TREES OF TALES:
Motivating Omani Children to Read for Pleasure

A project and exegesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

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Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the project is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

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Related Publications

Portions of the material in this thesis have previously appeared in the following publications:


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Abstract

It is commonly believed that reading extends the childhood experience and deepens their understanding of life, people and the culture around them. It opens doors for them – helps them to imagine, dream and visualise themselves in different situations. Fairytales, for example, can expand their imagination by providing opportunities to experience the fantasy lives of different characters.

From an all-age perspective, for a society to be successful its individuals need to be educated and informed. Reading is a key information resource that can leverage open-minded and successful communities. Existing research indicates that specifically reading for pleasure increases general knowledge, understanding of other cultures, and community participation, and fosters greater insight into human nature and decision-making. For these reasons and more, it is important to plant the habit of reading from early childhood.

Despite these insights, UNESCO statistics show that most Arab children are not reading enough. In Oman, factors that influence the low rate of reading among children include the non-existence of children’s books in public libraries, limited access to suitable reading materials, uninspiring school libraries, and a low level of reading motivation within Omani families. Therefore, in order to potentially improve reading habits among Omani and other Arab children, a thorough investigation of what motivates most children to read for pleasure and how it can be applied for Omani and Arab children was deemed necessary.

Existing research has suggested that reading rates among children may be improved by providing access to enjoyable, interesting and culturally relevant reading materials. The involvement of family and friends is also highly important to increase the perceived value and awareness of children’s reading abilities. Family members need to provide children with the freedom to choose what they want to read to elevate their interest. Access and family involvement have often been found to influence children’s reading habits and Subsequent academic achievements.
The aim of this research project was to provide Omani children with an experience that establishes reading for pleasure as a sustained practice. The proposal was to provide Omani children with a motivating, accessible and enculturated reading experience. The design of this reading experience was informed by current literature, to better understand the motivational factors that cultivate regular reading habits among children, as well as the most impactful structure of interactive storytelling applications and games. Based on this literature review and the author’s own knowledge of Omani society, a set of five guiding principles were established to guide the iterative design process, which resulted in the iPad app *Trees of Tales* that is now available at the Apple AppStore. *Trees of Tales* is an interactive, playful reading application that is inspired by Omani traditional folktales.

*Trees of Tales* was tested on 18 Al Waha Primary School children in the capital city of Oman, Muscat. The testing protocol used a ‘within-subject design’ method to collect both qualitative and quantitative data, comparing the impact of the interactive reading application against other existing reading interventions including traditional printed storybooks and e-books with limited interactivity. It measured the impact of these three interventions on reading behaviour, user experiences and intrinsic motivation for reading.

The quantitative results indicated that the interactive *Trees of Tales* is generally more enjoyable for children to read than the other two interventions. It improved their reading experiences, providing more interesting content than the limited interactive e-book and the printed storybooks. These measures also showed that *Trees of Tales* is significantly more effective in increasing the intrinsic motivation of female children, who engaged more with it in the study. However, the male children were less affected by the format of the reading interventions, as their observed engagement level was similar during *Trees of Tales* and the other sessions. Thus, one of the main conclusions from this study is that most children are keen to read irrespective of the intervention, as long as their interest is maintained.

These research findings are highly relevant for families, schools and the government of Oman, as well as the Arabic world in general. They highlight how essential it is for children in Oman and other Arab countries to be given access to a variety of reading
resources including printed storybooks, e-books and interactive reading applications. Although they also indicate that playful and interactive reading applications, particularly involving culturally relevant stories, are most likely to motivate children to read more. Electronic devices such as tablets are already widely used by Omani children, but for other non-reading purposes.

In Oman, the Ministry of Education should consider incorporating digital reading devices into school libraries to provide broader access to reading methods and materials including interactive reading applications. Furthermore, school children need to be given free reading time and more reading options by allowing them to select what to read. The Omani parents also need to be familiar with the digital devices their children use and download e-books and apps that engage their children with more reading material. In particular, parents should be highly involved in their children’s reading activities at home. In addition, designers of Arabic reading applications for children should consider creative, culturally relevant content, story related interactivities and games to provide children with reading experiences that are fun and engaging.

In summary, if governments, communities, schools and parents take on board and action this study’s results and recommendations in relation to engaging reading material and content, reading rates among Arabic children, including Omani primary school students, will remarkably improve.
CHAPTER 1

INTRODUCTION

Reading for Pleasure has been defined as “reading that we do of our own free will, anticipating the satisfaction that we will get from the act of reading.” (Clark & Rumbold, 2006). Reading for pleasure can also referred to as Reading for Enjoyment (Clark & Rumbold, 2006), Leisure reading or ludic reading (Nell, 1988). Reading for pleasure can take the forms of reading magazines, emails, social networking site, books, newspapers, and e-books (Clark & Rumbold, 2006). It has been proposed that reading for pleasure produces higher levels of literacy and language development, and the main path for literacy development (Krashen (1993). Therefore, reading for pleasure is important to keep the mind actively engaged, as it continuously processes and stores information.

The first word of the Quran sent to the Prophet Mohamed was the word ‘read’, which was repeated three times to emphasise its importance (Quran, v.96: 1). Yet a huge decline in reading and published materials in the Arab world has been identified. On the Al Jazeera program *The Phenomenon of the reluctance of the Arabs for reading*, Mahir AlKeyali from the Arab Foundation for Studies and Publications cited that publication of books printed in the Arabic language had decreased from three thousand in 1969 to one thousand, five hundred in 2000 (Aljazeera, 2005). This is despite a large increase in the Arab population, from 128 million in 1970 to 359 million in 2010 (Mirkin, 2010). Additionally, the number of Arabic internet users was estimated at approximately 90 million in 2012, which only represents 40% of Arabic countries’ population (Stats, 2012). This means that over half of the Arabic population do not have access to online reading materials, while the number of print publications is low. This suggests that Arabs who only read in Arabic suffer from a lack of reading resources.
It is widely acknowledged that children in the Arab world including Oman do not read enough. The Arab Thought Foundation Fikr released in its fourth annual cultural development report in January 2012 that the Arab child reads on average six minutes a year, compared with around 12,000 minutes each year that Western children are engaged in reading activities (Al-Yacoub, 2012). There are three potential reasons for the decline in reading in some Arabic countries (Al-Ashraf, 2010):

1. weakness of family support and encouragement for reading
2. low financial abilities to purchase books
3. spread of illiteracy within the community.

The Islamic sacred book the *Quran*, which guides Muslims and Arabs, encourages people to read and be educated; yet reading faces a major decline not only among Arab children but among Arabs in general.

1.1 OMAN

The Sultanate of Oman is a small but highly developed, wealthy country located in southwest Asia on the southeast coast of the Arabian Peninsula. According to the General Census of the Population, which includes housing and establishments, as of 2010 the population in Oman was 2,773,479 (MCD, 2011). It is the second largest country after Saudi Arabia on the Arabian Peninsula, with a geographic area estimated at 212,460 square kilometres. The official and main language spoken in Oman is Arabic; although English is widely used as a business language and for teaching science subjects in colleges and universities. The World Bank (2011) recently estimated the Omani GDP at USD$71.78 billion, and the GDP per capita at USD$25,221. Oman is listed as a high-income country within the best performing 35 countries in the world (World Bank, 2011).

Yet despite the high-income status of Oman and the availability of research, which shows that reading for pleasure is important for the development of a child, the country’s government and schools do not appear to be allocating sufficient resources to provide children with a more supportive environment to develop sustainable reading habits.
Both the number of public libraries and the availability of children’s books are severely limited in Oman. There are currently three main public libraries and several small Islamic libraries in different areas. The public libraries are located in the capital city and are mostly used by local college and university students (Oman Observer, 2013); the Islamic libraries are connected to mosques and do not loan books to the public. The separatist tradition of women and men in Islam, where men pray at mosques and women at home, also makes it culturally difficult for women and their children to use a mosque library. Thus, the limited amount of public libraries has a major influence on the Oman people’s lack of access to reading materials.

In most Omani government schools there are learning resource centres (LRCs), which are rooms divided into two sections: a computer section with basic computer applications, and a library section with printed books. However, there are no reading activities in these LRCs, such as games and exercises that encourage reading via competitions. Furthermore, most of the printed books in the library section are made up of fragile paper that is often not sturdy enough to withstand the sometimes rough handling of children; and most LRC furniture is basic, consisting of white rectangular tables and wooden chairs that are not conducive to reading. In addition, the computer section of the LRC is often used for computer classes and other workshops that do not generally involve reading.

In Oman and most other Arabic countries, there are many traditions and activities involving adults telling children stories, yet they do not generally include reading activities such as reading together or discussing books. It is also uncommon for Arabic parents to read stories to their children at bedtime. Therefore, as reading activities are rarely part of the day-to-day activities of Omani and other Arabic families, most of their children do not understand the value of reading at home and are unlikely to build reading into their daily routine.

1.2 RESEARCH MOTIVATION

All Omani children read their academic textbooks and the Quran as part of their religious and educational needs; thus, the literacy rates among Omani children are not concerning. However, the concept of reading for pleasure is generally overlooked in Omani and the Arabic society despite its importance (Banihani & Abu-Ashour, 2015).
A lack of public libraries, poorly prepared LRCs with limited books and a lack of computer activities involving reading, a lack of support from families, and a lack of government attention all contribute to a general shortage of reading for pleasure among Omani children (Abri, 1995; Mujaini, 1994). Yet these problems are not limited to Oman and other Arab countries, as similar issues have been identified in some Western societies where a decline in reading for pleasure has been highlighted as a concern by their governments and/or community and charity organisations (Alison, 2013; Clark & Rumbold, 2006; Knulst & Kraaykamp, 1997; Van der Voort, 1991).

Various Western governments have aimed to address declines in reading among children in particular by promoting the reading of books for pleasure via funding initiatives and community campaigns. For example, the UK Government funded the National Reading Campaign Year of Reading in 2008, and the Reading Champions campaign (Clark & Hawkins, 2010). In Australia, a similar campaign was initiated in 2005 called the Premier’s Reading Challenge (QDE, 2015). These community events are not competitive but instead present an individual challenge for each child, to promote the reading of books and develop reading habits and a love for reading among children. Unfortunately, such reading campaigns have not yet occurred in Oman. Thus, this project was conducted to identify ways to motivate Arabic children, Omani children in particular, to read for pleasure and maintain reading habits into their futures.

