. For the purpose of this research, prolonged field experience occurred while playing Hay Day. The researchers were involved in the

research process for an extended period of time and personally played the Hay Day APP game. This allowed the researchers to make robust and comprehensive observations.

According to Anney (2014:277), member checking is an important process in qualitative research, as it is the heart of credibility. Member checking is defined as a quality control process by which the researchers aim to enhance the accuracy, credibility and the validity of what has been recorded (Harper & Cole, 2012:1). The process was applied efficiently in this study to heighten the credibility of the information. Member checking is also known as participant verification, informant feedback, and external validity (Harper & Cole, 2012:2). For this research, this was applied as the researchers were the chosen participants of the study. In addition, regular feedback between the researchers was maintained, which was aided by an experienced supervisor to ensure external validity. Creswell and Miller (2000:127) mention that member checking consists of taking data and interpretations and narrative back to participants in a study so they can confirm the credibility of the information. Due to the researchers being the participants, data recorded in their reflective journals was exchanged between them to validate the recorded information. In addition, the researchers went back and checked the accuracy, completeness and interpretation of each other's experiences and recordings.

Transferability refers to the extent which the results of the research findings can be transferred to other contexts with other participants (Anney 2014:277). Moon, Brewer, Januchowski-Hartley, Adams and Blackman (2016:3) add that transferability refers to the extent to which the findings of the study are applicable or useful to theory, practice and future research. Transferability is a form of external validity (Gunawan 2015:10). Furthermore, transferability can play an important role in the application of the research findings because policies, management and various institutions can rely on the research conclusions and recommendations in order to extrapolate the data with confidence (Moon *et al.*, 2016:3). According to Anney (2014:277), transferability is equivalent to generalisability.

There are many ways that one can ensure transferability in research. Anney (2014:277) states that researchers can ensure transferability by the use of thick

description. This means that the researchers must provide a detailed description of the study. For the purpose of the study, a detailed and in-depth description of the area of study was provided. Providing an in-depth description enables individuals to judge on the ability of the research to fit other contexts (Anney, 2014:278). Transferability requires the researchers clarifying the entire research process, starting from the data collection, to the final report of the study (Anney, 2014:278). In this study the entire research process was given in detail in the current chapter. As such a detailed description of the study and various methods, tools and techniques employed in the study was given.

According to Elo *et al.* (2016:4), *dependability* refers to the stability of the data over a period of time and under various conditions. Moon *et al.* (2016:2) adds that dependability relates to the consistency and reliability of the findings, and the degree to which the research procedures are clearly documented which will further allow another researcher to follow, audit and evaluate the research process employed. Furthermore, detailed coverage of the methodology and methods employed to conduct the research will increase the transparency of the study (Moon *et al.* 2016:2). To ensure dependability in the current study, a detailed description of the research procedures as well as the methodology and methods employed were given. See Section 3.2 and 3.3 of this Chapter.

Confirmability refers to using different techniques or approaches within the same study, so that one set of results confirms to those of other researchers (Cutcliffe & McKenna 1999:379). Furthermore, Anney (2014:279) mentions that confirmability is the degree to which the results presented in a study can be confirmed by various researchers. Gunawan (2015:10) adds that confirmability relates to the presentation of information and data. In addition, confirmability relates to other researcher's objective views on the accuracy, relevance and meaning of the data. Confirmability of a study can be achieved through an audit trail, reflective journal and triangulation (Anney 2014:279). To ensure confirmability in the current study, the researchers made use of reflective journals and an audit trail documenting all the steps they followed in the research process.

3.5 ETHICAL CONSIDERATION

According to Resnik (2013:1), ethics are values instilled in an individual that enable them to critically evaluate what is right and what is wrong. These principles instilled in an individual may be their level of honesty, objectivity, confidentiality and respect for intellectual property (Resnik, 2013:2-3). Furthermore, ethical considerations in research involves protecting dignity of chosen subjects in the publication of the research information (Fouka & Mantzorou 2011:4). It is therefore imperative for researchers to ensure that ethics standards are upheld when conducting a study. However, in the current study the researchers themselves played the Hay Day business APP game to assess the value of APP games in entrepreneurship education. As such the researchers were recording their own experiences and no other people or participants were involved in the process of gathering the data. Given that no outside people are involved in this study, no ethical clearance was required. The necessary procedures of the Nelson Mandela University were however followed, and the appropriate documents were completed (see Annexure C).

3.6 SUMMARY

In Chapter 3, the research design and methodology adopted for this study was described. This chapter opened with a discussion on the literature review of the study. Thereafter, a discussion on the empirical investigation, focusing on the research paradigm and qualitative research strategy undertaken for the current study. Thereafter, the data collection was discussed looking at the population and sampling, the sample, the data collection tools and the data collection process. Following that a description of how the data was analysed, how trustworthiness was ensured and the ethical considerations of the study, concluded this chapter. Chapter 4 presents the empirical results of the study illustrating the value of application games in entrepreneurship education.

CHAPTER FOUR

EMPIRICAL RESULTS

4.1 INTRODUCTION

In Chapter 3, the research design and methodology of the current study was presented. The data was collected from the participants (players) by making use of reflective journals. The players were required to record their activities undertaken and the strategies adopted while playing the game. Furthermore, the lessons learnt and their experiences were also recorded.

Chapter 4 will present the results recorded in the reflective journals over a period of 21 sessions. Firstly, a brief description of the profiles of the two players will be given, followed by the list of various activities that were undertaken by the players. Thereafter, the strategies undertaken by the players will be described, followed by a detailed description of the various business lessons learnt throughout the playing sessions. Lastly, the performance of the players will be presented.

4.2 PLAYER PROFILES

The profiles of the two players are summarised in Table 4.1. Both players were male, under that age of 26 and studying towards B.Com honours degrees. Both the players have no work experience. Player one's parents are both Mathematics lecturers. Player two's mother is a Human Resource wellness manager and his father is an engineer. There is no prior businesses ownership in either of the family backgrounds of the players.

TABLE 4.1: PLAYER PROFILES

	Player one	Player two
Gender	Male	Male
Age	25 years 4 months	24 years 1 month
Qualification	B. Com Honours	B. Com Honours
Work experience	None	None
Parent occupation	Father: Lecturer Mother: Lecturer	Father: Civil Engineer Mother: HR Wellness Manager

Source: Self constructed

4.3 **PLAYER PARTICIPATION**

This section introduces a list of the activities undertaken by the players throughout the game. These activities are those that enabled the players to get points to move to new levels and also expand their businesses. These activities included the buying and selling of various products. In the first few sessions of the games, the players purchased chicken coups and chickens. These chicken laid eggs which were later sold. Moving through the levels of the game more machinery was purchased, such as feed mills, popcorn machines, grills, pie ovens, smelters and looms. This machinery contributed to the overall productivity of the businesses in delivering products in demand.

TABLE 4.2: ACTIVITIES PERFORMED

Player one	Player two
Buy chicken Eggs Fields Chicken coop Bakery (bread, corn bread, cookie, raspberry muffin, blackberry muffin) Feed mill (2x) Plant and harvest crops (wheat, corn, onions, tomato, carrots, sugar cane, soybean, indigo) Grill (bacon and eggs, burgers, fish burgers, grilled tomato, pancake) Cows (milk) Wheel of fortune (spin for rewards) Dairy (cheese, butter, cream) Roadside shop	Buy chicken Chicken coop Eggs Fields Bakery (Bread, cookies, muffins and corn bread) Pig pen Pigs (bacon) Popcorn machine Plant and harvest crops (wheat, corn, tomato, carrots, sugar cane, soybean, indigo) Cows (milk) Sugar mill

Postman Sugar mill (syrup, brown sugar, white sugar Loom (cotton fabric, sweater, blue woolly hat, blue sweater) Apple tree Sheep (Wool) Popcorn pot (popcorn, buttered popcorn, chili popcorn) Pie oven (pumpkin pie, carrot pie, bacon pie, apple pie, fish pie) Loom (cotton shirt, woolly chaps, blue woolly hat, blue sweater violet dress, blue woolly hat) Bought a Cat Bought a raspberry bush Bought a cake oven (Red berry cake, cheesecake) Bought a cherry tree Smelter (platinum bar, gold bar, silver bar) Started making cheesecake Bought a dog Started playing in the valley bought a blackberry bush Catching fish	Grill (Bacon and eggs, burgers, pancakes) Wheel of fortune (Spin for rewards) Open Pie oven (carrot pie, pumpkin pie, bacon pie) Roadside shop Postman Apple trees Sheep pasture Sheep (Wool) Docks Ship Loom (Cotton shirt, blue woolly hat, blue sweater, woolly chaps) Cat Dog Sewing machine Take part in the derby Cake oven (Redberry cake, cheesecake) Sugar mill
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Source: Self constructed

4.4 PLAYER STRATEGIES

The players were required to document the strategies they adopted during the playing of each session. From the content analysis of this data, various strategies adopted were identified. These are summarised in Table 4.3 together with supporting quotes.

The first strategy identified related to the players *gaining an overall understanding of the game*. This strategy was adopted mostly during the first ten sessions of playing the game. This suggests that after these first ten sessions, the players had gained an overall understanding of how the game had to be played.

Another strategy identified related to the *expansion of infrastructure* which was adopted throughout the various sessions. The expansion adopted by the players relating to growth and progress within the game. Another strategy relating to expansion adopted by the players related to the purchasing of infrastructure such as machinery, equipment and land. Another expansion strategy, which was commonly,

adopted related to the growth of inventory levels. It is therefore evident that both the players considered expansion as a crucial strategy in playing the game.

The third strategy adopted by the players related to *diversification*. This entailed adding new products to the farm, purchasing different livestock and the manufacturing of new products. This strategy was adopted mostly during the first ten sessions of the game. The fourth strategy related to *developing supplier networks*. The strategy was adopted firstly in the initial stages of the game. The strategy was later again adopted by the players towards the end of the game.

Another strategy which was adopted by the players related to *savings*. This entailed saving diamonds and coins, which would later be used for investment in machinery and other equipment. This strategy was adopted in the second session of the game, and mostly during the tenth sessions of the game, as recorded by the players. The savings was done primarily to increase sales.

Increasing sales was a strategy adopted throughout all sessions of the game. The players clearly indicate that sales played a crucial role in the raising of funds, which could then be used to purchase equipment or machinery. The vital role of sales in ensuring growth of the farm was recognised which led to both players creating sales targets, in order to raise capital to use at a later stage.

Another strategy adopted by the players related to the *completion of goals* in the game. This strategy was adopted mostly in the first ten sessions of the game, and later towards the end of the playing sessions. The final strategy identified and adopted by the players was the *improvement of the farm's appearance*. This occurred in the third playing session and again toward the final stages. This was identified only by player one and entailed the cutting down of trees to ensure the farm will have a better appearance and also for the rearranging the farms facilities.