Many researchers have already investigated the effects of using the computer as a learning and motivation tool in curricular contexts, such as www.mathletics.com.au for mathematics, GEOSpy for geography, and www.primarygamesarena.com for literacy (Anderson, 2005; Bilal & Bachir, 2007; Cameron & Dwyer, 2005; Ibáñez & Delgado-Mata, 2011; Iqbal, Kankaanranta, & Neittaanmäki, 2010; Ke & Grabowski, 2007). However, these studies have only examined tools designed for children in Western cultures, and have only been conducted in Western or East Asian societies among secondary school or college students. They are unlikely to relate to young children in Arab societies such as Oman.
Moreover, little is known about the effectiveness of applications on more modern platforms such as e-books and interactive apps to initiate, motivate, and improve the reading habits of children, despite their extensive availability. In addition, most relevant studies have been performed on children with reading disorders or children who were reluctant to read in general (Lamb & Johnson, 2011; Maynard, 2010; McClanahan, Williams, Kennedy, & Tate, 2012; Moss, 2012). No prior research was available on the use of electronic applications to motivate Arabic children to attain a sustainable reading habit. Thus, this research project combined the motivational aspects of games and interactive applications with the traditional stories of the Omani culture to help understand what motivates local children to read for pleasure.

1.3 RESEARCH AIMS AND OVERALL OBJECTIVE

Reading for pleasure is deemed an important indicator of the future success of a child (Kirsch et al., 2002). Clark and Rumbold (2006) believed that reading for pleasure is highly important for people and their societies – it improves an individual’s general knowledge, decision-making skills, community participation, understanding of other cultures and insights into human nature. However, children generally have to be motivated to engage in reading or other learning activities (Metsala, Wigfield, & Dacey, 1996).

Compared with most Western societies, Omani children rarely read for pleasure, despite their high literacy rates based on the country’s high-income status. Based on the few available resources and the author’s personal experience as a citizen of Oman (Abri, 1995; Mujaini, 1994), two reasons for Omani children’s lack of reading for pleasure are proposed in this study:

1. A lack of family encouragement – most parents do not read for their children, and the children do not often see their parents reading.
2. A lack of suitable reading resources and facilities for children in public and school libraries.

Thus, Omani children do not have access to motivational reading materials at home, at school or in the public domain. However, they have access to digital technologies as they generally use tablet computers to play commercial games that they download from the internet.
An investigation of research and theories relating to reading motivators was of value to this study, to help understand what motivates children to read for pleasure. However, much of this research has only focused on the motivation for learning and self-determination purposes, while there has been limited research on intrinsic motivation in regards to reading for pleasure. One particular aspect that has received limited attention is the use of a playful application to motivate and engage children in reading activities. There has also been a lack of research in motivating Arabic children to read for pleasure. This research has therefore attempted to investigate the impact of playful applications on children’s intrinsic reading motivation and engagement, based on Omani primary school children aged nine to ten years.

The overall objective of this research was to investigate reading interventions that motivate and engage Omani children in increased reading that can evolve into a regular reading routine. Motivating Omani and other Arabic children to read for pleasure via interactive applications could help them to develop lifelong reading habits. This research is therefore specifically aimed at designing a motivating reading experience that would encourage Arabic children to read more for pleasure.

1.4 SIGNIFICANCE AND CONTRIBUTIONS

Tablet computers and playful designs are becoming more common in an educational context. Existing research has focused on the use of interactive applications and games to motivate students to learn mathematics or languages. Yet there has been a lack of research on interactive approaches to motivate children, particularly Arabic speaking children, to read more for pleasure. To this end, the interactive reading application Trees of Tales was specifically developed for Omani primary school children. It was designed based on a thorough study of theories and design approaches of best practices to design a motivating reading experience for children. It is hoped that this research will contribute to the design research by providing guidelines and recommendations for future designs of interactive reading applications for children. It is also hoped that this research will contribute to the development of a future Omani generation that is more educated, knowledgeable and able to participate in the country’s development.
1.5 EXEGESIS OUTLINE

CHAPTER 2 presents a literature review of reading motivation and the current situation in Oman in regards to reading for pleasure. It also covers existing examples from around the world on designing motivating reading experiences for children.

CHAPTER 3 presents the research design and methodology used to design and evaluate Trees of Tales. All data collection points are discussed and explained in detail.

CHAPTER 4 covers the iterative design process of Trees of Tales and offers reflection on specific issues and considerations.

CHAPTER 5 presents an evaluation of the data collected from the survey, and via observation of interaction with Trees of Tales, e-books with limited interactivity, and standard printed storybooks during the experimental phase of this research project.

CHAPTER 6 discusses the research findings in relation to changes in the behaviours, user experiences and motivations for reading among Omani primary school children that participated in the study.

CHAPTER 7 summarises the main findings of this research project, provides answers to its research questions, and discusses its research contributions to knowledge and design of interactive reading applications, and the Omani community in general.
2.1 READING FOR PLEASURE

Reading for pleasure often benefits children and their futures. Clark and Rumbold (2006) listed several benefits of reading for pleasure: elevated levels of reading attainment, writing ability, text comprehension, grammar, breadth of vocabulary, positive reading attitudes, greater self-confidence as a reader, and more reading through the rest of their lives.

Reading also aids the development of humanity and can lead to a better understanding of the world around us. Freire (1983) contended that through reading, an individual can change their perceptions of the world via critical perception and conscious interpretation. Reading is essential to the accomplishment of any individual and thus to the development of any society (Snow, Burns, & Peg, 1998). That is, for a society to be developed, its individual members need to be educated and informed. Reading is an important resource for obtaining of such information and knowledge, which often culminates in an open-minded and successful community (Freire, 1983). Therefore, it was recognised in this country-specific study that the Omani children need to read more to ensure they are informed and can participate in the future development of the country.

2.2 READING MOTIVATION

Previous research suggested that reading for pleasure is one of the most important indicators of the future success of a child (Kirsch et al., 2002). However, without motivation it is difficult to engage even the brightest child in reading or any other learning activities (Metsala et al., 1996). Reading motivation has been defined as “the individual’s personal goals, values, and beliefs with regard to the topics, processes, and outcomes of reading” (Wigfield & Guthrie, 2000, p. 405). Wigfield and Guthrie (2000) also identified that engaged reading is a merger of motivation and
thoughtfulness. Engaged readers seek to understand; they enjoy learning and they are confident about their reading abilities. They are mastery oriented, intrinsically motivated, and have self-efficacy.

According to Wigfield and Guthrie (2000), reading motivation is a multi-layered construct involving various aspects such as the person’s reading goals, intrinsic and extrinsic motivations, self-efficiency, and other social motivations. Wigfield and Guthrie (2000) defined intrinsic reading motivation as curiosity and a preference for a challenge; and extrinsic reading motivation as the desire for recognition and getting good grades in reading. According to Wigfield, Guthrie, Tonks, and Perencevich (2004), competence and efficacy beliefs refer to an individual’s assessments of their ability to accomplish a reading task or activity, such as reading a book or part of a book.

It has been proposed that intrinsic and extrinsic motivations relate differently to literacy outcomes. For example, Wigfield et al. (2004) argued that intrinsic motivation is more effective than extrinsic motivation in the context of improving reading skills. Intrinsic motivation, for instance, is better able to predict increases in the amount of reading for pleasure than extrinsic motivation (Cox & Guthrie, 2001; WANG & Guthrie, 2004). Self-efficiency and social motivation also relate differently to literacy outcomes and reading behaviours, as explained in the following section.

2.3 CONSTRUCTS OF READING MOTIVATION

2.3.1 ACCESS TO READING (EXTRINSIC MOTIVATION)

Existing literature indicates that reading for pleasure is important for personal development, and a key extrinsic factor that increases this activity is having access to reading material. This is often achieved by owning reading materials at home or by having access to public libraries.

A study by the US Reading is Fundamental (RIF) organisation has indicated that access to printed materials improves the reading performance of children, it encourages them to read more and for an increased duration (Lindsay, 2010). A German study from the same time period also suggested that the number of printed materials available at home has a positive impact on a child’s reading achievements
Clark and Poulton (2011) further indicated that there is a strong relationship between owning books and reading enjoyment. Their survey of 18,141 young people aged eight to seventeen years in the UK revealed that those who own books are twice as likely to enjoy reading compared with those who do not. Numerous Western organisations such as the National Literacy Trust (NLT) in the UK and RIF in the USA are striving to distribute printed books to children in disadvantaged areas, to provide them with better access to reading materials.

A key element for increasing access to reading materials is the availability of public libraries. Research has shown that accessibility and use of public libraries improves reading habits and overall academic attainment among both children and adults. Clark and Hawkins (2010) explored the relationship between public library use and reading enjoyment, and found that public library users are twice as likely as non-users to confirm that they “enjoy reading quite a lot”. Yet even though this research confirmed a correlation between public library usage and reading pleasure, it did not uncover whether this usage significantly influences increased reading enjoyment. In addition, Clark and Hawkins (2010) contended that young people who use a public library generally hold a more positive attitude towards reading than those who do not.

In addition to increasing reading enjoyment, Bhatt (2010) analysed data from a Population Survey, American Time Use Survey and National Household Education Survey, and identified that public library use increases the amount of time an individual spends reading by approximately 27 minutes per day. Public libraries often have a huge impact on civilised societies, playing a vital role in their development via enhanced general education and academic research. According to Garrison (1979), “The development of the public library has generally been considered as evidence of the humanitarian and democratic ethos of American society and history” (p. xi). Public libraries also often play a crucial role in children’s reading activities, spending as much as 25% of their budgets on reading materials for children (Mathews, 2004).

Traditionally, public libraries have fostered an environment that nurtures reading and exploration. However, the relationship between reading and the library has evolved due to the advancement of technology including computers and the internet. Digital libraries or e-libraries and e-books have become commonplace and have replaced
many printed materials. Online libraries have an advantage over physical libraries in that they are easily accessed from anywhere in the world without the need to be in a specific location. According to Parkes and Walton (2010): “e-books can provide an instant library – a library where we can easily weave and search through the texts” (p. 16). Even though physical public libraries remain an essential part of a community and its educational system, some scholars have argued that the digital world is taking over. Johnson (2010) pointed out that the internet and search engines such as Google and Yahoo are contributing to the diminished role of the library; which somewhat explains the notable decline in library usage over the past decade (Martell, 2008). However, some public libraries, university libraries and school libraries have already tapped into this advanced technology to improve the use and perceptions of the physical library. For example, on-site computers are used to look up the location of printed books or to read digital library books.

The reading experience via computer is different from reading a printed book but the achievements are obviously similar. Clark and Poulton (2011) identified in their survey that when book owners and non-book-owners were asked about their favourite reading materials, both groups indicated that “technology-based materials dominate as reading choices”, and that “text messages, emails, websites and reading on social networking sites” are mostly read by young people (p. 12). Having a computer at home can no doubt contribute to reading achievements. Clark and Hawkins (2010) indicated that having a computer, a desk, books of one’s own and/or access to newspapers and magazines all have a significant impact on reading attainment. Even while debate continues on whether reading from a screen including e-readers such as Kindles and iPads is a positive or negative experience (Shamir & Korat, 2006; Stoeckle, 2011), such reading is becoming more commonplace in both Oman and around the world (World Bank, 2011).