TABLE 4.3: PLAYER STRATEGIES

Strategies	Supporting quotes	Sessions
Gaining an overall understanding	<i>To better understand the game and see if I can move up levels quicker (P1); Wanted to see how real the game actually was (P1); Learn more concepts (P2); Understanding the farming & harvesting process & times (P2).</i>	1, 2, 6, 8
Expansion of infrastructure	<i>Progress from previous levels (P2); Still planning to save money to start repairing the dock (P1); Want to see if I can make enough money today to buy another smelter because I have noticed other farms have many smelters (P2); Multiply crops (P1); Complete all the activities in the valley as I can get shapes that will help me get title deeds faster cause that is all I need to buy a big piece of land (P2).</i>	1, 7, 11, 20, 21
Diversification	<i>Add new products to farm (P2); Buy cow pen (P1); Build feed mill (P1); Make a lot of sales today that I can save enough money to buy a pie oven (P1).</i>	2, 4, 8, 10,
Developing supplier Networks	<i>See if I can add more friends to buy stock so that I don't have to use diamonds (P1); Take part in today's derby (P2); Ask for help because I hardly use this option (P2).</i>	2, 14, 19
Savings	<i>See if I can add more friends to buy stock so that I don't have to use diamonds (P1); Try to raise 14 000 coins to repair dock (P2); Plan to save money to buy mine (P1)</i>	2, 10,
Increasing sales	<i>Make a lot of sales today that I can save enough money to buy a pie oven (P1); Manage farm efficiently while making sales (P1); Make more sales (P2); Complete all the boating orders</i>	4, 5, 11, 18
Completion of goals	<i>I think I will try to play five levels a day maybe I will reach level 35 faster (P1); Try out JIT (P2); Complete orders on the ship (P2); To complete this level as fast as I can (P2).</i>	3, 6, 18, 10
Improvement of the farm's appearance	<i>Planning to cut down and blast as many trees as possible so that there is more space on my farm (P1); Think I want to start rearranging my farm because I have seen other farms and they look nice (P1)</i>	3, 17

Source: Self constructed

4.5 LESSONS LEARNT

From the data collected it can be seen that the players learnt several lessons about operating a business while playing the game. Initial identification of lessons was guided by the coding schedule and categorised as such. Within each category of

lessons several specific lessons were learnt. The various lessons are described below together with and supporting evidence is tabled.

4.5.1 MARKETING

Several marketing lessons were learnt by the players (See Table 4.4). These lessons related to advertising, the importance of marketing and sales. These lessons were learned by both players and what is evident is that when running a business it is important to efficiently and effectively market your products in order to make sales and for your business to be recognised. Both players learned valuable marketing lessons but player 2 learned the most in the first few sessions as this player also described the importance of marketing in his reflective journal. The marketing lessons occurred mostly in the first five sessions of the game, however, both players recorded marketing lessons such as how regular advertising increase sales, that sales is important as it can lead to more profits and also when advertising, the products of a business are sold faster.

TABLE 4.4: MARKETING LESSONS

Marketing lessons	Supporting quotes	Sessions
Advertising	<i>Regular advertising increases sales (P1)</i> <i>Showcasing product increases sales (P1)</i>	1,
Importance of marketing	<i>Marketing is crucial to the success of a business (P2)</i> <i>When advertising, products move faster (P1)</i>	1,2
Sales	<i>Made a lot of money on eggs sales (P1)</i> <i>Sales is something very important in business (P1)</i>	2, 5

Source: Self constructed

4.5.2 PURCHASING AND LOGISTICS

The most lessons learnt by the players related to purchasing and logistics. These lessons included: stock taking, storage, diversification, suppliers and supply chain management. All these lessons indicate that the purchasing function and its elements are crucial to the success of a business. In the first few sessions of the game, stock taking, storage and suppliers were the most important lessons learnt. Stock taking is

important in a business to be able to supply customers with what they want. It is also a necessity in a business to keep storage space available for new inventory coming in and the players learned that sometimes there is a shortage of products even from suppliers. This revealed to the players that in the beginning phases of the business it is important to pay attention to these business activities to ensure that there are enough products and enough storage space in order to successfully operate a business. Player 1 learned the importance of supply chain management in the first session of the game, whereas player two did not. Player 2 had a lesson in diversification in the 10th session but player 1 did not have this lesson. It is evident that these lessons were learnt mostly in the first few sessions of the game. More lessons were learnt in the midpoint of the playing sessions and later on toward the final sessions of the game.

TABLE 4.5: PURCHASING AND LOGISTICS LESSONS

Purchasing and Logistics lessons	Supporting quotes	Sessions
Stock taking	<i>Always make sure you have enough stock to serve your customers (P1)</i> <i>Monitor levels of inventory to know when to start production (P2)</i>	1
Storage	<i>Have to make sure stock is used in an appropriate manner meaning what is stored, what is processed and what is used for resale (P1)</i> <i>Storage is minimal (P2)</i>	2
Suppliers	<i>Sometimes you might need to find another to buy a product that you don't have from (P1)</i> <i>Suppliers sometime do not have the stock that is need (P1)</i>	1, 2
Supply chain management	<i>Time it takes to go from a delivery to come back is time where the operations of the business need to be properly managed (P1)</i> <i>Supply of raw materials delayed in farm if not producing fast enough (P2)</i>	1, 3
Diversification	<i>Diversifying products increases sales (P2)</i>	10

Source: Self constructed

4.5.3 GENERAL MANAGEMENT

The game gave the players lessons relating to general management such as facilities management (which includes production processes such as feeding chickens and then planting wheat and corn so that more chicken feed can be made), maintenance

(where the players learned that the bigger the farm, the more attention it requires to be successful) and time management (where it is important to realise that all the activities in the game are timed and this influences when products are manufactured). The general management lessons were learned in session 2, 3, 4 and 12 and throughout the playing sessions. In the first few sessions of the game, the players learned valuable lessons in regard to general management and only later was this function discussed again. This reveals that sometimes in business other activities are focussed on more than the management function which is only noted at a few times.

TABLE 4.6: GENERAL MANAGEMENT LESSONS

General Management	Supporting quotes	Sessions
Facilities management	<i>Management of facilities requires attention of various activities and functions(P2) I have realized that this farm must always be working. For example, I can just make chicken feed. If I make chicken feed, I must go plant wheat and corn so that my chickens do not starve (P1)</i>	2, 3
Maintenance	<i>I do not think I learned anything today. I just maintained the farm and made sure all the animals were fed and I produced goods for truck orders (P1). The bigger a business, the more attention it requires for all activities (P2)</i>	12, 14
Time management	<i>This game helps with management skills because you need to ensure that all operations are done well and in a timely fashion (P1)</i>	4

Source: Self constructed

4.5.4 PRODUCTION

The game provided the players with production lessons relating to operations and the expansion of these operations. The players learned that a business must always be operational and that sometimes a bigger production space is needed to produce products faster. The players also learned that sometimes it is difficult to expand a business without enough resources. A business must always be producing goods but must be careful not to overdo it because it is sometimes hard to expand when the need arises. The operations of the farm were learned in the first two sessions of the game. This is because the players were still trying to understand the game and how to run the farm. Expansion came in sessions 6 and 11. Expansion also has to do with

diversification. Player 2 realised the importance of diversification because it increases sales in the purchasing function (refer to 4.4.2) in the 10th session whereas both players saw the need to expand in the 6th and 11th session of the game.

TABLE 4.7: PRODUCTION LESSONS

Production	Supporting quotes	Sessions
Operations	<i>Must constantly ensure production is constantly running (P2)</i> <i>Need bigger production space so I can make products faster (P1)</i>	2
Expansion	<i>I just feel like the longer I play this game the less there is to learn because of the repetition of activities. All I have been doing is expanding the farm with machinery (P1)</i> <i>It is still hard to expand storage space (P2)</i>	7, 11

Source: Self constructed

4.5.5 FINANCING

Financing lessons related to budgeting and capital requirements. The players realised that it is important to manage the finances of a business through budgeting as funds are needed for the business to be operational at all times. Both players learned a lesson is budgeting by session three. The players had to budget in order to expand their farms and perform other purchasing activities. Only Player 1 learned the importance of capital by session 8 as this player was focussed on buying new machinery and expanding the farm.

TABLE 4.8: FINANCING LESSONS

Financing	Supporting quotes	Sessions
Budgeting	<i>Money management is important, you cannot just buy stuff because they are nice (P1); Difficult to increase storage with minimal funds (P2)</i>	3, 4
Capital requirements	<i>One thing I know is that to operate successfully a business needs money. I bought two pieces of machinery today and I have only a few coins (P1)</i>	8

Source: Self constructed

4.5.6 OTHER LESSONS

The players also learned other lessons besides those associated with the eight business functions. These lessons included the buying of land which taught the players that in real life situations the buying of land includes title deeds and getting land expansion permits, and that this could take time and money. The players also learned that when operating a business at maximum efficiency, as in all machines are in operation, it is very hard to speed up or to stop due to the time constraints in the game.

TABLE 4.9: OTHER LESSONS

Other	SUPPORTING QUOTES	SESSION
	<i>Apparently getting permits for expanding the land takes forever and requires lots of diamonds (P1); Once production has begun hard to stop (P2)</i>	9

Source: Self constructed

4.6 PLAYER EXPERIENCES

The players were required to document their thoughts, feelings, problems, frustrations and so forth during or after playing a session. These experiences were further divided into positive and negative experiences.

Positive experiences recorded by the players related to the game being *interesting*, *fun* and *easy*. These experiences were recorded mainly during the initial sessions of the game. The first positive experience recorded by the players referred to an *interesting* experience. This was recorded only in the initial stages of the by both players. Player one indicated that he found the game *interesting* as there were a number of new activities that had to be performed. Player two had only recorded that the game was very *interesting* during the first playing session and again in the sixth session.

The second positive experience referred to the game being *fun*. This was recorded by both players in the initial sessions of the game. Player two stated that he was enjoying the game, while player one recorded that he was willing to play the game for long

period. Both these statements indicated that the players were having a *fun* experience during the initial sessions. The last positive experience was recorded in the first session and again in the final session. This referred to *easy*, which was recorded by both players. Player one recorded that he was moving through the levels faster, while the player two found it easier to make money.

The various positive experiences accompanied by the supporting quotes reported by player one and player two are shown in Table 4.10 below.