Irrespective of the platform, the recognised benefits of reading for pleasure drive many governments and community organisations to encourage their people to read more. For example, the RIF and NLT are both charity organisations that seek to increase literacy in the USA and UK respectively by motivating people to read more for pleasure, via campaigns that include Literacy Champions, Premier League Reading Stars, and Young Readers Programme (NLT, 2014). Similarly, in Australia
the Premier Reading Challenge encourages children in every state or territory to read a specific amount of books each school year. Children that complete the specified number of books on time are listed by name on the campaign website and receive a certificate of accomplishment (Premier's Reading, 2014).

2.3.2 THE ROLE OF THE FAMILY (SOCIAL MOTIVATION)
Clark and Hawkins (2010) claimed that young people encouraged to read by their parents are more likely to enjoy reading and do it more frequently than those without such parental support. In addition to parent encouragement, other familial factors such as observing parents read at home, talking about books with family members, and parents reading to them contribute to increased reading enjoyment among young people (Clark & Hawkins, 2010). Existing research also indicates that parents that promote reading as a valuable activity generally have children motivated to read for pleasure – such family support often has a strong positive influence on the child’s interest in reading, attitude towards reading and consequent concentration in the classroom (Rowe, 1991). The family environment is clearly a pivotal influencer of reading for pleasure from an early age.

Another factor that often leverages increased reading, especially among children, is self-efficacy. It has been proposed that the major influences on children’s self-efficacy beliefs are how well they have done on similar tasks or activities, and the feedback and encouragement they receive from others (Wigfield et al., 2004, p. 301). Other research has suggested that children who believe they can master a particular skill such as reading are more likely to engage in activities where it is required, and to continue using that skill as they encounter difficulties (Metsala et al., 1996, p. 360). This means that if children believe they can accomplish a reading task, they will be motivated to read it. Schunk and Zimmerman (1997) contended that students with high self-efficacy will consider difficult reading tasks as challenging but achievable and work comprehensively to master them.

2.3.3 INTRINSIC MOTIVATION
According to Reed (2010), cognitive theorists such as Weiner perceived motivation as a result of intrinsic needs. In line with this, more recent scholars such as Csikszentmihalyi (1990) have emphasised the importance of intrinsic motivation in
learning activities. He explained that when students use a computer, it often shifts their perception of learning from a task to be done to a task to be enjoyed. Thus, it could be argued that a similar change of feelings may occur when children read interactive e-books where the novelty of technological devices including the playful interactive elements may transfer the reading task from something to be done to something to be enjoyed.

It has previously been proposed that there is a direct relationship between intrinsic reading motivation and the frequency that children read for pleasure (Metsala et al., 1996). Wigfield and Guthrie (2000) described such intrinsic motivation as a curiosity about reading and a preference for a challenge in reading. Kellaghan, Madaus, and Raczek (1996) also found that intrinsic motivation is often related to learning, conceptual understanding and higher-level thinking skills. Metsala et al. (1996) emphasised the importance of intrinsic motivation in relation to the reading frequency of children, recommending that teachers accommodate a child’s specific interests and curiosity via a range of relevant books for them to read. While various motivational dimensions contribute differently to reading frequency and comprehension among children, they argued that intrinsic motivation mostly influences reading for pleasure.

In regards to children reading motivation and gender, various researchers have indicated that girls generally have more positive reading motivation than boys (Baker & Wigfield, 1999; Marinak & Gambrell, 2010; Wigfield & Guthrie, 1997). To further define such gender differences, McGeown, Norgate, and Warhurst (2012) measured both the intrinsic and extrinsic reading motivations for boys and girls separately. They used the curiosity, involvement and efficacy dimensions of the Motivation for Reading Questionnaire by Wigfield and Guthrie (1997) to measure intrinsic motivation; and recognition and grades dimensions to measure extrinsic motivation. They found that girls often have significantly higher positive intrinsic reading motivation than boys, but no gender differences were identified in regards to extrinsic reading motivations (McGeown et al., 2012). Therefore, when designing any type of leisure reading experience for children that aims to leverage the intrinsic reading motivation, gender differences should be considered and measured separately.
According to Colombo and Landoni (2014), to design a playful reading experience that supports reading for pleasure among children, three aspects of intrinsic motivation need to be addressed. These aspects were originally outlined by Wigfield and Guthrie (2000) as curiosity, desire for challenge, and involvement. Colombo and Landoni (2014) explained that curiosity can be fostered in a reading experience by adding activities that enable exploratory behaviour, playfulness and interactivity; challenge by providing children with the freedom to select opportunities that are suitable to their different reading abilities; and involvement by using content that makes children lose track of the world around them and causes them to become fully immersed in the story. Thus, producing a playful reading experience often involves designing suitable interactions, different levels of challenge and a focus on the content of the reading.

2.3.4 SELF-DETERMINATION THEORY

Deci and Ryan (1985) developed the Self-Determination Theory (SDT) as part of their examination of motivations. SDT is concerned with supporting humans’ natural or intrinsic tendencies to behave in effective and healthy ways, and proposes that humans have three psychological needs: autonomy (a sense of control and agency); competency (feeling competent with tasks and activities); and relatedness (feeling included or affiliated with others). It groups human motivations into three main types: intrinsic motivation (to do something because it is enjoyable, optimally challenging or aesthetically pleasing); extrinsic motivation (to do something because it leads to a separable outcome); and amotivation (the state of lacking intention to act) (Ryan & Deci, 2000). Amotivation represents the least self-determined type of motivation, while intrinsic motivation signifies the most. According to SDT, self-determined types of motivation (intrinsic motivation and identified regulation) may lead to positive outcomes (Ryan, 1991). According to Ryan and Deci (2000), intrinsic motivation is the personal desire to challenge, extend one’s capacities, explore, and learn.

The discussion of the three types of motivation leads to the Cognitive Evaluation Theory (CET), which was presented by Deci and Ryan (1985) as a sub-theory within SDT, to specify factors that explain variability in intrinsic motivation (Ryan & Deci, 2000). In CET, Ryan and Deci explained that satisfying the feelings of competence
and autonomy during any activity that is intrinsically motivated enhances intrinsic motivation. CET further indicates that feelings of competence will not enhance intrinsic motivation unless accompanied by a sense of autonomy (Ryan & Deci, 2000). Satisfying relatedness, according to Ryan and Deci (2000), does not have the same strong links with intrinsic motivation as satisfying needs for autonomy and competence does. Ryan and Deci (2000) stated that: “People will be intrinsically motivated only for activities that hold intrinsic interest for them, activities that have the appeal of novelty, challenge, or aesthetic value” (p. 60) and satisfying the feelings of competence and autonomy can only influence but cannot cause intrinsic motivation for an activity. The CET is of value to studies relating to reading for pleasure, as children of a young age in particular are usually intrinsically motivated to read (Wigfield & Guthrie, 2000). Based on this theory, motivation may be leveraged by providing children with reading activities that satisfy their feelings of competence and autonomy.

Ryan and Deci (2000) further explained the relationship between the three groups of motivation in SDT; the intrinsic motivation, extrinsic motivation, and amotivation via the Self-Determination Continuum shown in Figure 2.1 below. This diagram demonstrates these three motivation types with their regulatory styles, loci of causality and corresponding processes.

<Image removed due to copyright restrictions>

**Figure 2.1: The Self-Determination Continuum (Ryan & Deci, 2000)**
Another sub-theory of SDT is the Organismic Integration Theory (OIT) which details the different forms of motivation and the factors that either promote or lower internalisation and integration of the regulation for these behaviours (Deci & Ryan, 1985). These factors are explained further in the Self-Determination Continuum (Ryan & Deci, 2000). The far left of the Self-Determination Continuum (see Figure 2.1), amotivation is the state of lacking intention to act, and to the far right is the intrinsic motivation which is caused by inherent satisfaction. In the middle, the four classifications of extrinsic motivation range between external regulation (not autonomous) and integrated regulation (autonomous). Notice in the diagram (figure 2.1), that identified regulation and integrated regulation are caused by internal factors similar to the intrinsic regulation, which is a regulatory style of intrinsic motivation. Hence, the OIT argues that although some forms of external motivation are autonomous or self-determined, they are still considered extrinsic because “they are done to attain separable outcomes” (p. 55) rather than for their inherent enjoyment (Ryan & Deci, 2000). It should therefore be mentioned here that these identified, integrated and intrinsic forms of regulation that together represent value, congruence or awareness of self, and enjoyment can be combined to study the internal factors that enhance motivation for reading for pleasure.

Self-determination theorist Ryan (1982) was the first to develop and use the Intrinsic Motivation Inventory (IMI). The IMI is intended to assess participants’ subjective experience related to a target activity in laboratory experiments. It contains the following seven subscales, which can be used dependent on which are needed: (1) interest/enjoyment; (2) perceived competence; (3) effort/importance; (4) pressure/tension; (5) perceived choice; (6) value/usefulness; and (7) relatedness. However, in the IMI scale description, the interest/enjoyment subscale is deemed the self-report measure of intrinsic motivation. Additionally, the interest/enjoyment subscale is the only subscale that assesses intrinsic motivation according to the OIT.

In a recent study, De Naeghel, Van Keer, Vansteenkiste, and Rosseel (2012) based their new reading motivation questionnaire, SRQ-Reading Motivation, on SDT. In particular, they used the SDT distinction of different motivation types such as autonomous (including intrinsic and identified regulation) and controlled (including introjected and external regulation), in both a recreational and academic context. They
identified that recreational autonomous reading motivation is often more positively associated with reading frequency, engagement and comprehension, while controlled reading motivation is not significantly related to reading engagement and is often negatively associated with reading comprehension. They therefore recommended that interventions aimed at overcoming the decline of reading motivation as children grow older should focus on enhancing autonomous reasons for reading, because this leads to a more positive reading behaviour (De Naeghel et al., 2012). However, their recommendations need to be tested further via the development of new innovative reading interventions.

All the different forms of motivation suggest that when people are motivated to perform a task, they will stay on task, which will increase their chances of processing and storing relevant information. This was particularly relevant to this study’s key objective of understanding how to motivate Omani children to read for pleasure. Based on the SDT, its sub-theories and the intrinsic motivation aspects, the following three factors can positively enhance autonomous reading for pleasure: (1) enjoyment/interest; (2) self-competence/self-awareness; and (3) personal-importance/value. Hence, when designing an experience for this study to motivate Omani children to read for pleasure, it was essential to consider these three factors – to provide an experience that was enjoyable, of personal value and involved positive feedback to encourage children’s self-competence.

Prior to this research, enjoyment/interest, self-competence/self-awareness and personal-importance/value have been used to measure intrinsic motivation for reading in many other relevant studies (Baker & Scher, 2002; De Naeghel et al., 2012; Gambrell, Palmer, Codling, & Mazzoni, 1996; Ryan, 1982). Each of these factors has been recognised as an internal influence of the self, stemming from a personal desire to accomplish a task, which is why they were used in this study to evaluate the impact of the reading experience on Omani children. These factors will be further discussed in Chapter 4 in relation to designing a scale to measure intrinsic reading motivation among the Omani children used in this study.
2.3.5 FLOW AND ENGAGEMENT

Over 20 years ago, Csikszentmihalyi (1990) first introduced the concept of ‘flow’. He explained that when a person fully focuses on an activity and forgets about time and life pressures, they reach the optimal experience known as ‘flow’. Furthermore, when the person is in the state of flow, the concentration is so intense there is no attention left for anything else and self-consciousness disappears. Csikszentmihalyi (1990) defined six flow dimensions: (1) there must be a balance between the skills of the person in the activity and the challenge the activity provides; (2) an activity that provides clear goals and feedback of the person’s performance; (3) the person’s full attention must be devoted to the activity; (4) the person should feel they have control over the outcomes of the activity; (5) the person loses a sense of time while in the flow state (e.g. time passes too quickly or too slowly); and (6) the person in the flow state temporarily loses self-awareness. Flow can be experienced via many external activities including watching TV, watching movies, playing video games and reading books. Csikszentmihalyi and Csikszentmihalyi (1988) earlier described the balance of challenge and skills as the most important precondition to experience flow. That is, assuming all other conditions have been met, a person is in flow only when challenge and skills are balanced.

McQuillan and Conde (1996) identified in their study in relation to optimal experience or flow that the most common reason for experiencing the flow state is reading for pleasure and having a choice of the text. They found that when students were assigned texts in school, flow was more likely to occur if they had an interest in the text. Hence, the flow experience is more likely to be integrated into reading material designed for children when it contains choices and directions they can select dependent on their interests and abilities.

The findings from McQuillan and Conde (1996) study and the conditions of the flow state (Csikszentmihalyi & Csikszentmihalyi, 1988) need to be considered by designers of children’s digital and print books. These considerations include providing children with reading materials that are suitable to their skills, address their interests, enable them to control the situation, deliver clear goals and feedback,
maintain their attention and distract them from their self-awareness – hence, to experience ‘flow’.

Computer games have also been recognised as providing an environment that is conducive to a flow experience. In the context of this study, (Roussou, 2004) identified computer game playing as one of the most popular activities among children. Furthermore, according to Chen (2007), players experience flow when they are immersed in a game. Therefore, to strengthen the flow experience among children in relation to reading for pleasure as focused on in this study, game mechanics should be implemented to help trigger a flow experience for the young reader.

In the context of reading for pleasure, flow and engagement are often difficult to distinguish. It has been suggested that engagement is a subset of flow. For example, experiencing engagement can be similar to experiencing flow but missing one or some of flow conditions such as user control (Webster & Ahuja, 2006). Yet O'Brien and Toms (2008) identified attributes that are often shared between flow and engagement including focused attention, feedback, control, activity orientation, and intrinsic motivation. O'Brien and Toms (2008) based their definition of engagement on four application areas – (1) online shopping; (2) web searching; (3) educational webcasting; and (4) video games – and defined engagement as “a quality of user experiences with technology that is characterised by challenge, aesthetic and sensory appeal, feedback, novelty, interactivity, perceived control and time, awareness, motivation, interest, and affect” (p. 23). In a reading context, Wigfield and Guthrie (2000) argued that engagement increases the amount of reading outcomes such as achievement, knowledge and practices.

Based on existing literature that has identified the importance of intrinsic motivation to enhance reading for pleasure, several aspects had to be factored in when designing a reading application to understand the motivations of reading for pleasure among the Omani children focused on in this research. First, the reading application needed to contain a well-considered selection of topics that would be of interest and relate to the Omani culture. The six dimensions of flow also needed to be considered when designing the playfulness of the application. For example, the balance between skills and challenge, to ensure the challenge elements were not too difficult for the
children’s skills but instead helped increase their skills. The reading application also needed to provide feedback on each child’s choices, and the goals of the interactive elements within the reading had to be clear. It has often been recognised that reading enjoyment can be enhanced by building interactivity that engages the reader with the story; engagement is significant to ensure a high-quality user experience that motivates the reader to keep them interested to revisit the reading application.

2.4 THE SITUATION IN OMAN

2.4.1 TECHNOLOGY IN OMAN

There are approximately 52,562 subscriptions to fixed broadband in Oman. In 2011, approximately 68% of the population used the internet (Sanou, 2012); and according to the Ministry of Education (MOE), all public schools in the Muscat area were provided with internet services in 2009. In total, 67% of public schools in Oman have been connected to the internet service since 2009 (Ministry of Education, 2012). Established in 2006, Oman’s Information Technology Authority (ITA) is responsible for national IT infrastructure projects, and supervises those related to the Digital Oman Strategy and e-Governance initiatives in Oman (ITA, 2011). The ITA has overseen multiple projects including National e-Payment Gateway, Oman Government Network, National Data Centre, and various IT training and awareness programs. Despite this national IT progression, no data was available during this research in regard to the availability of electronic books or use of portable devices such as the iPad for reading.

Although in contrast with this research’s inability to find data on electronic reading sources in Oman, the Global Entertainment and Media Outlook 2011-2015 anticipated that the electronic consumer book market in the Middle East and North Africa would increase from USD$1 million in 2010 to USD$26 million in 2015 (Gruen, 2011). The report stated that “the convenience of portable readers and the ability to purchase books wirelessly and have them instantly available have appeal and an electronic book market is developing even in retail price maintenance countries” (Gruen, 2011, p. 584). Electronic reading technology is no doubt advancing around the world, and it is predicted that it will advance in Oman as well, albeit at a slower rate.
2.4.2 EDUCATION AND LITERACY IN OMAN

Education continues to be a high priority in the Omani Government’s development strategy. The number of public schools in Oman has risen substantially, from only three in 1970 to around nine-hundred and thirty-three by 1994 (Oman Daily Observer, 23 July, 1994). Primary school education in Oman normally commences at the age of six, but is not compulsory. Since 2009, all children in Oman have been enrolled in primary education. According to UNESCO (2010), literacy rates of persons aged 15 to 24 years reached 98.2% for females and 97.4% for males in Oman by 2010.

As part of Oman’s prioritisation of education, the Ministry of Education has significantly improved its online content, which has earned awards for the education portal website (Ministry of Education, 2012). This website content includes forums and curriculum materials, and enables online student enrolment, transfer and parental involvement. Oman’s Ministry of Education has also been developing online content on its website that supports the national curriculum and provides access to it to all schools.

Overall, education has significantly progressed over the past 30 years in Oman, and the majority of primary-school-aged children are literate and able to read well in the Arabic language. However, this has not addressed the ongoing issue of Omani children not regularly reading for pleasure – there remains a lack of reading applications outside of the educational system. According to Moss (2012), multi-platform reading strategies that uniquely combine traditional books with electronic applications, such as games and chat forums, are more likely to engage students and encourage reluctant readers. Yet in Omani schools, most available books are old, coloured black and white, and in an unsatisfying condition. Children are only allowed to use the library room during technology class and they are not allowed to borrow books. Additionally, there is no story time reading in the classes and books are only available in the school library. The computers do not provide applications or activities that encourage reading; most computers are not used for reading purposes.

2.4.3 READING SPACES IN OMAN

There are three main public libraries in Oman, including the Grand Mosque Library which mostly contains Islamic books. Another is the technical library which was
established by Petroleum Development Oman (PDO) in 1990 to make the 20th National Day (Petroleum Development, 2011) – it only provides public resources for technical education and research. The other more recent library which was opened in April 2012 is situated in one of the Sultan’s Palaces. Omanis working in educational and research contexts are encouraged to visit the library, as its main purpose is to develop scientific research. Out of these three public libraries, only the Grand Mosque contains books for children, and most of these are Islamic history books. Furthermore, females including young girls are rarely able to access the library even though it is open to the public, because it is part of the Grand Mosque. Clearly the availability of one public library with books for children, where access for some is limited, is not sufficient for a country of this size and wealth.

There is a growing awareness of the lack of reading materials for children in Oman, underpinned by a limited amount of public libraries. Mujaini (1994) previously reported on the lack of reading resources and the issue of limited public libraries in Oman. He emphasised the need for a community public library in Oman that is modern and has up-to-date resources. Abri (1995) further investigated the necessity of public libraries to encourage reading and knowledge seeking at an early age in Oman. She pointed to the passive learning systems in Omani schools and issues with children not developing a regular reading habit. Abri (1995) further acknowledged the shortage of literature for Omani children in public libraries and the lack of training for librarians. Her survey involving children aged seven to fourteen years revealed that 71.0% obtained their books from bookshops, 61.9% borrowed books at school libraries, 47.6% borrowed books from friends, and only 28.6% had books at home; none of the surveyed children obtained reading materials from a public library (Abri, 1995). These results highlight the pressing need for additional public libraries in Oman, to cultivate an atmosphere where children are motivated to read books for pleasure.

In comparison with other countries, Oman is lacking spaces that encourage sustainable reading and learning habits. The size of Oman is slightly smaller than the US Midwest state of Kansas. According to the US Census Bureau, US Department of Commerce, the population of Kansas was approximately 2,871,238 in 2011 (QuickFacts, 2012). The Kansas State Library shows there were 328 public libraries
in Kansas in 2012, with a total of 1,753,903 library cardholders (Kansas Library, 2012). These statistics indicate that approximately two-thirds of the total Kansas population use the public library service. In comparison, Brisbane’s metropolitan area in Australia had a population of 2.15 million people as at 2011, which is also relatively similar to the Omani population (Quick Stats, 2011). The Brisbane City Council manages 33 libraries across Brisbane, in addition to state public libraries including the State Library of Queensland and others located across the state (City Council, 2012). As a citizen of Oman, it is disturbing to realise that in Western countries, cities of equivalent size and population to Oman have a significantly higher number of public libraries and support services that encourage reading and learning.

2.4.4 ELECTRONIC READING FOR OMANI CHILDREN

Very few interactive reading applications and websites in Arabic language aimed at motivating Omani children to read were available during this research. One of the few interactive applications that is booming in the Middle East is Lamsa¹, a new Arabic educational application involving e-books and games for preschool children. The e-books offer limited interactivity such as text highlighting, text to speech, word searches and the ability to touch objects to initiate small animations in different pages. The base application is free to download with limited access to four e-books, with the ability to subscribe for USD$3.99 per month to obtain full access to the games and e-books.