TABLE 4.10: POSITIVE PLAYER EXPERIENCES

Experiences	Supporting quotes	Sessions
Interesting	<i>This game starts out interesting for the first few days because almost every single activity is a new activity but now all I ever do is repetition (P1); Very interesting (P2)</i>	1, 6
Fun	<i>Enjoying game (P2); I'm willingly to play this game for long periods of time so that my gold coins increase (P1);</i>	2, 3
Easy	<i>We move through the levels very fast and that sucks because the game is really interesting (P1); Easier to make money (P2)</i>	1, 23

Source: Self constructed

The players also recorded various negative experience. The first negative experience recorded by the players related to the game being *time consuming* or taking too long for actions to be implemented. This was experienced mostly in the first few sessions (up to 10) of the games. The players pointed out that it took very long to attain certain achievements. These included duct tape which was essential for the expansion of barn. In addition the player felt that they had to wait long for production material and activities to be complete. An example of this was the time it took for cows to produce milk.

During the sessions, more specifically after the 10th session, the players had other experiences which were negative. A second negative experience noted by the players related to the game being *unrealistic*. This was experienced mainly in the first five sessions of the game. The players indicated that the time it took for planting and harvesting of crops was too short as well as the laying of eggs. Another unrealistic aspect experienced by the players related to the allocation of time given to the production of materials. For instance, materials that would normally take longer to

produce and manufacture in a real-world situation had time frames that were drastically reduced, while the exact opposite occurred for activities that required less time in real world situations. This negative experience was not recorded during later sessions (after session 5).

Both players recorded being *irritated* with the game. This occurred in session 3 and then again in sessions 14 and 16. Irritation occurred as a result of the game not providing enough information about the cost of capital equipment in the stages that would follow. Another source of irritation was that the players found it hard to make money and progress to higher levels.

Boredom was another negative experience recorded by both the players. This occurred firstly from the fourth session until the last few playing sessions of the game. It is evident that the players found the game boring because of repetition of various activities in the game. As a result, time spent playing the game decreased as the players were bored. *Repetition* was another negative experience recorded by both the players. This occurred from the fourth session, and further followed in the seventh and ninth session and again in the eighteenth playing session. As a result, the players felt that the game was redundant due to the repetition of activities that had to be performed to ensure the farm will run efficiently.

Frustration is another negative experience which was recorded by both the players. This first occurred in sessions 4 and 7 and then again in sessions 12 and 17. The players were frustrated for various reasons but stemmed mainly from delays in the progression to higher levels, and the expansion of inventory and infrastructure. Player one had also recorded that he was frustrated because it felt as if he had no control of his farm and spent too much time on one level.

The various negative experiences reported by the players are shown in Table 4.11 below.

TABLE 4.11: NEGATIVE PLAYER EXPERIENCES

Experiences	Supporting quotes	Sessions
Time consuming	<i>Takes longer to get some achievements (e.g. first duct tape) (P2); It takes a whole hour for the cows to be ready and this is a waste of time (P1); Have to wait (P2); Playing this game for long periods of time is really frustrating because all that happens is that you just want to get points and money to get onto the next level (P1).</i>	1, 2, 7, 10
Unrealistic	<i>Felt the game was too unrealistic because chicken do not take two minutes to lay eggs (P1), Unrealistic in terms of time frames (P2); Too short to plant (P2); I really don't understand why it takes 6 hours for wool to be produced. A big problem is how the time is allocated in this game as I said before it is not possible for bacon and eggs to be made in two how (P1).</i>	1, 2, 5
Irritating	<i>I wish this game would tell us how much things cost at the next level. Like I did not have enough money to buy the pie oven because the game did not tell us what to expect price wise (P1); This game is really starting to give me a headache; It is starting to get hard to make money and proceed to the following levels (P2)</i>	3, 14, 16
Boring	<i>When I started this game, I thought it was really fun, now that I have played for a while its getting kind of boring because it is just a repetition of things I did and it has literally been like 4 days (P1); Bored (P2); I am bored of this now (P1); I am tired of this game that is why I have stopped playing it often (P1).</i>	4, 7, 12, 17
Repetitive	<i>There is nothing really new that I did today, most of what I did was just management functions making sure that my farm operates to its full capacity (P1); Repetitive (P2), Starting to feel redundant (P2); I wish this game would finish faster. I Just feel like I am repeating myself every time (P2);</i>	4, 7, 9, 18
Frustrating	<i>I didn't feel like I was in control of the farm because the scarecrow guy keeps popping up and telling me what to do. I want to run the farm freely (P1); I am spending a lot longer on 1 level than necessary and it's frustrating (P1); Why can't I buy coupons for Land with my OWN coins (P2).</i>	1, 2, 10, 18

Source: Self constructed

4.7 PLAYER PERFORMANCE

Figure 4.1 and 4.2 illustrates how the players performed in terms of the most truck deliveries in one day, the most player visits in one day and the maximum revenue from roadside shops of the players made in one day.

FIGURE 4.1: PLAYER 1 FARMING STATISTICS



Source: Hay Day App game (2019)

FIGURE 4.2: PLAYER 2 FARMING STATISTICS



Source: Hay Day App game (2019)

Player 1 reported the most truck(16) deliveries on any one day, whereas player 2 had one more (17). Player 1 reported 187 player visits from the game's customers on his best day, whereas player 2 had 222. The roadside shop maximum revenue earned in one day was also different between the two players. Player 1 earned a maximum revenue of 10 697 coins whereas player 2 earned 11312. From the best performance for a particular day it can be seen that player 2 performed better than player 1.

However, from Table 4.12 (see below), when considering the overall performance of the players it can be seen that after 21 sessions of playing, player 1 had reached level 29, whereas player 2 had only reached level 23. Furthermore, at the last level played by the players (level 23), player 1 had 24 130 coins on hand whereas player 2 had

14 567 coins on hand. Player 1 had 55 diamonds whereas player 2 only had 9. As such player 1 was in a much better financial position than player 2.

TABLE 4.12: PLAYER STATISTICS

Session	Level reached		Cash/coins on hand		Diamonds on hand	
	Play1	Play2	Play1	Play2	Play1	Play2
1	5	2	473	21	33	9
2	10	4	658	123	32	3
3	14	6	2096	256	36	4
4	15	10	12500	367	36	12
5	16	13	15201	231	37	9
6	17	14	9255	456	31	2
7	18	15	15520	1238	35	2
8	20	16	4500	345	42	12
9	21	17	11300	2604	44	12
10	23	18	24130	3245	55	13
11	24	19	36124	345	57	14
12	24	20	15124	3245	57	13
13	24	21	16570	4356	57	3
14	25	21	21407	4589	52	4
15	25	21	22300	4367	52	6
16	26	22	13824	6578	66	4
17	26	22	13288	6578	67	5
18	27	23	15721	7568	73	9
19	28	23	42201	4567	75	9
20	28	23	498	6298	81	9
21	29	23	15226	9867	84	9

Source: Self constructed

4.8 ENTREPRENEURIAL INTENTION AND ENTREPRENEURIAL SELF EFFICACY

The players were required to complete a questionnaire to assess their entrepreneurial self efficacy and entrepreneurial intention prior to and after playing the game. This questionnaire was completed in March, which was before playing the game. Thereafter, the same questionnaire was complete a second time in September. This was done after playing the game. The purpose was to assess the the potential impact

of playing the game on the players entrepreneurial intentions and entrepreneurial self-efficacy. The results for entrepreneurial intentions for March and September for both players is shown in Table 4.13 and Table 4.14 respectively.

TABLE 4.13: PLAYER 1 ENTREPRENEURIAL INTENTIONS

STATEMENTS	MARCH	SEPTEMBER
I will make every effort to start and run my own business in the future.	6	6
My professional goal is to become and entrepreneur.	6	6
I want to be my own boss	6	6
I would become an entrepreneur if a suitable opportunity arises.	6	6
I have a strong intention to start my business one day.	6	6
I often think about starting my own business in the future.	6	6
I am highly likely to pursue a career as a self-employed person.	6	6
I am determined to create a business in the future.	6	6
I will start my own business before the age of 34.	6	6
I would prefer to be an entrepreneur than an employee in someone else's business.	6	6
I intend to start and run my own business in the future	6	6
If I choose between running my own business and being employed, I would choose to run my own business	6	6
MEAN	6	6

Source: Self constructed

The mean for player one in March was 6. This shows that before player one played the game, he already had high intentions of starting his own business. After playing the game, the mean remained unchanged at 6.

The mean for player two before playing the game in March was also recorded at 6. After playing the game, the mean also remained unchanged at 6. This shows that he also had high intentions of pursuing an entrepreneurial career before and after playing the game.

TABLE 4.14: PLAYER 2 ENTREPRENEURIAL INTENTIONS

STATEMENTS	MARCH	SEPTEMBER
I will make every effort to start and run my own business in the future.	6	6
My professional goal is to become and entrepreneur.	6	6
I want to be my own boss	6	6
I would become an entrepreneur if a suitable opportunity arises.	6	6
I have a strong intention to start my business one day.	6	6
I often think about starting my own business in the future.	6	6
I am highly likely to pursue a career as a self-employed person.	6	6
I am determined to create a business in the future.	6	6
I will start my own business before the age of 34.	6	6
I would prefer to be an entrepreneur than an employee in someone else's business.	6	6
I intend to start and run my own business in the future	6	6
If I choose between running my own business and being employed, I would choose to run my own business	6	6
MEAN	6	6

Source: Self constructed

The results for entrepreneurial self-efficacy of player two was also measured before and after playing the game. The measurements for the entrepreneurial self-efficacy were adopted from the scale of Stevenson and further divides entrepreneurial activities into four phases (McGee, Peterson, Mueller & Sequira, 2009). These phases are the *searching, planning, marshalling* and *implementing phase*. The *implmenetation phase* was further split into (McGee *et al.*, 2009). The results of the entrepreneurial self-efficacy for player one and player two are shown in Table 4.15 and Table 4.16 respectively.

TABLE 4.15: PLAYER ONE ENTREPRENEURIAL SELF-EFFICACY

PHASES	STATEMENT	MARCH	SEPTEMBER	CHANGE
SEARCHING	Ability to brainstorm a new idea for a new product or service	5	6	+1
	Identify the need for a new product or service	4	6	+2
	Design a new product or service that will satisfy customer needs and wants	3	6	+3
	Mean	4	6	+2
PLANNING	Estimate customer demand for a new product or service	4	5	+1
	Determine a competitive price for a new product or service	5	6	+1
	Estimate the amount of start-up funds and working capital necessary to start my business	3	5	+2
	Design an effective marketing/advertising campaign for a new product or service	4	6	+2
	Mean	4	5.5	+1.5
MARSHALLING	Get other to identify with and believe in my vision and plans for a new business	3	5	+2
	Network i.e. make contact with and exchange information with others	4	6	+2
	Clearly and concisely explain verbally/in writing my business idea in everyday terms	5	6	+1
	Mean	4	5.67	+1.67
IMPLEMENTING PEOPLE	Supervise employees	5	6	+1
	Recruit and hire employees	6	6	+0
	Delegate tasks and responsibilities to employees in my business	4	6	+2
	Deal effectively with day-to-day problems and crises	4	6	+2
	Inspire, encourage, and motivate my employees	4	6	+2
	Train employees	5	6	+1
	Mean	4.67	6	+1.33
IMPLEMENTING FINANCIAL	Organize and maintain the financial records of my business	5	5	+0
	Manage the financial records of my business	5	5	+0
	Read and interpret financial statements	5	6	+1
	Mean	5	5.33	+0.33
MEAN		4.34	5.7	+1.4

In March, player 1 reported a mean of 4 for the *searching phase* and a mean of 6 in September when the assessment was complete. The average grew by 2. In the planning phase, the mean was 4 in March and 5.5 for September. During these months, there was evident growth in player 1. The mean for *marshalling* revealed that player 1 had an average of 4 for March and 5.67 for September. The average for *implementing people* for player 1 in March was 4.67 and 6 for September. With regard to the *implementation of finances*, player one reported an average of 5 in March and 5.33 in September.