The few websites that provide Arabic children stories are mainly international projects that aim to provide children with access to books in different languages. For example, the Children’s Library² provides e-books for children in 51 languages including 30 Arabic books. The e-books consist of images that have been scanned from the original. Once the child clicks on the e-book, images of all the pages appear and the child has to click on each page to enlarge it; the child can then click through the pages or can use the navigation arrows below the book. Even though this website is beneficial to many Arabic children who lack online reading resources, its usage is static and slow, which is unlikely to compel children to use it, and also means it is

¹ https://itunes.apple.com/app/id517583488#
² http://en.childrenslibrary.org/
likely to be eclipsed by the millions of internet-based, non-educational games also online.

Another website is the *Children’s Books Online*³ which provides translations of children books into several languages including Arabic. However, only five books have been translated into Arabic, and the image text is still in English. For every page the child views, they first have to click on the translation button to read it in Arabic. This is a slow process which may influence children to quit before they have finished reading the e-book. The Arabic website that children can use for reading and other entertainment is *Jordanian Children*⁴ website which includes games, lessons, stories and forums. However, there are only a few stories with basic text and images of books located at the top of the page, with the text below in a small font. The games page contains a collection of links to other websites.

2.4.5 THE OMANI FAMILY

Reading for pleasure is not commonly encouraged in Omani and other Arab families (Al-Yacoub, 2012). Furthermore, the home demographics in Oman is somewhat different from that of Western countries. For example, most families in Oman are large with an average of seven children, and also often include extended family members all living in the one house. When most Omanis get married, the wife moves in to live with her husband in his parents’ house and they raise their children there together with the other family members. Consequently, generations of grandparents, parents, children and their cousins live in the same house. These family members usually spend most of their time together and often involve elders in consultations. In a typical Omani household, when the children finish their homework, they spend the evening sitting with their parents and grandparents, listening to stories from the past. Reading activities are rarely part of the Omani family routine, which makes it difficult for children to understand the value of reading at home and to get into such habits.

Traditional folktales and stories have been passed through generations of Omanis via oral storytelling, which has been an essential part of Omani society – few of the folktales have been written down in books. However, as family household dynamics

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continue to change based on reduced family sizes and more parents working, the
tradition of oral storytelling is decreasing and there is a danger of losing many of the
traditional Omani folktales. Consequently, it is becoming more important for families
to encourage their children to read for pleasure.

2.5 CHILDREN’S LITERATURE AND NARRATIVE

2.5.1 CHILDREN’S BOOKS

Literature has the power to shape children’s early literacy experiences (Cairney,
2011). Through narrative and storybooks, children experience much of reality through
the power of storytelling. According to Rosen (1985) “Narratives in all their diversity
and multiplicity make up the fabric of our lives; they are constitutive moments in the
formation of our identities and our sense of community affiliation.” Researchers argue
that great texts have the power to change human lives and to offer more meaning and
purpose than other forms of communication (Cairney, 2011; Rosen, 1985). While the
text is important to tell stories, other researchers argue that picture books are more
powerful to make children enjoy the stories compared to books with only text (Lyga,
2006). Picture books are becoming popular to motivate young children to read and
engage with stories.

Picture books have proven to be useful in helping young children to learn and love
reading (Lyga, 2006). Pictures and graphics in the books help reluctant readers to
understand the plot of the story. They also attract visually dependent readers to read
the text. Children’s picture books have also proven to be successful in getting children
visual elements in the narrative to draw the reader/viewer into the reading experience,
by using literature that is enticing, both visually and verbally, is a way of tapping into
the child’s enjoyment”. However, with the development of new forms of reading such
as electronic books, researchers are concerned that children end up just playing with
the books rather than reading them (Cairney, 2011). The next section discusses the
impact of electronic books on children reading and their comprehension of the story.
2.5.2 CHILDREN’S E-BOOKS

Recent technologies such as the Apple iPad have altered reading experiences, especially for children (Schreurs, 2013). With the development of e-books, children’s books are continuing to be converted or created in a digital format. The electronic book or e-book has been defined as a container and content through which information is organised and structured to be presented to readers (Landoni, 2003). Even though all e-books are presented in a digital format, the features they provide to the readers are different. There are two types of e-books: (1) basic; and (2) enhanced (Schreurs, 2013).

Basic e-books distinguish themselves from print books in that the content is electronically stored and displayed via a screen. Basic e-books generally provide a limited range of interactive features such as flipping the pages, word definitions, searching for content, and other functionalities that are usually aimed at providing a similar-to-print reading experience (Sargeant, 2015; Schreurs, 2013).

With the advances of technology, designers have since been able to further enhance e-books via more advanced features such as integrating video, audio and interactivity. However, as not all enhanced e-books include interactivity, Schreurs (2013) defined a new category of e-books that include interactivity as ‘interactive e-books’. These are usually apps that use the power of tablets to enable users to interact with storylines (Schreurs, 2013) – interactive e-books with increased technological enhancements as the interactive features.

E-book publishers and designers often attempt different approaches of using interactivity to enhance engagement, especially for educational e-books (Pearman, 2008). Although recent research findings may need to be factored in, after indicating that children who read interactive e-books with many interactive elements recall significantly less details about the narrative than those who read print books or basic e-books (Chiong, Ree, Takeuchi, & Erickson, 2012; Longa & Mich, 2013). Conversely, Labbo and Kuhn (2000) found that interactive e-books which integrated corresponding interactivity into the content of the story elevated the child’s comprehension. Thus, further research on how interactivity is effectively used in e-
books, including how it can be used in an engaging fashion, is needed. This may also help to move children away from interactive e-books that merely entertain towards those that also educate as they entertain.

Most of the interactivity in children e-books is there to improve the engagement of children with the application. Such applications are often fun and attractive to children, and have been known to motivate them to continue reading and interacting with the application. Playful interactive e-books are applications that use interactivity in the form of playful elements to support reading – they have been recognised as providing “a meaningful contribution to the text and reading remains the primary activity” (Colombo & Landoni, 2014). Such playful e-books should address the three aspects of intrinsic motivation associated with reading for pleasure: curiosity, desire for challenge, and involvement. Colombo and Landoni (2014) proposed that if the reading activity causes feelings of curiosity, challenge and involvement among children, then the playful reading will enhance intrinsic motivation. However, this argument has not yet been fully supported by empirical evidence in the literature.

In children’s e-books, a connection between the narrative and the interaction is believed to further the reader’s understanding of the story. Matthew (1997) and Lewin (2000) both identified that features such as narration, sound effects and animation, which support the text, help to remove the effort from decoding individual words and allow a child to focus on meaning. Another approach that uses interactivity to support the text is to enable the reader to intervene with the story events, such as trying to match the content of the story with the visual and interactive elements in the e-book. These audience-based actions may be resources for enjoyment and engagement, and a method to reinforce the understanding of the story.

A recent study by the National Literacy Trust (2014) revealed an increase in the positive motivation for reading among young people who sourced e-books (Picton, 2014). The type of motivation that is usually associated with reading for pleasure is the intrinsic reading motivation as discussed in the intrinsic motivation section (Cox & Guthrie, 2001; Wang & Guthrie, 2004). According to Colombo and Landoni (2014), playful interactive e-books should influence intrinsic reading motivation among children. Although other empirical studies have unveiled no notable
differences in children’s motivation for reading based on the book format they read from (Wells, 2012). Some have instead recognised lower motivation levels among students who read from screens compared with those who read from printed books (Aydemir & Ozturk, 2012).

The impact of using e-books to motivate and improve the reading habits of children has also recently been researched. For example, a study by Maynard (2010) used three Kindle, iPod touch and Nintendo DS-Lite devices to examine their effects on the reading habits of children aged seven to twelve years. The iPad was also considered, but it was not available at the time of the study in mid-April 2010 in the UK. The study revealed a positive impact on the reading habits of children via the use of these devices. The research also postulated that e-reader devices could be beneficial for reluctant readers. Another study was performed by McClanahan et al. (2012) to evaluate the effects of using an iPad to improve reading achievements for a fifth grade reader struggling with Attention Deficit Hyperactivity Disorder. It was found that reading e-books from the iPad helped this student to focus his attention and he became more metacognitive in his reading. The experiment showed that the student had gained one year’s growth in reading skills after a six-week period of using the iPad for reading stories.

Despite all this recent research since the introduction of e-books, only a few researchers have investigated the impact on comprehension of reading from e-books compared with printed books. It has been suggested that this could be due to the difficulty of selecting a suitable approach to measure reader comprehension (Dillon, 2004). The most common method that has been used to assess reader comprehension is via a set of post-test questions (Korat & Shamir, 2007; Stoeckle, 2011). Stoeckle (2011) used post-tests to investigate the effects of e-books on comprehension and inattentive behaviours, in comparison with printed books. This study concluded that academically average students performed far worse in the e-book session, and that special education students do not display any notable differences between the two types of reading sessions. However, it should be noted that the selected e-book included only limited interactive features such as page turning, page-by-page dropdown menu, and the ability to zoom in (Stoeckle, 2011).
It has been recognised that different types of interactivity in e-books produces differing effects on reading comprehension (Shamir & Korat, 2006); and with the rapid development of technology, multiple forms of interactivity have become available. It is therefore difficult to truly determine how the different functionalities of e-books affect a child’s understanding of the text.

2.6 DESIGNING INTERACTIVE CHILDREN’S BOOKS

Druin (2009) explored how mobile technologies designed for children can change the way children learn. A major benefit is that the availability of mobile devices makes it easier to reach children both inside and outside the classroom. Mobile devices also have the “potential to reach children from economically disadvantaged communities and those who are geographically isolated” (Druin, 2009, p. 28). Druin provided insight into how children, who are digital natives use and interact with mobile devices to inform the design of better interactive technologies for children. Additionally, Markopoulos, Read, MacFarlane, and Hoysniemi (2008) provided a detailed evaluation of various types of interactive technologies for children.

However, there is limited research on guidelines for the design of interactive software for children. In Hourcade’s (2008) review of interaction design and children involved research trends, safety issues, design methodologies and principles of human-computer interaction. The findings that were published in the *Interaction Design and Children Journal*, stressed that designing interactive applications for children should take into account their abilities, interests and developmental needs. Many of Hourcade’s (2008) findings should be used to guide the design of interactive applications for children, including the use of big icons, reduction of visual complexity of the interface, and the minimised use of text.