Overall, the mean reported in March for entrepreneurial self-efficacy was 4.3 and 5.7 in September. A total increase of 1.4 was observed for player one for ESI.

In March, the mean for player two for the *searching phase* was 3.33. After playing the game, the mean for *searching* in September was 5.33. This shows that player two had greater confidence in searching after playing the game as there was a total increase of 2.00. For the *planning phase*, the mean for player two was 2.75 and 5.75 for March and September respectively. This shows that after playing the game, the level of confidence in the *planning* abilities increased by a total of 3.00. The third phase refers to the level of confidence in *marshalling* abilities. The mean for March and September was 3.67 and 6.00 respectively. An increase of 2.33 was observed.

The last phase referred to *implementation*. More specifically the implementation of people and implementing financials. In March, the mean for *implementing people* was 3.00 and for September, it was 6.00. This shows that after playing the game, the level of confidence in implementing people doubled. Lastly, for *implementing financials*, the means in March was 2.00 and 6 in September. A total increase of 4 was observed after player two played the game.

Overall, the mean in March for the entrepreneurial self-efficacy was 2.94 and 5.78 for September. A total increase of 2.84 was observed for player two for ESI.

TABLE 4.16: PLAYER TWO ENTREPRENEURIAL SELF-EFFICACY

PHASES	STATEMENT	MARCH	SEPTEMBER	CHANGE
SEARCHING	Ability to brainstorm a new idea for a new product or service	3	6	+3
	Identify the need for a new product or service	4	5	+1
	Design a new product or service that will satisfy customer needs and wants	3	5	+2
	Mean	3.33	5.33	+2
PLANNING	Estimate customer demand for a new product or service	3	5	+2
	Determine a competitive price for a new product or service	3	6	+3
	Estimate the amount of start-up funds and working capital necessary to start my business	2	6	+4
	Design an effective marketing/advertising campaign for a new product or service	3	6	+3
	Mean	2.75	5.75	+3
MARSHALLING	Get other to identify with and believe in my vision and plans for a new business	4	6	+2
	Network i.e. make contact with and exchange information with others	4	6	+2
	Clearly and concisely explain verbally/in writing my business idea in everyday terms	3	6	+3
	Mean	3.67	6	+2.33
IMPLEMENTING PEOPLE	Supervise employees	3	6	+3
	Recruit and hire employees	3	6	+3
	Delegate tasks and responsibilities to employees in my business	3	5	+2
	Deal effectively with day-to-day problems and crises	3	6	+3
	Inspire, encourage, and motivate my employees	3	6	+3
	Train employees	3	6	+3
	Mean	3	5.83	+2.83
IMPLEMENTING FINANCIAL	Organize and maintain the financial records of my business	2	6	+4
	Manage the financial records of my business	2	6	+4
	Read and interpret financial statements	2	6	+4
	Mean	2	6	+4
MEAN		2.94	5.78	+2.84

4.9 SUMMARY

In Chapter 4, the empirical results of the study were presented. Firstly, a profile of the two players was presented. Thereafter, a list of the various activities performed by them was given. The strategies the players used when playing the game were identified and the business lessons learnt were highlighted. The chapter concluded with a summary of each player's performance statistics as well as their levels of EI and ESE as reported prior to and after playing the game. Chapter 5 will discuss the results and present the conclusions and recommendations arising from this study.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

In Chapter 4, the empirical results of the current study were presented. More specifically the data collected in the reflective journals of the players was presented to describe their experiences when playing the Hay Day APP game. Chapter 5 will give an overview of the study as a whole, making reference to where the objectives were achieved. Following that will be a discussion on the findings recorded in the reflective journals. After that a discussion on the implications and contributions of the study will be given and the chapter will conclude with the limitations of the study and avenues for future research.

5.2 OVERVIEW OF THE STUDY

Chapter 1 provided the background to the topic under investigation. The introduction was followed by the problem statement and the purpose of the study, as well as the research objectives and research questions. The problem statement suggested that although entrepreneurship plays an important role in transforming an economy from emerging to developed, the entrepreneurship levels in South Africa are low. Previous studies have indicated that inadequate and ineffective entrepreneurship education in South Africa is a contributor to this problem. Furthermore, students feel ill-equipped with the knowledge which will assist them in establishing and managing their own businesses. The current study attempted to investigate whether the use of application (APP) games can improve the ability of students to learn how to start and run their own business, and in turn improve their levels of entrepreneurial self-efficacy and entrepreneurial intentions.

More specifically, the primary objective of this study was to explore the value of using APP game's in entrepreneurial education.

In order to address the primary objectives of this study, the following secondary objectives were formulated:

- SO₁ To establish whether playing App games provides students with real-life entrepreneurial lessons.
- SO₂ To establish whether playing App games enhances the entrepreneurial self-efficacy of students.
- SO₃ To establish whether playing App games enhances the entrepreneurial intentions of students.

In order to address the primary objective and secondary objectives of this study, the following methodological research objectives were formulated:

- MO₁ To undertake a theoretical investigation into entrepreneurship education as well as the use and value of games in entrepreneurial education.
- MO₂ To determine the appropriate research methodology to address the identified research problem and research objectives.
- MO₃ To develop a reflective journal template to collect the necessary data.
- MO₄ To summarise, analyse and interpret that data collected from the reflective journals of participants.
- MO₅ Based on the empirical results of this study, to put forward recommendations on the use of APP games to both students and educators of entrepreneurship.
- MO₆ To suggest areas for future research in terms of using APP games as tools for entrepreneurial education.

Based the objectives of the study, the following research questions were posed:

- RQ₁ Does playing App games provide students with real-life entrepreneurial lessons?
- RQ₂ Does playing App games enhance student's entrepreneurial self-efficacy?
- RQ₃ Does playing App games enhance student's entrepreneurial intentions?

Following in Chapter 1 was a description of the research design and methodology to be used which included the primary and secondary research undertaken. Thereafter how trustworthiness was ensured and the ethical consideration taken into account were described. Following that a discussion on the scope and delimitation of the study took place. Chapter 1 concluded with the key definitions used in the study, the significance of the study and an overview of the structure of the chapters that followed.

Chapter 2 provided a literature overview of entrepreneurship education, the experiential learning theory, games in entrepreneurship education and the outcomes of entrepreneurship education. The nature of entrepreneurship education and the various teaching and learning methods used in entrepreneurship education were elaborated on. Entrepreneurship education was defined as a form of education that provides future entrepreneurs with the relevant knowledge for managing their own business and ultimately creating jobs (Byun *et al.*, 2018:2). Thereafter, several teaching and learning methods used in entrepreneurship education were described. Two learning methods were highlighted, the traditional and the innovative methods (Arasti *et al.*, 2012:5). Traditional methods are less effective because students become dormant participants in the learning process (Arasti *et al.*, 2012:5). Innovative methods require an active environment that stimulates learning and encourages students to participate (Samuel & Rahman, 2018:1809). The challenges facing entrepreneurship education were then discussed, these included both teaching and research challenges.

Chapter 2 then discussed the experiential learning theory. This entailed a description of the experiential learning cycle which gives insight into how individuals develop through different learning techniques. The experiential learning cycle places an emphasis on how practical experiences play a role in learning experiences. After describing the experiential learning cycle the use of games in entrepreneurship was discussed. This discussion revolved around the use and value of games in education and various studies were highlighted. The nature of application games and the growing use of App games both in education and entrepreneurship education were also discussed.

The chapter concluded with a discussion on the outcomes of entrepreneurship education. Two theories that support positive outcomes of entrepreneurship education, namely Ajzen's (1991) theory of planned behaviour and Ajzen and Fishbein's (1977) theory of reasoned action, were introduced. In general, these theories were developed to assess the intention of individuals to perform certain behaviours. The relevance of the two theories to the current study was explained by discussing the relationship between entrepreneurship education and both entrepreneurial intention and self-efficacy.

Chapter 3 focussed on the research design and methodology used in this study, as well as the rationale behind the selected methodology. The research paradigm, the methodology and the data collection methods, as well as the sample of the study were described. The current study is positioned in the interpretivism paradigm. This paradigm is appropriate as the study makes use of qualitative data which will give information on human nature (Chilisa & Kawulich, 2012:3). Furthermore, this paradigm allowed the researchers to gain a deeper understanding of phenomena of interest as they were able to express their own subjective opinions. For the purposes of this study an inductive approach was used. This is because the researchers used a qualitative research method to collect the data. The researchers gathered information by making use of a single case study. The single case study used was relatively inexpensive and allowed for the information needed to achieve the objectives of this study faster than multiple case studies would. The single case study gave the researchers the information required in order to meet the objectives of the current study.

In Chapter 4 the empirical results relating to the case study were presented. The player profiles and the various activities they performed in their fictional businesses were presented. Following that the strategies adopted by the players to move up the levels of their fictional businesses were listed. The various business lessons learnt by the players were presented next. These lessons included those relating to marketing, purchasing and logistics, general management, production and financing. In addition, the positive and negative experiences of the players and their performance statistics were summarised. Chapter 4 concluded with the results of the player's entrepreneurial self-efficacy and entrepreneurial intention assessments that were conducted at two different points in time.

In Chapter 5, the current chapter, the summary, conclusions and recommendations will be presented. This chapter will give reference to the objectives achieved in this study as well as give answers to whether there is value in playing App games in entrepreneurial education.

The overview of the current study confirms the achievement of the primary, secondary and methodological objectives. Table 5.1 summarises in which chapters each of the study's objectives were achieved.