Fisch (2005), another researcher of children’s educational multimedia, examined how children learn via various media channels such as television, websites and digital games. His guidelines for creating effective educational games informed this research methodology, including matching topics to the most appropriate media, placing the educational content at the core of the game, and providing feedback and hints as necessary to scaffold children’s interactions for stimulating content. Further detail on
Hourcade’s and Fisch’s guidelines and recommendations are discussed in Chapter 4 in relation to the design of this study’s *Trees of Tales*.

### 2.6.1 INSPIRATIONAL INTERACTIVE E-BOOKS

In reading applications for children aged eight years and above, interactivity often plays a significantly more important role than just adding fun and enjoyment to the reading experience. For example, interactivity could be used to ensure text comprehension, as children of this age generally have better reading skills than their younger counterparts. The iPad app series, *Bartleby’s Book of Buttons*, by Monster Costume Inc. is a relevant example of this value-add interactivity. In this app, Bartleby collects buttons by solving mysteries, and the reader is the actual co-investigator who helps the character to find his buttons. The pages are filled with images and buttons that can be pressed and moved according to the text to help Bartleby on his journey. After the quest on each page is resolved, the main button turns green to indicate its ability to be pressed, which allows the reader to move to the next page. This type of design is more likely to engage children while ensuring text comprehension and give them the feeling that they are playing a game more than reading a story.

Another example is *The Treasure Kai and the Lost Gold of Shark Island* by Treasure Bound Books, a game-based adventure e-book where the reader controls the storyline. By clicking the different treasure chests, new adventures advance the storyline. Yet even though there is a sense of controlling the narrative, the reader does not participate much in the adventures, and there is limited interactivity with the main character. This type of limited narrative control appears to be more common in e-books for younger children.

Greater control of the narrative in e-books appears to be more popular in those targeting teenage readers. Controlling the narrative in this way make it more engaging and helps to personalise the reading experience. The iPad app *Brush of Truth* by Story Bayou is an example of such an e-book aimed at teenagers. In this e-book, the

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reader is given a choice of directions that affects the narrative, to the point where the story can end in failure at resolving the mystery. When reading this e-book, the teenager has to understand the text to make an informed decision to progress the story in a meaningful way. Although this method allows manipulation of the narrative, it also encourages careful reading, and it can therefore be assumed that this enhances comprehension of the given storyline.

2.6.2 *MISE-EN-SCÈNE* AS AN INTERACTIVE MECHANIC

While controlling parts of the narrative allows the reader to feel more engaged and in control of the storyline, the age of the reader should be factored in when setting the level of control over the narrative and the design of the e-book in general. Shamir and Korat (2006) contended that the age of children is a significant consideration when providing control over the narrative, as too much could be extremely challenging for younger children. Younger children with lower reading abilities may easily lose interest and quit reading the story altogether if the control required is (too) challenging (Shamir & Korat, 2006). Interacting and playing with the scene of a page in the story can become an enjoyable part of children’s interactive storybooks if the challenge is balanced.

*Mise-en-scène* is a French term meaning ‘place on stage’, and refers to all the visual elements of a theatrical production within the space provided by the stage itself, which essentially means visual theme or telling a story (Bordwell & Thompson, 2012). *Mise-en-scène* entails the set design including available props, the composition of the stage space, lighting, placement of characters, etc. The technique of setting the scene is used in many storytelling applications where children act as the directors of the stories. Thus, it was recognised in this research that this directorial involvement motivates children to read and create stories in an interactive and fun way.

An example of a storytelling application that uses *mise-en-scène* is *Toontastic* by Launchpad Toys. This creative application for children allows the creating and sharing of a cartoon, and also enables children to choose a setting, drag characters and move each character while recording their voice to make a dialogue. Other similar applications that have been created to help children develop stories include the *Book* 8

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Creator™ app by Red Jumper Studio, where children can drag and drop pictures, text and voice to create digital books. Such applications not only motivate children to create stories, but also encourage them to share their stories with their friends. Some aspects of the interactivity used in Toontastic and Book Creator, such as creating the scene, can be used in reading applications to allow for creativity and to enhance understanding of the text.

There are several positive aspects from using this interactivity technique, including that children might perceive adjusting the scene as a quest they need to achieve to produce a matching scene for the story. It may also be engaging and enjoyable to play and interact with the characters and create different versions of the storyline. In turn, using this technique can provide an assessment tool to measure a child’s understanding of the text. That is the designer of the interactive e-book can use the scene creation technique to build specific algorithms that connect the correct images of characters and objects to the different pages of the story. This will allow the software to evaluate whether children are setting the scene elements accurately, according to the text of the story, or inaccurately. If the child sets the scene correctly, feedback can be given, such as music and changing button colours, to motivate the child to keep reading and playing. Negative feedback or the absence of positive feedback can provide the reader with an indication that something is missing or what could be wrong with the scene.

2.7 SUMMARY

From the literature review, it is obvious that Omani and Arabic children in general need to improve their reading frequency. Issues such as lack of appropriate public libraries and electronic Arabic reading material, unsatisfying school libraries, and discouraging home environments all contribute to the poor reading outcomes of Omani children. Yet the technology that is already available in most Omani homes such as desktop computers, tablet devices and the internet facilitates the potential distribution of interactive reading applications that can be downloaded and accessed by children all over the country.

Intrinsic reading motivation is essential to enhance the frequency in which children read for pleasure (Wigfield and Guthrie, 2000). The SDT and its sub-theories (Deci & Ryan, 1985) provide guidelines to the most important factors for enhancing children’s internal behaviours for reading for pleasure: enjoyment/interest; self-competence/self-awareness; and personal-importance/value. To engage children with reading materials and achieve an optimal experience (Csikszentmihalyi, 1990), challenges in the reading activity were balanced with the reading abilities and skills of the surveyed children in this research. The recommendations of Colombo and Landoni (2014) illustrate that intrinsic motivation for reading can be enhanced when the reading activity is playful and engaging.

This literature research of the potential reasons for the general lack of reading for pleasure in Oman, as well as the various theories put forward for enhancing reading motivation and engagement, indicated that designing an interactive reading experience specifically for Omani children may enhance their reading frequency. Hence, *Trees of Tales* was designed and used in this research, representing an interactive, playful reading application for children in the Arabic language. The application includes game elements and interactivity to enable a playful experience that better engages the children with the content, and motivates those who are more reluctant to read. Stories were selected that relate to Omani culture and are part of Omani traditional folktales, to better satisfy the children’s interest and curiosity.

This study’s interactive reading application was also guided by previous work on designing interactive applications for children (Druin, 2009; Fisch, 2005; Hourcade, 2008). Furthermore, using the iterative design process, which enabled a better understanding of the design practice, has produced guidelines, which may be valuable for future designs of interactive reading applications for Omani and Arabic children.
CHAPTER 3

RESEARCH DESIGN

3.1 OVERVIEW
A recent UNESCO (2010) study’s findings confirmed that many Arab children are not reading enough. In Oman in particular, factors that influence the low rate of reading in children include the non-existence of children’s books in public libraries, lack of access to suitable reading materials, uninspiring school libraries, and the low level of motivation for reading within Omani families. Yet this study’s literature review indicates that these reading rates among Omani children could be enhanced if they are given access to enjoyable, interesting and culturally related reading activities. This study’s literature review also reveals that the involvement of families and friends is highly important to increase perceived value and awareness of children’s reading abilities.

This research project provided a new reading experience for the Omani children it surveyed, with the aim of understanding how to establish reading for pleasure as a sustained practice among Omani children. The design of this reading experience was informed by existing literature to better understand the motivational factors that often lead to regular reading habits among children, as well as the most effective structure of interactive storytelling applications and games.

3.2 RESEARCH AIM
The main aim of this research project was to assess how the design of an interactive reading application, targeted at Omani primary school children, can enhance the motivation to read more for pleasure and instil a sustainable habit of reading among Omani and other Arab children. As part of this objective, a prototype was designed and tested among Al Waha Primary School children in Oman.

This study was also aimed at gathering knowledge of any behaviour or attitude changes in children’s reading habits when reading from an interactive application,
compared with a printed storybook or a basic e-book. Therefore, the level of the
children’s engagement and user experiences from reading the *Trees of Tales*
application was analysed against the other two reading interventions, with the data
collected via a within-subjects measure design.

The main research question is concerned with the evaluation of the prototype and the
examination of its suitability as a standalone prototype that children can use both at
home and at school in Oman. However, to design a suitable interactive reading app
for children, guidelines needed to be formulated, which resulted in one of this
project’s main research sub-questions. Reflective analysis of the iterative design
process also formed another main research sub-question, to address the actual process
of designing and developing the prototype, and the knowledge that it generates.

These main research questions and sub-questions are as follows:

**What is the impact of an interactive reading application on the reading
behaviour and motivation of Omani children in relation to reading for
pleasure?**

1. What are the design guidelines of an interactive reading application designed for
   Omani children?
2. What are the design issues that were identified during the iterative design process of
   *Trees of Tales* that may be of relevance to the design of future interactive reading
   applications?

To address the main research question, *Trees of Tales* was tested on primary school
children in Oman. A mixed-methods evaluation procedure and qualitative and
quantitative data were collected to assess the impact of the reading application. This
involved surveys as well as observations through video-recordings and the Fun
Toolkit, to compare the impact of three types of reading experiences. The testing
procedure involved a group of 18 students at Al Waha Primary School in Oman over
a timeframe of six weeks.

To address the first sub-question and derive a guideline that is suitable for designing
this project, a research through design approach was followed. Specifically, the
ideating phase of the research through design approach was helpful to collect information and explain the culture and the reading situations in Oman. Literature review was conducted on the motivational dimensions for reading, game mechanics, dimensions of flow, and interactivity aspects to assess comprehension. The most suitable software and hardware was also identified, to assist in the development and dissemination of an interactive reading application for children to use in schools and at home.

The second sub-question was addressed via a reflection of the design process of *Trees of Tales*, which was based on the Critiquing phase of the research through design approach. This led to the identification of issues, as well as the development of recommendations that can be useful for future developments of similar applications.

### 3.3 RESEARCH THROUGH DESIGN

This mixed-method research project used a research through design approach to progress knowledge. The concept ‘research through design’ was initiated by Frayling (1993), who adapted it from Herbert Read’s model of education through art. He described research through art and design as “an action research where a research diary tells, in a step-by-step way, of a practical experiment in the studios, and the resulting report aims to contextualise it” (Frayling, 1993). However, as a relatively new way of performing research specifically for artists and designers, there are no clear expectations and standards that describe a ‘good’ research through design methodology (Forlizzi, DiSalvo, Bardzell, Koskinen, & Wensveen, 2011; Gaver, 2012). Several scholars have attempted to define the nature of research through design as the process of designing a product and reflecting on the design process by telling a story at the same time (Downton, 2003). “By telling stories and determining patterns we can reflect, we can place something in a larger narrative, see similarity between a thing and a model, between two things or two models” (Downton, 2003, p. 126).

A serious effort to define the methodology and its standards, especially for interactive design researchers, was attempted by Zimmerman, Forlizzi, and Evenson (2007), whereby they emphasised the process of ideating, iterating and critiquing potential solutions. They argued that research through design should produce a concrete problem framing and articulation of the desired state, a series of prototypes, and
documentation of the design process. They also proposed a set of criteria for evaluating interactive design research that uses research through design: process, invention, relevance and extensibility (Zimmerman et al., 2007). According to Zimmerman, et al. (2007), the process is good if all the design phases and choices made in the design are documented in detail so the process can be reproduced. The contribution must constitute a significant artefact, and that can be achieved by creating an extensive literature review that situates the work in the current state of the art. Relevance of the research is achieved when the researcher articulates the preferred state their design attempts to achieve and provides support for it, and extensibility is the ability to build on the resulting outcomes of the design research (Zimmerman et al., 2007).

As this study has been guided by a research through design approach, it aimed to achieve the approach’s most common standards of ideating, iterating and critiquing potential solutions (Zimmerman et al., 2007). This research methodology commenced by framing the current reading and literacy situation in Oman and its relationship to the family and culture. Then to identify potential solutions, the existing literature was used to investigate key elements that motivate children to read or participate in any activities. Guiding principles were then developed from these first two stages, to use in the design process of the research prototype. Furthermore, the iterative design process of Trees of Tales was documented and reflected on, to highlight issues, findings and recommendations uncovered through the design process. This was important to support Trees of Tales extensibility and reproduction in further research, and further details on the design guidelines and process are provided in Chapter 4.

3.4 EXPERIMENT DESIGN

This study used a within-subjects design approach to progress knowledge. Within-subjects design refers to a series of experiments in which the same participants serve in more than one treatment (Charness, Gneezy, & Kuhn, 2012). That is repeating the measures by exposing participants to all treatment conditions. This type of experiment design was preferred over the between-subject design for several reasons. Within-subjects design has been deemed suitable for examining how individual behaviour changes when the circumstances of the experiment change (Charness et al., 2012). Investigation of the changes in reader behaviour among participants was one of the
main aims of this particular study. Another reason for choosing this design is that it supports experiments with fewer participants – the amount of iPad tablets available to use in this study was limited. Additionally, the within-subject design was commonly identified when investigating technology use and behavioural changes among previous research on children (Ciampa, 2013; Sim, MacFarlane, & Read, 2006; Stoeckle, 2011).

A counter-balanced measure approach was also used to divide the group of participants into smaller groups, to limit potential disadvantages of the within-subject design such as carryover effects and order effects. Counter-balancing refers to exposing participants to treatment conditions at different stages to ensure that carryover effects and order effects do not eventuate from exposure to one treatment before the other (Lewis-Beck, Bryman, & Liao, 2003). This was achieved in this study by dividing the participants into smaller groups where they were given the reading interventions in different order.

Various data collection mechanisms were also used in this research, including both qualitative and quantitative methods. The reason for collecting both qualitative and quantitative data was to support the results obtained from the quantitative data, such as the Fun Toolkit. The two forms of data collection provided greater insights into the findings – more than what would have probably be obtained by using either type of data alone (Creswell & Clark, 2003). Qualitative data gathered for this study was obtained from the observation of participants reading in three different sessions, as well as open-ended questions from the parents’ surveys on the change of reading behaviours among participants. The quantitative data that was collected included questionnaires completed by the children and their parents, and the Fun Toolkit. The questionnaires were used to measure the motivation and attitude of the surveyed students towards reading for pleasure before and after the experiment. A small survey to obtain student opinions about each reading intervention was used after each treatment. Finally, the Fun Toolkit exercise was performed in the final stage of the experiment, to measure student opinions towards technology (Read, 2008).
3.5 RESEARCH PARTICIPANTS

The study was conducted in Al Waha Primary School in the city of Muscat, the capital of Oman. The Ministry of Education in Oman established Al Waha Primary School in 1998, and it comprises of classes from grades one to four, with 772 students in total. There are nine classes for grade four, with a total number of 266 students aged between nine and ten years – the average number of students in a fourth-grade class is 29 students. Most of the fourth-grade classes have the same ratio of male and female students. The school has one LRC, which includes a book section and a computer section, and is shared among all of the school’s students.

Al Waha Primary School is similar to hundreds of other public primary schools in Oman. All public primary schools in Oman are governed under the Ministry of Education’s curriculum and methods of teaching. Al Waha Primary School was selected for this research because of its close proximity to the author’s home.

Eighteen students from the fourth grade of Al Waha Primary School were randomly selected from 6 classes, based on their teachers’ perception of their academic performance. The teachers were asked to recommend one high-, one average- and one low-performing student from their class. Only males were selected from the first three classes, and only females from the other three. The three students from each class were considered one participant group, and overall there were six groups.

3.5.1 READING INTERVENTIONS

The main reading instruments included in the study were:

1. *Trees of Tales* (TT): designed by the researcher as part of this research, and read from an iPad2.
2. Traditional print storybooks (PB): existing storybooks from the school library that were available to the children – children were given the option to select those they wanted to read out of a collection of approximately 40.
3. *Arabic Stories* basic e-book application (EB): stories available in the Apple AppStore for download. The *Arabic Stories* application contains five children’s e-

books in Arabic, and the only interactive elements in this application are selecting one of the books, flipping the pages, and turning audio narration on or off.

3.6 RESEARCH INSTRUMENTS

3.6.1 READING BEHAVIOUR SURVEY

The Reading Behaviour Survey was sent to the parents of the students who participated in the user test to complete at home. It was given to students before the experiment started and was collected on the first day of the experiment. It was aimed at obtaining information about the family reading practices and specifically the student’s reading behaviour at home. It asked the parent eight relevant questions, such as how the family spends its free time and whether or not the family reads together. It also enquired about the type of reading resources that are available for the child at home, whether parents encourage their children to read enough, and whether they buy them books as gifts or take them to libraries. This survey was developed with the help of the supervisors to understand the Omani parents’ attitudes and behaviour at home towards reading and whether it was a practice that they wanted their children to improve.

3.6.2 CHANGES IN READING BEHAVIOUR SURVEY

The Changes in Reading Behaviour Survey was distributed to participants to take home after the experiment, to be returned on the final fieldwork visit to the school. The purpose of this questionnaire was to obtain the parents’ perspectives of any changes in their child’s behaviour and attitude towards reading for pleasure. It enquired whether the parents noticed that their children were more motivated to read, or talked about reading more often than before the experiment. It also sought parents’ opinions of all the different reading interventions that were given to their children during the research. The results from this questionnaire were quantitatively analysed to support the findings from other surveys such as the Fun Toolkit exercise.

3.6.3 ELEMENTARY READING ATTITUDE SURVEY

The Elementary Reading Attitude Survey (ERAS) (McKenna & Kear, 1990) is a public instrument that measures elementary students’ attitudes towards both academic (or school-based) and recreational (or leisure) reading. This survey has been extensively used to assess student attitudes towards pleasurable reading and academic
reading (Krashen, 1993; McKenna, Kear, & Ellsworth, 1995), and contains 20 standard statements about reading that users need to respond to. In this study, the pleasurable reading portion of the survey, which combines 10 statements, was used. Students were asked to complete the ERAS both at the beginning and at the final stage of the experiment. The aim of using this survey was to examine the effect of this experiment on Omani children’s attitude towards reading for pleasure. Specifically, it was used to explore the possibility of improving children’s attitudes towards reading after being exposed to reading for three weeks. Therefore, the purpose of giving the students the survey twice was to compare any differences in the children’s attitudes towards reading before and after being exposed to all the reading interventions. The time allocated for this survey was approximately 10 minutes.

The school children were asked to respond to each statement in the ERAS by circling a Garfield type character that was closest to their own feelings towards reading, based upon that statement. The survey may be administered to a small or large group, and it may be read to the students or read by the students independently (McKenna & Kear, 1990).

3.6.4 EXPERIENCE SURVEY

The one-page Experience Survey asked the students questions about their experiences with the reading interventions, and was provided each time the students had returned each of the three reading interventions. Three questions were included to gather the students’ opinions towards each of the reading interventions. For example, the first question gauged their enjoyment of the reading intervention they took home the previous week. Using a Likert 5-point scale, question one had multiple choice options represented by smiley faces, to assist the students to find the most suitable answer. The answers ranged from (1) did not enjoy, to (5) enjoyed it very much. This survey method is called the Smileyometer and it has been employed in previous research to rate children’s opinions of using software (Sim et al., 2006). Analysing this survey provided deeper insights on the experience of the surveyed children, as well as opinions about each of the reading interventions they used.
3.6.5 THE FUN TOOLKIT

According to Read (2008), the Fun Toolkit has been tested and validated to establish its abilities to gather children’s opinions of different software. It is mainly used to determine the opinions of children and their educational software and games preferences and consists of three tools. The first tool is the ‘Smileyometer’, which is used before and after the child interacts with any software or game. The second is the ‘Fun Sorter’, which requires children to rate the software or game against a number of different constructs. In this study the children ranked the reading based on different constructs, ultimately selecting which was the best and which was the worst. The third tool was the ‘again-and-again’ table, where the children answer a question such as ‘Would you like to play this again?’ by picking yes, maybe or no.

In this study, the second and third tools of the Fun Toolkit were used. The used tools are the ‘Fun Sorter’ and the ‘again-and-again’ table. The ‘Fun sorter’ activity consisted of three questions in which children were able to rank the most fun reading intervention, the easiest to use, and the reading intervention with the best stories. The ‘again-and-again’ table was an activity in which children selected the reading intervention that they wanted to read again. The Fun Toolkit was utilised at the end of experiment to obtain the children’s opinions of the different reading interventions they used during the overall experiment. Results from the Fun Toolkit were statistically evaluated to compare the children’s preferences for the reading interventions.

3.6.6 INTRINSIC READING MOTIVATION SCALE (IRMS)

One of the main research methodology aims of this study was to create a scale that measures the intrinsic motivation of children for pleasure reading. Therefore, the four most common questionnaires used in previous research to measure children’s motivation related to reading were identified. Three of these four questionnaires were used to measure the motivation of children for reading, and one was used to measure intrinsic motivation in general.