Table 5.1: STUDY OBJECTIVES ACHIEVED AND RELEVANT CHAPTER

OBJECTIVES		RELEVANT CHAPTER(S)
Primary objective:		
To explore the value of using APP game's in entrepreneurial education.		Chapter 2 & 5
Secondary objectives:		
SO ₁	To establish whether playing APP games provides students with real-life entrepreneurial lessons.	Chapter 4
SO ₂	To establish whether playing APP games enhances the entrepreneurial self-efficacy of students.	Chapter 3 & 4
SO ₃	To establish whether playing APP games enhances the entrepreneurial intentions of students.	Chapter 4 & 5
Methodological objectives:		
MO ₁	To undertake a theoretical investigation into entrepreneurship education as well as the use and value of games in entrepreneurial education.	Chapter 2
MO ₂	To determine the appropriate research methodology to address the identified research problem and research objectives.	Chapter 1 & 3
MO ₃	To develop a reflective journal template to collect the necessary data.	Chapter 3
MO ₄	To summarise, analyse and interpret that data collected from the reflective journals of participants	Chapter 4 & 5
MO ₅	Based on the empirical results of this study, to put forward recommendations on the use of APP games to both students and educators of entrepreneurship.	Chapter 4 & 5
MO ₆	To suggest areas for future research in terms of using APP games as tools for entrepreneurial education.	Chapter 5

Source: Self constructed

In the next section the key findings of the study are discussed.

5.3 DISCUSSION OF FINDINGS

5.3.1 PLAYER PROFILES AND PLAYER PARTICIPATION

For this study, both players were males studying towards their B.Com honours qualification, with neither having any work or entrepreneurial experience. Furthermore neither of the parents of the players was involved in entrepreneurship. As such neither of the players had any entrepreneurial influences as a result of family background. However, both players indicated high levels of entrepreneurial intentions which is the “intention to engage in any form of entrepreneurial behaviour and carry out entrepreneurial activities, which can be affected by a number of factors” (Paul *et al*, 2017:4), when assessing these levels prior to and after playing the game. The high levels of entrepreneurial intentions reported by both players could be as a result of their perceived feasibility and perceived desirability. In addition, both the players are pursuing a qualification, which specialises in Business Management. This is another factor that has influenced the high levels of entrepreneurial intentions of the players. Furthermore, in Chapter 2 it was stated that in the context of entrepreneurial intentions the theory of planned behavior proposed that actual entrepreneurial venture creation is influenced by the intention of someone to create a venture, which both players plan to do.

The players had to record the various activities they performed in order to move through the levels. These activities included feeding chickens, planting and harvesting crops and buying machinery, amongst others. When the players performed these activities, they received points which enabled them to move through levels in the game.

Within the 21 sessions that were played by both players, player 1 was able to perform more activities than player 2. Player 1 also reached a higher level than player 2 which enabled player 1 to perform more activities. The players' strategies were different throughout the game with player 1 mainly focussing on making a lot of money in order to perform other activities, whereas player 2 focussed on the sales and marketing of his fictional business. The different strategies influenced the level of the game that the players reached and also how fast they went through the levels.

The different strategies also influenced the lessons that were learned by each of the players. The players learned different lessons at different levels of the game. Within the first 5 sessions both players learned about the importance of marketing but as the game progressed the players learned at different levels about financing and the general management of their businesses.

5.3.2 PLAYER STRATEGIES

The players adopted various strategies which were recorded throughout their playing sessions. As highlighted in Chapter 2, the two main teaching methods which exist in entrepreneurial education are the traditional and innovative methods (Samuel & Rahman, 2018:1809). The latter being the primary focus of the current study. The findings of this study suggest that through playing the game, the players were able to enhance their entrepreneurial abilities through implementing various strategies for running their businesses and adapting them as needed.

The first strategy identified as being implemented by the players was *gaining an overall understanding of the game*. This strategy was implemented during the initial sessions of the game, however once the players had gained an understanding of the game and its functions the strategy changed. This suggests that once an individual has started a business, it may take some time within the first few months or years of operations to understand how the business operates. After a certain period of time, it can be assumed that the entrepreneurs would understand the business and can then focus on other strategies, such as *expansion of infrastructure* which was the second strategy identified by the players. This strategy was adopted in the first few sessions, but mostly after session ten. Based on this, one can assume that once an entrepreneur has started their business, there will be a need for the *expansion of infrastructure* during the initial phases but this will increase as the business starts to expand.

The third strategy which was adopted by the players was *diversification*. This strategy was adopted continuously till session ten. This implies that as a business grows, the entrepreneur is required to diversify his product and service offerings. This strategy was followed by *developing supplier networks* which occurred in the initial sessions,

the middle sessions and again towards the final session. This indicates that once a business has been started, an entrepreneur will need to continuously explore various ways to develop the firms network of supplier. Thereafter, *savings* was the strategy adopted by the players. This occurred in the second stage and again in session ten. This shows that entrepreneurs need to save funds from the firms early stages and also as the firm grows. These *savings* have multiple functions such as investing in machinery for the expansions of firms production, diversifying the firms products or services.

Another strategy that was adopted by the players was the *completion of goals*. This occurred throughout the game, from the beginning sessions till the final sessions. This shows when owning a business entrepreneur's will have various goals that they will need to complete. The final strategy was the *improvement of the farms appearance*. This occurred in the third session and again towards the final session. This shows that once an entrepreneur has started a business, he will improve its appearance during the initial stages and once again after the business has grown.

Based on the discussion of the results above the first research question (RQ₁ -Does playing APP games provide students with real-life entrepreneurial lessons?) is addressed. Through playing the game, both players have been presented with opportunities to implement and adapt their strategies. The results show that the players were exposed to the need to adapt their strategy based on the stage of development as well as their the product or service on offer.

The literature study undertaken mentions that games allow students be creative, as they have a strategic element, which will spark the analytical thinking (Moursrand, 2007). In addition, Belloti *et al.* (2012:180) states that using games allows students to enhance their decision making skills for running a business. This has been applied while playing the game, as it is evident that both players had to decide on the relevant strategies to ensure the business will succeed. Furthermore, Almeida (2017) mentions that the use of games allows students to adopt various entrepreneurial skills such as strategic thinking, problem solving and risk management. As such, these skills allows the students to experience real life decision- making which would be experienced by real entrepreneurs. It is evident that both player did make these decision. These

decisions were made by creating various strategies to implement while running the business. As such, the players had an opportunity to apply the literature in practice.

According to Samuel and Rahman (2018:1809), innovative learning methods require an active environment that stimulates learning and encourages students. . It is evident that playing the APP game did provide an active environment, as both players had to continuously engage with the game and also documenting throughout the sessions. Furthermore, the players had to continuously make decisions on the how to run the business. The decision made in the game required the players to be active and further understand the game.

From the above it can be seen that both players had to learn to implement certain strategies and to change these strategies as they progressed through the game if they wanted their businesses to grow. According to McFarland (2017:269), entrepreneurs generally learn more from practical business simulations than traditional methods. The strategies applied while playing the game are strategies that can be implemented by an owner of business. However, these strategies implemented allows to provide a conceptual basis for entrepreneurship and can support the development of an entrepreneurial mindset (Belloti *et al.*, 2012). Furthermore, La Guardia *et al.* (2013) mentions that games allow students to move from basic scenarios to more complex ones by familiarizing themselves with the basic concepts of business management. It is evident that both players have done this, as they have adopted strategies which play a role in decision making. In addition, Almedia (2017) conducted a study which revealed that games develop skills such as innovation, strategic thinking, problem solving and risk management. As such, the game has allowed both players to apply such skills.

5.3.3 LESSONS LEARNT

In Chapter 3 the various business functions were elaborated on and this gave way to develop a coding framework for identifying the various lessons that could be learnt while playing the APP game. These business functions were general management, purchasing and logistics, financing, production, marketing, public relations, human resources and administration. Of these eight business functions, lessons were only

learnt that related to five of the functions. No lessons were learnt within the areas of public relations, human resources and administration. Fayolle (2008:202), suggests that learning to be an entrepreneur is not how to manage a business but about learning to deal with situations as they emerge. From playing the APP game, many situations emerged where the players had to think quickly in order to satisfy the needs of their clients. This may have contributed to the players not learning lessons in these functions because throughout their reflective journals, their goals were to quickly move through the situations that were presented to them. It can further be suggested that the players did learn lessons in all of the functional areas but because of lack of work and entrepreneurial experience these lessons were not noticed.

The first category of lessons that the players learnt had to do with marketing. These lessons related to advertising, sales and the importance of marketing. Within the first five sessions of the game the players learned all of these lessons as reported in the empirical results. These lessons illustrated to the players the importance of marketing a business. For products to be sold in the game, continuous advertising had to be conducted. This was a real life example for the players about the marketing function in business. It taught the players that in order for their businesses and products to gain recognition, it is important to continuously market products in the form of advertising. From advertising the products are sold and sales are generated which showed the players that in order to make profits, marketing has to be conducted.

The second category of lessons that the players learned while playing the game related to purchasing and logistics. These lessons were learned within the first 10 sessions of the game. Purchasing lessons were learned at different levels. These lessons included: stock taking, storage, diversification, suppliers and supply chain management. These lessons showed the players the importance of the purchasing and logistics function in real-life situations. The players began to understand that this is an important functional area in business in order to ensure that the operation runs smoothly. Lessons such as stock taking taught the players that in business it is important to evaluate the stock levels so that there is no shortage of goods or shortage of storage. Lessons in diversification taught the players the importance of having different products to sell in a business. The suppliers and supply chain management

lessons taught the players the importance of comparing different suppliers and also having enough products for delivery at all times.

The third category of lessons learnt by the players related to general management. These lessons occurred within the first 4 sessions and session 12 and 14. These lessons suggest that when running a business, management at the start up is important in order to be successful. These lessons related to facilities management, maintenance and time management. These lessons taught the players the importance of the management function in business such as when there are buildings, the need to be maintained and managed in a timely fashion. The management function also occurred within session 12 and 14 which shows that the players were more experienced in running their businesses as well as more confident within their management decisions.

The fourth category of lessons related to production. Lessons learnt by player 1 related to expanding the farm and producing and saving money in order to buy new machinery to produce more products whereas lessons learnt by player 2 focused on the marketing and the production of animal products.

Finally, the players learnt lessons within the area of financing. The lessons related to finance were budgeting and capital requirements. The players learnt the importance of saving in business especially when facing issues of expansion. The lessons were saving money and monitoring the cash flows in order to buy new machinery and expand their farms.

Within the context of the *experiential learning theory*, both players were exposed to reflective observation which involved a review of new learning experience through playing the APP game. The players had to undertake reflective journaling and also make note of any problems or misrepresentations that occurred during the playing of the game. This contributed to learning. Furthermore, the players were also exposed to a *different learning technique* which uses *diverging* where the players learn better through concrete experience and reflective observation. Concrete experience occurred through playing the game and reflective observation occurred when the players recorded their experiences and lessons in their reflective journals.

5.3.4 PLAYER EXPERIENCES

According to the literature, learning can be experienced both negatively and positively. A study conducted by Sudrajat *et al.* (2018) showed that 76.5% of students found it interesting learning entrepreneurship using the concept of games, while 17.6% found it unattractive and the remainder refused to comment. Furthermore, a study conducted by BECTA (2001) also revealed that games being too easy or too difficult could lead to a decrease in interest of playing the game. Amr (2012) found that a game with fantasy and challenge will influence the players positively.

Both positive and negative experiences were reported by the players. The first positive experience that was identified by the players was that the game was interesting. This occurred in the first session and again in the sixth session. This suggests that once an entrepreneur has started their business, it will be interesting mainly in the initial stages as they are learning about the business and its operations. The game was also experienced as being fun. This occurred during the second and third session. This could be an indication that once an individual has started a business it will be fun mainly in the initial stages. This was closely linked to the game being experienced as easy, which occurred in the initial stage and again in the final playing session. Based on this experience, one can assume that an entrepreneur may find it easy to run the business in the initial stages.

Several negative experiences were also encountered while playing the game. These experiences can also be applied to running a business in the real world. The first negative experience identified by the players was the game being time consuming. This occurred mainly in the first few sessions up to session ten. When applying this in the real world, running a business can be time consuming, especially during the first few years of development. Thereafter, it is assumed that as the business grows the entrepreneur will develop better time skills and find various ways to manage their business.

Another negative experience reported by the players related to the game being irritating. This occurred at various playing sessions. When applying this in the real

world, it can be assumed that from time to time, running and managing a business can become irritating. This is closely linked to another experience, namely the game being boring. This was also experienced at various stages of playing the game. When applying this in real world situations, running a business can become boring during various stages of its lifespan.

Another experience reported by the players related to the game being repetitive. This occurred continuously, from the initial stages until the end. When applying this in real world situation, running a business can be repetitive. Various activities such as production and production schedules, routines and principles become repetitive. The last negative experience related to the game being frustrating. This also occurred during all playing sessions. When applying this in real world situations, running a business could be experienced as frustration.

Given that many more negative than positive experiences were reported by the players in the current study, the findings of this study appear to contradict those of Sudrajat *et al.* (2018) who reported that the majority of students found it interesting learning entrepreneurship using the concept of games. BECTA (2001) also revealed that games being too easy or too difficult could lead to a decrease in interest of playing the game. It is evident that the decreasing interest of the players is due to the game having a combination of being very easy in the beginning, which increased the players interest in the game. However, as the game progressed, it became difficult to purchase various products such as the land expansion products which led to the players losing interest. However, Amr (2012) found that a game with fantasy and challenge will influence the players positively. It is evident that this game influenced the players positively to a certain point.

Throughout the playing sessions, while having both negative and positive experiences, various business lessons are evident. The game has provided both players with the opportunity to experience what it is like to run a business. According to the literature operating a business can be repetitive, boring and frustrating (Shepherd, 2004). It is evident that both the players have experienced these emotions while running their virtual business.

According to Hatak and Snellman (2017:350), running a business is a rollercoaster of emotions. Active participation therefore provides students to process all the types of information including emotions', strategies and feelings (Shepherd, 2004). It is evident that while playing the game, both players went through this as they had moments of enjoyment and other positive emotions and also had negative emotions such as frustration and boredom. In addition, positive emotion such as joy have been shown to drive an entrepreneurial career (Hatak & Snellman, 2017:350). The game has allowed players to experience these emotions. It is evident mainly in the beginning, as players enjoyed the game, played more and recorded more in their reflective journals. In contrast, negative emotions when running a business could be emotions such as grief, frustration and fear of failure (Shepherd, 2004). The game has also allowed both players to experience these negative emotions as they had periods of frustration, irritation and even boredom.

The game has shown that negatives experiences may arise due to running a business such as repetitive and boredom. Playing this APP game has revealed that running a business will have repetitive activities which can lead to managers being bored, irritated or even frustrated. More importantly, the game has taught the players that regardless of both positive and negatives which may arise, it is important to be resilient to ensure you will reach your goals and expand the business.

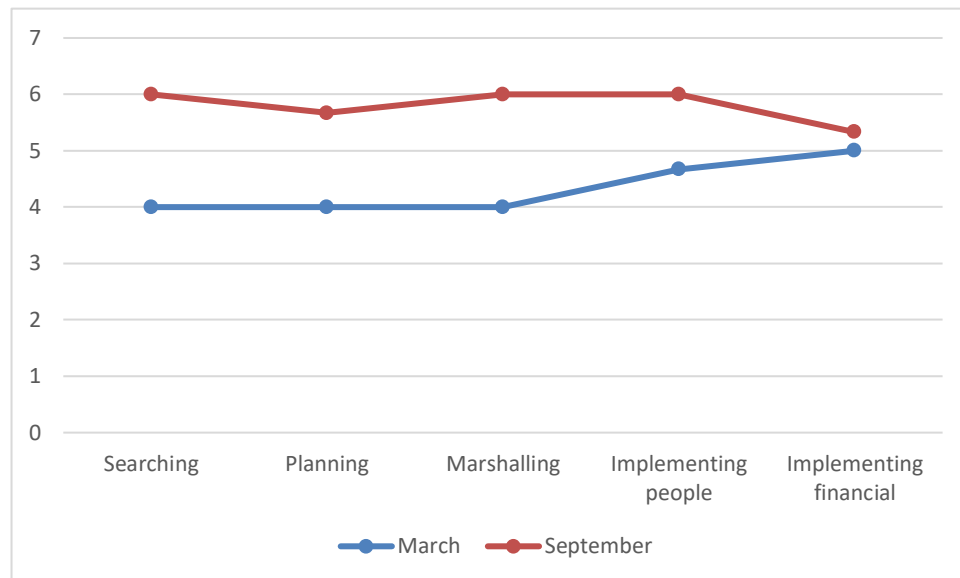
5.3.5 PLAYER QUESTIONNAIRES (EI AND ESE)

The second secondary objectives (SO2) of this study was to establish whether playing APP games enhance the entrepreneurial intention of students. For both players, the means remained unchanged which was a score of six. Therefore, it could not be established whether playing the game had any influence on their entrepreneurial intentions. This findings resulted because both players already had intentions of becoming entrepreneurs.

The third secondary objective (SO3), namely, to establish whether playing APP games enhances the entrepreneurial self-efficacy of students could however be addressed. To assess the player's entrepreneurial self-efficacy, four different criteria was used namely, *searching*, *planning*, *marshalling* and *implementing*, which was further split

into *implementing people* and *implementing financial*. Figure 5.1 shows the change that occurred from March to September by player 1 for these criteria.

FIGURE 5.1: PLAYER 1 ENTREPRENEURIAL SELF-EFFICACY



Source: Self constructed

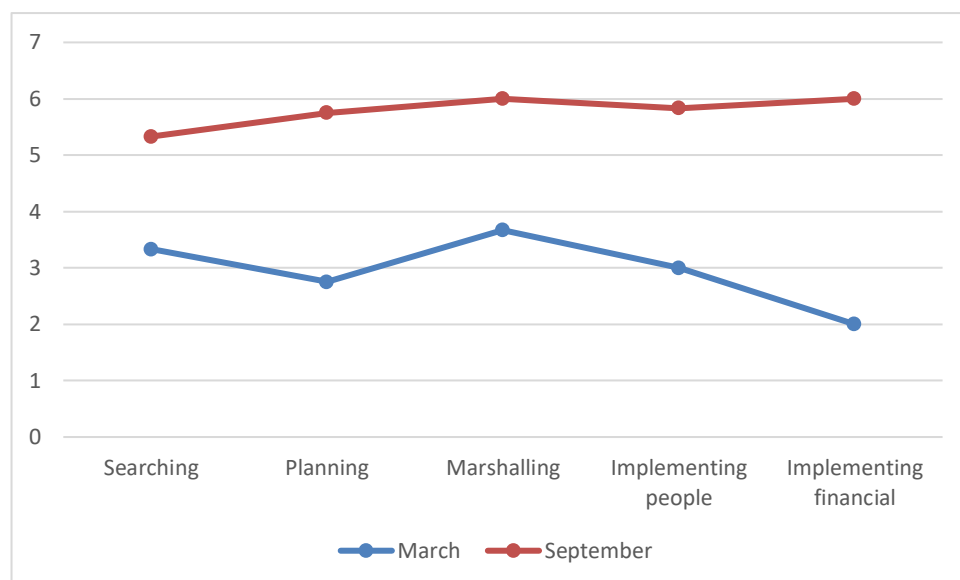
It is evident that all the entrepreneurial self-efficacy criteria for player 1 increased. For *searching*, the mean for March was 4. While playing the game, it is evident from player 1, various lessons were learnt which were linked to *searching*. These lessons included the ability to brainstorm a new idea through the purchasing of new equipment to mass produce the products that clients wanted. Furthermore, player 1 had identified the need for saving and budgeting money in order to purchase new machinery. It is through these lessons, that player 1 experienced an increase in confidence in terms of his *searching* abilities. Consequently, the mean increased from 4 to 6 in September.

Following that, was the mean for *planning*, which was 4 in March. The player lessons provide substantial evidence for the increase in this criterion. Player 1 identified the importance of advertising products in a business. During the advertising process, player 1's used the maximum price for products in order to make profit and compete successfully where other products were advertised. These played an important role for the *planning* criterion. Thereafter, the player 1 had also noted various general management lessons such as facilities management and maintenance which had an effect on estimating the customer demands for the products and also which new

machinery was needed in order to produce them. The mean for September increased to 5.5. It is evident that these lessons contributed largely to the increase of player 1's confidence in his *planning* abilities. In March player 1 had a *marshalling* criterion of 4. Player 1 had identified the importance supply chain management and looking for different suppliers of products. The mean in September, after playing the game was 5.67. For *implementing people*, the mean for March was 4.67. Player 1 learned how to deal with problems and crisis and they arose and this may have been influenced by the player trying to gain an overall understanding of the game in the first few sessions. Consequently, the mean for September was 6. Finally, *implementing financial* had a mean of 4.34. Various strategies implemented by player 1 such as saving and budgeting put this player in a strong financial position by the end of the game. The mean for September was 5.7.

Figure 5.2 shows the change that occurred from March to September by player 2 for these criteria.

FIGURE 5.2: PLAYER 2 ENTREPRENEURIAL SELF-EFFICACY



Source: Self constructed

It is evident that all criteria for player 2 increased. For *searching*, the mean for March was 3.33. While playing the game, it is evident from player 2, various lessons were learnt which were linked to *searching*. These lessons included the production of various products in the game which satisfied the needs and wants of the customers.

Furthermore, player 2 had identified the need for diversification which relates to identifying the need for new products. Through these lessons, it is evident that this is the cause for increase of player 2 confidence in their *searching* abilities. Consequently, the mean increased by two and had mean of 5.33 in September.

The mean reported for *planning* in March was 2.75. The player lessons provide substantial evidence for the increase in this criterion. Player 2 had identified various aspects relating to the advertising of the firm's products. In addition, while advertising the products, player two had to determine the competitive price of the product when placing it on the market. These played an important role for the *planning* criterion. Thereafter, the player had also noted various general management lessons such as facilities management and maintenance which had an effect on estimating the customer demands for the products, which also contribute to the *planning* criterion. The mean for September increased by three and was recorded at 5.75. It is evident that from these lessons contributed largely to the increase of player 2's confidence in his *planning* abilities. The highest mean for March was the *marshalling* criterion, with a mean of 3.67. The player strategies provide evidence for the increase of 2.33. Player two had identified the importance of developing supplier networks which plays a crucial role in the *marshalling* criterion. The mean in September, after playing the game was 6. The last criterion, *implementing* had the largest increase after playing the APP game. The player strategies noted by player two provide sufficient evidence for this large increase. For *implementing people*, the mean in March was 3. It has been noted that no Human resource lessons were learnt and noted by player two, which does not give a reasonable explanation for the increase in Implementing people. The strategies which had an influence on the increase of 2.83 include gaining and overall understanding of the game. This plays a part in understanding the various tasks and responsibilities in the firm which will further allow for the player to deal effectively with the day-to-day problems and crises which may arise. Consequently, the mean for September was 5.83. Finally, *implementing financial* had the lowest mean in March, which was 2. Various strategies implemented by player two provide evidence for the increase of 4 which was then recorded at a mean of 6 in September. These strategies entailed saving diamonds and coins which were used for purchasing machinery for the business. Another financial strategy implemented by player two related to finding ways to increase sales, which was a way of raising funds to use for the business.

Table 5.2 illustrates a comparison between player 1 and player 2's entrepreneurial self-efficacy assessments in March and September. Between March and September player 1's overall entrepreneurial self-efficacy increased by 1.6, whereas player 2's increased by 2.84.

TABLE 5.2: COMPARISON OF PLAYER 1 AND 2 ENTREPRENEURIAL SELF-EFFICACY SCORES

Player 1		Player 2	
March	September	March	September
SEARCHING MEAN SCORE			
4	6	3.33	5.33
PLANNING MEAN SCORE			
4	5.5	2.75	5.75
MARSHALLING MEAN SCORE			
4	5.67	3.67	6
IMPLEMENTING PEOPLE			
4.67	6	3	5.83
IMPLEMENTING FINANCIAL			
5	5.33	2	6
MEAN AVERAGE			
4.34	5.7	2.94	5.78

Source: Self constructed

By analysing all the criteria of entrepreneurial self-efficacy in March, player 1 had a higher level entrepreneurial self-efficacy than player 2. When analysing the criteria in September, player 2's entrepreneurial self-efficacy increased more than player 1's. This increase could be related to the different strategies adopted by both players throughout the game. Player 2 may have gained more confidence in the game

because his strategy mainly involved the sales and marketing of products. While playing the game, the more advertising that was done for the products the more products got sold. Player 1 focused more on the purchase of equipment for mass production and not on the sales and marketing function. This is an explanation for the small increase in the criteria *implementing financial*, the results indicate that player 1 already had high levels of confidence, which was evident while playing the game. Player 2 had low levels in their abilities to implement financials.

5.4 THE VALUE OF USING APP GAME'S IN ENTREPRENEURIAL EDUCATION.

Given the results of this study, support is given for the notion that when making use of games in entrepreneurship education value is added. Firstly, the study has revealed that games allow students to be more hands on which ensures that they are more engaged in the learning activity (Zirawaga *et al.*, 2017:55). The current study also shows that using APP games enhances personal attitudes and skills required for an entrepreneurial mindset (Sinkovec & Cizelj, 2013:6). This has been evident in that playing the game has proved to enhance both of the players levels of entrepreneurial self-efficacy.

The current study has also provided evidence of the positive outcomes associated with using APP games in entrepreneurship education. Belloti *et al.* (2012) mentions that using games can provide a conceptual basis for entrepreneurial skills and supports the development of an entrepreneurial mindset. It is evident that the outcomes of playing the game supports Belloti *et al.*'s. (2012) view.. Both players have developed this mindset by running a virtual business and applying various strategies to ensure the growth of that business. Such strategies included findings ways of raising funds which can be used to expand the business, marketing the firms products to increase sales and managing orders to meet the demands of customers. In addition, both players has to manage the business efficiently to ensure success by integrating the various business functions, In addition, the use of APP games for entrepreneurship education can enhance a student's understanding of finance, marketing, accounting and other business related functions (Grecu & Denes, 2017:3). It is evident that the game, Hay Day has allowed both players to apply these in practice. This was done by

identifying products to produce which the business can then sell. The products were then sold by applying various marketing principles, which were identified by both players. Through these efforts, players could raise funds and further manage their finances in order to grow their business. The findings of the current study show that by playing the Hay Day APP game lessons have been learned which relate to the various business functions. As such, the first research question, namely, does playing APP games provide students with real-life entrepreneurial lessons has been addressed.

Kolb *et al.* (1992) mentions that practical experiences play a role in learning experiences. Furthermore, Mukuthy and Williams (2015) state that in the context of entrepreneurship education, experiential learning is beneficial as students gain concrete experience and are thus more likely to perform better in real life situations. Mukuthy and Williams (2015) also state that learning from experience plays a role in entrepreneurship education as it helps “managers” put into practice what they have learnt. Based on their qualifications and degrees enrolled for, both players had some theoretical knowledge of the various functional activities into which all business activities can be categorized. The APP game further enhanced this knowledge by exposing the players to practical examples of the activities categorised under each of the business functions. The players learned from traditional learning methods of teaching what to look for when running a business (literature) and put this into practice while playing the APP game.

McFarland (2017:269) suggests that entrepreneurs generally learn less from traditional methods of education than from practical business simulations which are more beneficial. Furthermore, learning from experience plays a role in entrepreneurship education as it helps managers put into practice what they have learnt. In addition, experiential learning is beneficial as students gain experience and are more likely to perform better in real life situations.

The second research question namely, does playing app games enhance students entrepreneurial self-efficacy has been answered. Both players showed an increase in their entrepreneurial efficacy after playing the game. The period ending September showed an increase in all the criteria used to evaluate the players level of confidence

in their abilities. The last research question, namely, does playing APP games enhance students entrepreneurial intentions has not been answered. Both player entrepreneurial intentions were unchanged over the two periods, therefore, the research questions could not be answered. Through this APP game the players have gained some practical experience of running a business as is evidenced by the lessons learnt in their reflective journals. The increase in their entrepreneurial self-efficacy also provides evidence of real-life entrepreneurial lessons learnt and the value of the APP game in entrepreneurial education.

The primary objective of the study was to explore the value of using APP games in entrepreneurial education. In order to achieve the primary objectives, two of the secondary objectives were answered effectively. In doing so support is given for the notion that APP games add value to entrepreneurial education and the primary objective of this study is thus achieved.

5.5 CONTRIBUTIONS OF THE STUDY

The primary objective of this study was to explore the value of using APP game's in entrepreneurial education. In order to achieve this, a literature investigation into entrepreneurship education as well as the use and value of games in entrepreneurial education was undertaken. This investigation identified the *experiential learning theory*, which explains how practical experience plays a role in the learning experience. The *theory of reasoned action*, which proposes that an individual's intention is a result of their attitude towards performing the behaviour, their subjective norm (Ajzen & Fishbein, 1977:884) and that actual behaviour, was also identified. The findings of the current study provide support for these theories within the context of using games in entrepreneurial education.

According to Ayankoya (2016:2), entrepreneurship is the backbone of developing economies. This study has contributed to the knowledge that using innovative teaching methods such as APP games supports the *experiential learning theory* and add value to entrepreneurship education. As such educators should use more non-traditional teaching methods to prepare students for real-life entrepreneurial ventures. These non-traditional methods include the playing of APP games in order to enhance the

entrepreneurial self-efficacy of their students. Educators may also benefit from this study in that they can adjust their teaching methods by implementing non-traditional teaching methods such as playing business games so that students may gain practical experience. From playing the APP game in the current study the players' entrepreneurial self-efficacy improved. This improvement could be the result of applying their theoretical knowledge of business into practice within a fictional business.

The aforementioned also make a contribution in that it highlights some of the shortcomings of the Hay Day games. Shortcomings exist in that the players experienced the game as time consuming, unrealistic, irritating, boring, repetitive and frustrating. The developers thereof should take note of this if they want to improve their game and make it more realistic for users.

5.6 LIMITATIONS OF THE STUDY AND AVENUES FOR FUTURE RESEARCH

Although the current study attempted to make meaningful contributions to the field of entrepreneurship education through investigating the value of APP games in entrepreneurship education, several limitations surfaced while conducting this investigation.

The first limitation was the focus of the study. Many games exist in the market that can be used for entrepreneurship education. There are also many APP games that exist which could be used for entrepreneurship education and could have formed part of this study. Furthermore, there are numerous other games that exist which could provide similar learning experiences for students. The focus of the current study was on one game only, namely Hay Day which was experienced as unrealistic by both players. Furthermore, Samuel and Rahman (2018:1809) state that innovative learning includes activities such as developing business plans, presentation by entrepreneurs and involvement in business competitions. It's evident that the game limited the players from carrying out these functions which would be required in real life. For educators it is important that the games used for education must stimulate students and be as realistic as possible.

In addition, the study focused primarily on APP games which was also a limitation in the current study. Future studies could focus on several APP games which could be used in entrepreneurship education. In addition, future studies could also investigate other games which can be used for entrepreneurial education. This will allow researchers to obtain information about games in general and present more accurate findings on the value of using of APP games in entrepreneurship education.

Another limitation of the study was that the empirical results were based on the experiences of two players only. As a result the results are not a true representation of the population as a whole. Other players with different background could have had different experiences when playing the game. To overcome this limitation, future studies should expand the number of players as this would provide a more accurate representation of the population being investigated.

Another limitation was that as the game progressed the players began to lose interest in the game and as a result many lesson that could have been learnt were missed. The journals provide evidence that the players had reached a stage of boredom, and as a result, their primary focus was on completing the game and reaching the required stage, rather than focusing on the lessons. In addition, both players lack work and entrepreneurial experience, therefore various lessons which could have learnt from the game were missed. Educators should provide students with relevant guidelines on what crucial lessons to look out for when playing the game.

Another limitation of the study was that both players reported high levels of entrepreneurial intention at the beginning of the game. Therefore it was not possible to assess whether playing the game has added to their future entrepreneurial intentions.

Another limitation of the study was the reflective journals that were used to record and collect the data. The literature suggests several methods that could be used to collect data for qualitative research. Therefore, it is important for future researchers to explore other methods that can be used to collect data.

Future research could also focus more on South African entrepreneurial education. The study conducted has provided evidence for this. Belloti *et al.* (2012:76) shows that over 200 business games are being utilised by more than 900 educators in the United States. In addition, in the UK, educators have been using computer games in their teaching (Williamson, 2009:2) for many years. No academic literature was found on the use of games or APP games in South Africa for entrepreneurship education.

The study conducted has revealed that entrepreneurship is the backbone of developing economies and develops individuals who can be productive members of society (Ayankoya, 2016:2; Guatam & Singh, 2015:24). Furthermore, entrepreneurship, which can be stimulated through effective entrepreneurship education, can empower citizen. In addition, developing entrepreneurship is in urgent need for emerging economies like South Africa to ensure that the economy grows and integrates into the global economy (Fal *et al.*, 2010:3). As such, it is important for future researchers to focus on developing entrepreneurial education in South Africa.

5.7 CONCLUSION

From the investigation conducted, greater insights have been acquired into the value of APP games in entrepreneurial education. As such, the current study has contributed to the existing body of knowledge regarding the use and value of games in entrepreneurship education. Based on the fact that entrepreneurship is the backbone of developing economies, it is vital to conduct more extensive research on the value of APP games in entrepreneurial education. It is hoped that the findings presented in this study will provide educators and aspiring entrepreneurs with practical recommendations on how to conduct entrepreneurial education and also how one can enhance both their entrepreneurial self-efficacy and their entrepreneurial intentions.

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ANNEXURE A: REFLECTIVE JOURNAL TEMPLATE

Business game



Ground rules:

- Download the game 'Hay Day' onto your phone/tablet/laptop (Google search it).
- Play the game from 4 June until 31 July 2019.
- Stop at level 35
- You are **not allowed to spend real money** on buying diamonds or on any other aspects of the game.
- Keep notes of insights and lessons learnt as you move up the levels, as well as your performance and the time you spend on the game.
- Complete a reflective journal after each time period of playing.

Hay Day reflective journal

- 1 Playing session number: Date:
- 2 Time start: Finish:
- 3 What new activities did you undertake?

-

4 What was your strategy?

-

5 Lessons learnt/Insights: What insights about operating a business did you gain from playing the game? E.g. insights relating to supply, demand, marketing, selling and sales, production, management of facilities, logistics, storage, expansion.

-

6 Other thoughts, feelings, problems, frustrations etc. that came to mind during or after playing the session?

-

7 Performance statistics at end of playing session

Level reached:	
Points scored on this level:	
Cash/coins on hand:	
Number of diamonds:	

ANNEXURE B: QUESTIONNAIRE

PROJECT: THE VALUE OF GAMES IN ENTREPRENEURIAL EDUCATION

NAME:

DATE COMPLETED:

ENTREPRENEURIAL INTENTIONS

Below are several statements relating to individual psychological well-being and entrepreneurial intention. Please indicate (with an **X**) the extent to which **you agree or disagree with each statement**. The columns are graded from **1** to **6**. The number **1** denotes strong **disagreement** with the statement, and at the other end of the scale, **6** denotes strong **agreement** with the statement.

		Extent of agreement					
		Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree
1	I will make every effort to start and run my own business in the future	1	2	3	4	5	6
2	My professional goal is to become an entrepreneur.	1	2	3	4	5	6
3	I want to be my own boss	1	2	3	4	5	6
4	I would become an entrepreneur if a suitable opportunity arises	1	2	3	4	5	6
5	I have a strong intention to start my own business someday	1	2	3	4	5	6
6	I often think about starting my own business in the future	1	2	3	4	5	6
7	I am highly likely to pursue a career as a self-employed person	1	2	3	4	5	6
8	I am determined to create a business in the future	1	2	3	4	5	6
9	I will start my own business before the age of 34	1	2	3	4	5	6
10	I would prefer to be an entrepreneur than an employee in someone else's business	1	2	3	4	5	6
11	I intend to start and run my own business in the future	1	2	3	4	5	6
12	If I choose between running my own business and being employed, I would choose to run my own business	1	2	3	4	5	6

ENTREPRENEURIAL SELF EFFICACY

Below are several statements relating to entrepreneurial self-efficacy. Please indicate (with an **X**) your level of confidence concerning **each statement**. The number **1** denotes very confident in your ability to perform the entrepreneurial task where at the other end of the scale, **6** denotes no confidence in performing the task

	How much confidence do you have in your ability to:	Level of confidence					
		No Confidence	Moderately lacking in confident	Slightly lacking in confident	Slightly confident	Moderately confident	Very confident
1	Brainstorm a new idea for a new product or service	1	2	3	4	5	6
2	Identify the need for a new product or service	1	2	3	4	5	6
3	Design a product or service that will satisfy customer needs and wants	1	2	3	4	5	6
4	Estimate customer demand for a new product or service	1	2	3	4	5	6
5	Determine a competitive price for a new product or service	1	2	3	4	5	6
6	Estimate the amount of start-up funds and working capital necessary to start my business	1	2	3	4	5	6
7	Design an effective marketing/advertising campaign for a new product or service	1	2	3	4	5	6
8	Get others to identify with and believe in my vision and plans for a new business	1	2	3	4	5	6
9	Network—i.e., make contact with and exchange information with others	1	2	3	4	5	6
10	Clearly and concisely explain verbally/in writing my business idea in everyday terms	1	2	3	4	5	6
11	Supervise employees	1	2	3	4	5	6
12	Recruit and hire employees	1	2	3	4	5	6
13	Delegate tasks and responsibilities to employees in my business	1	2	3	4	5	6
14	Deal effectively with day-to-day problems and crises	1	2	3	4	5	6
15	Inspire, encourage, and motivate my employees	1	2	3	4	5	6
16	Train employees	1	2	3	4	5	6
17	Organize and maintain the financial records of my business	1	2	3	4	5	6
18	Manage the financial assets of my business	1	2	3	4	5	6
19	Read and interpret financial statements	1	2	3	4	5	6

ANNEXURE C: ETHICS FORM B



FACULTY OF BUSINESS AND ECONOMIC SCIENCES

ETHICS CLEARANCE FOR TREATISES / DISSERTATIONS / THESES

Instructions:

- Should be completed by study leader and student
- Must be signed off by student, study leader and HoD
- *Please note that by following this Proforma ethics route, the study will NOT be allocated an ethics clearance number*

FACULTY: **BUSINESS AND ECONOMICS SCIENCE**

SCHOOL / DEPARTMENT: **BUSINESS MANAGEMENT**

I, (surname and initials of study leader): **PROF SM FARRINGTON**

the study leader for: **MASIZA, O - 214336387 & MOSWANE MLF- 217690505**

Candidates for the degree of: **BACHELOR OF COMMERCE HONOURS IN BUSINESS MANAGEMENT**

with a treatise entitled (full title of treatise): **THE VALUE OF APPLICATION (APP) GAMES IN ENTREPRENEURIAL EDUCATION**

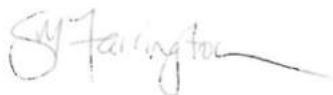
considered the following ethics criteria (*please tick the appropriate block*):

		YES	NO
1.	Is there any risk of harm, embarrassment of offence, however slight or temporary, to the participant, third parties or to the communities at large?		√
2.	Is the study based on a research population defined as 'vulnerable' in terms of age, physical characteristics and/or disease status?		√
2.1	Are subjects/participants/respondents of your study:		
2.1.1	Children under the age of 18?		√
2.1.2	NMMU staff?		√
2.1.3	NMMU students?		
2.1.4	The elderly/persons over the age of 60?		√
2.1.5	A sample from an institution (e.g. hospital/school)?		√
2.1.6	Handicapped (e.g. mentally or physically)?		√
3.	Does the data that will be collected require consent of an institutional authority for this study? (An institutional authority refers to an organisation that is established by government to protect vulnerable people)		√

		YES	NO
3.1	Are you intending to access participant data from an existing, stored repository (e.g. school, institutional or university records)?		√
4.	Will the participant's privacy, anonymity or confidentiality be compromised?		√
4.1	Are you administering a questionnaire/survey that:		√
4.1.1	Collects sensitive/identifiable data from participants?		√
4.1.2	Does not guarantee the anonymity of the participant?		√
4.1.3	Does not guarantee the confidentiality of the participant and the data?		√
4.1.4	Will offer an incentive to respondents to participate, i.e. a lucky draw or any other prize?		√
4.1.5	Will create doubt whether sample control measures are in place?		√
4.1.5	Will be distributed electronically via email (and requesting an email response)?		√
	Note: - If your questionnaire DOES NOT request respondents' identification, is distributed electronically and you request respondents to return it <i>manually</i> (print out and deliver/mail); AND respondent anonymity can be guaranteed, your answer will be NO. - If your questionnaire DOES NOT request respondents' identification, is distributed via an email link and works through a web response system (e.g. the university survey system); AND respondent anonymity can be guaranteed, your answer will be NO.		
5.	Do you wish to publish an article from this study and submit to an accredited Journal?		√

Please note that if ANY of the questions above have been answered in the affirmative (YES) the student will need to complete the full ethics clearance form (REC-H application) and submit it with the relevant documentation to the Faculty RECH (Ethics) representative.

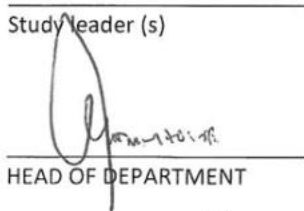
and hereby certify that the student has given his/her research ethical consideration and full ethics approval is not required.



24 April 2019

Study leader (s)

DATE



24 April 2019

HEAD OF DEPARTMENT

DATE

Masiza, O
STUDENT



24 April 2019

DATE

Moswane, MLF
STUDENT



24 April 2019

DATE

ANNEXURE D: TURNITIN REPORT

Masiza and Moswane treatise draft 1

ORIGINALITY REPORT

% 15	% 6	% 5	% 12
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Tshwane University of Technology Student Paper	% 1
2	uir.unisa.ac.za Internet Source	<% 1
3	Submitted to University of Stellenbosch, South Africa Student Paper	<% 1
4	Submitted to Nelson Mandela Metropolitan University Student Paper	<% 1
5	Submitted to Grand Canyon University Student Paper	<% 1
6	Submitted to University of Witwatersrand Student Paper	<% 1
7	Submitted to Northcentral Student Paper	<% 1
8	Submitted to Universiteit van Amsterdam Student Paper	<% 1