The chosen questionnaires that measure children’s motivation for reading are the Motivation to Read Profile (MRP), the Motivation for Reading Questionnaire (MRQ), and the Motivation for Reading Scale (MRS). The MRQ was designed by Wigfield
and Guthrie (1995) and measures 11 dimensions including: (1) reading efficacy; (2) challenge; (3) curiosity; (4) reading involvement; (5) importance; (6) recognition; (7) grades; (8) social; (9) competition; (10) compliance; and (11) reading work avoidance. The MRP was designed by Gambrell et al. (1996) and measures two motivational dimensions: (1) the self-concept as a reader; (2) and the value for reading. It was specifically designed to scale reading motivation among elementary school students. The third is the MRS by Baker and Scher (2002), which was also designed for elementary school students and measures enjoyment, value, perceived competence, and library-related dimensions. All of these surveys contain subscales that measure a mix of intrinsic and extrinsic dimensions. The fourth less reading specific questionnaire is the IMI by Ryan (1982), which includes subscales concerning different aspects of intrinsic motivation such as enjoyment, importance, pressure and perceived competence.

The MRP, MRQ and MRS have been designed to measure motivation for general reading among children, which includes intrinsic, extrinsic and self-efficacy subscales. The MRP contains two subscales that are used to explore the personal dimensions of students’ reading motivation (Gambrell et al., 1996): (1) students’ self-concept as readers; and (2) the value they place on reading. The self-concept subscale is concerned with the students’ opinion of their own reading skills, which is similar to the reading efficacy subscale in the MRQ survey.

However, the MRQ does not consider reading efficacy as an intrinsic motivation – it is instead used as a separate subscale (Wigfield & Guthrie, 1995). It also considers importance as an extrinsic motivation and not intrinsic motivation. WANG and Guthrie (2004) later modified the MRQ to include only eight dimensions out of the original eleven, and the following three of these are considered intrinsic motivation dimensions: (1) challenge; (2) curiosity; and (3) involvement. The other five are extrinsic motivation dimensions: (1) competition; (2) recognition; (3) grades; (4) compliance; and (5) social interactions. In contrast with this, Rowe (1991) contended that out of these eight reading motivation dimensions, only two – curiosity and involvement – could be defined as components of intrinsic reading motivation. Even though the MRQ has been used and validated across many studies that measure children’s reading motivation (Lau & Chan, 2003; McGeown et al., 2012), there are
some critics. For instance, Watkins and Coffey (2004) argued that it needed to be revised after investigating its validity via confirmatory factor analyses, where they found that the MRQ structure did not adequately fit the data.

The MRS measures the motivation for reading among early learners such as first-grade students (Baker & Scher, 2002) – it assumes that most of these children have not yet been reading independently. Its subscales relate to enjoyment, perceived value and perceived competence, and it also measures the interest of the children in library-related activities such as visiting a library. According to Baker and Scher (2002), the items in this scale have been derived from other scales such as the Heathington Primary Scale (J. E. Alexander & Filler, 1976), the Survey of Reading Attitudes (D. G. Alexander & Engin, 1986), the Estes Attitude Scale (Estes, 1971), and a series of inventories developed by Gambrell et al. (1996). In this study, it was perceived that the items in this scale are clear, simple and easy to translate to another language such as Arabic.

Many self-determination theorists propose that intrinsic motivation, including the interest and enjoyment one gets from an activity, is a powerful motivational force (Deci & Ryan, 1985; Harter, 1981). Ryan (1982) was first developed and use the corresponding IMI, which commonly assesses participants’ subjective experiences related to a target activity in laboratory experiments. It contains seven subscales that can be used: (1) interest/enjoyment; (2) perceived competence; (3) effort/importance; (4) pressure/tension; (5) perceived choice; (6) value/usefulness; and (7) relatedness. However, it is mentioned in the IMI description that interest/enjoyment is considered the self-report measure of intrinsic motivation, and is the only subscale that assesses intrinsic motivation. It was previously discussed in section 2.3.4 on SDT that the OIT sub-theory identifies autonomous motivation as the form of motivation which is caused by internal factors related to the self, such as enjoyment/interest, personal importance/value and self-awareness/competence.

The four motivation scales; MRQ, MRP, MRS, and IMI share many elements but sometimes use different terms or group elements in different subscales. For example, the perceived competence subscale in the IMI measures the personal beliefs of an individual’s abilities and skills. Reading efficacy in the MRQ also refers to the
personal beliefs of one’s reading abilities, while MRP uses self-concept to describe exactly the same thing. In this study, a closer examination of the subscales in each questionnaire assisted in finding dimensions that measure intrinsic reading motivation. The subscales in the IMI were closely examined, as well as the other reading motivation scales, and the meanings of the subscale statements were then examined to identify and collect common statements.

3.6.6.1 Common motivation subscales

The intrinsic dimensions of motivation for reading that most commonly exist across the above questionnaires are outlined below in Table 3.1.

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enjoyment/interest</td>
<td>IMI, MRS</td>
</tr>
<tr>
<td>Curiosity</td>
<td>MRQ</td>
</tr>
<tr>
<td>Importance/value</td>
<td>MRQ, MRP, IMI, MRS</td>
</tr>
<tr>
<td>Involvement</td>
<td>MRQ</td>
</tr>
<tr>
<td>Challenge/pressure</td>
<td>MRQ, IMI</td>
</tr>
<tr>
<td>Self-concept/reading efficacy/perceived competence</td>
<td>IMI, MRQ, MRP, MRS</td>
</tr>
</tbody>
</table>

Table 3.1: Common subscales in the four motivation questionnaires

From these questionnaires, it was identified in this study that enjoyment/interest, curiosity and involvement have the potential to be combined into one subscale as they share many elements. The importance/value subscale has to be treated as a separate subscale because of its appearance in all the four questionnaires, and its direct relatedness to intrinsic motivation. Challenge is included as a subscale in the MRQ survey, while a similar subscale in IMI is pressure/tension. Although in IMI this relates more to feelings of anxiety and tension while doing an activity in general, such as ‘I was anxious while working on this task’; whereas the MRQ relates to the benefits of reading versus the difficulties, such as ‘I usually learn about difficult things by reading’. Hence, the similarity is not strong in the context of these questions in both scales. Additionally, the MRQ does not consider the challenge dimension as an intrinsic motivation factor, but rather part of self-efficacy and competence beliefs (Wigfield & Guthrie, 1997). For this reason, challenge was not included as a direct subscale in this study’s Intrinsic Reading Motivation Scale (IRMS), but instead part of perceived competence that exists in most scales. The self-concept/reading efficacy/perceived competence subscale is also used in all of the four questionnaires,
and was considered the third subscale in the IRMS. Table 3.2 below illustrates the final subscales used in this study, including the questionnaires they come from.

<table>
<thead>
<tr>
<th>Final subscale</th>
<th>Similar subscales</th>
<th>Surveys contain subscales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enjoyment</td>
<td>Interest, involvement, curiosity</td>
<td>IMI, MRS, MRQ</td>
</tr>
<tr>
<td>Value</td>
<td>Importance, value, usefulness of reading</td>
<td>MRQ, MRP, IMI, MRS</td>
</tr>
<tr>
<td>Perceived competence</td>
<td>Reading efficacy, self-concept</td>
<td>IMI, MRQ, MRP, MRS</td>
</tr>
</tbody>
</table>

Table 3.2: Most used subscales in relation to intrinsic motivation

It was noted in this research that all four scales share the same subscales, except the MRP, which does not include a subscale for enjoyment. A further investigation was therefore done by comparing all of the questions/statements from each subscale in the four questionnaires. Questions/statements that were common across the different scales were highlighted and used for the final subscales of the IRMS of this study. These questions/statements were then tested for readability and comprehension among four Omani children from grades three and four.

3.6.6.2 The IRMS

It was identified in this study that intrinsic motivation for pleasure reading often depends on the enjoyment felt from the reading, the level of interest in the reading topic, and how engaging and involving the content is. The challenges that are preferred, self-perceptions of own skills and abilities, and the perceived value of reading were also factored in. In contrast, dimensions such as perceived choice (autonomy) – a subscale in the IMI – were not used in this study as pleasure reading should be a voluntarily activity. That is, the participating children were asked to participate in this study only if they wanted to read.

In designing surveys for children, it is better to use a questionnaire that is as short as possible while still covering the research questions. Longer questionnaires are likely to have lower response rates among children (Roszkowski & Bean, 1990). Two to three printed pages of large-font questions is a common children’s survey design (O'Reilly, Dogra, & Ronzoni, 2013), which was achieved in this study by separating each subscale questions/statements in a page with three to four questions/statements.
in each page. After analysing existing surveys that have measured reading motivation and intrinsic motivation, the following statements were identified as most common:

**Enjoyment**
1. Reading is a very interesting thing to do
2. I like to read
3. I think reading is a boring way to spend time (r)

**Value**
4. It is very important to me to be a good reader
5. I think people can learn new things from reading
6. I think reading could help me become a better student

**Self-competence**
7. I am a good reader
8. I know that I will do well in reading next year
9. Reading is hard for me (r)

These common statements make up this study’s IRMS, which is derived from the MRQ, MRP, MRS, and IMI. The final three subscales of the IRMS were similar to the autonomous motivation forms of the SDT (Ryan & Deci, 2000), which clarified that the most common internal factors that can enhance reading for pleasure as mentioned in OIT were being used. Similar to most of the four surveys, a 1 to 4 scale was used in this study’s IRMS, with Garfield smiley faces representing the multiple choice answers. As the research was conducted among Arabic children, the scale was translated into Arabic language and pre-tested informally with the researcher’s own children.

The IRMS survey was conducted three times during the experiment. Every time the children returned their reading intervention from the previous week, they were asked to answer the IRMS survey. The IRMS survey was administered after the experience survey to measure the children’s intrinsic motivation for reading after using each intervention. The aim of conducting the survey after reading from each intervention was to investigate and compare any changes in the intrinsic motivation for reading that resulted from using the different interventions.
3.6.7 RESEARCH OBSERVATION

A non-structured observational approach was also used in this research to collect data on children’s interactions with the reading interventions. The main purpose of this was to ascertain any differences in engagement when the children read from the three different interventions. Every reading session occurred in the school’s break time and was video-recorded for the period of 20 minutes. The break time is a 25-minute session in which students eat their snacks and have time away from the classrooms. The break starts after the fourth study session of the day, and afterwards the students continue without a break until session seven when they leave for home.

The first reading session occurred on 13 November 2013, the second was on 21 November 2013, and the third was on 5 December 2013. The protocol for each reading session was the same – the researcher and research assistant prepared the room, ensured participants started on time, and distributed the right reading interventions according to each participant group. The briefness of the 20-minute reading session was the main challenge in performing the observation. The research sessions had to be both fast and accurate, as the room was needed immediately afterwards.

Six students (three male and three female) were selected for direct individual observation in each of the three sessions. The objective of this direct observation was to compare the level of engagement for the students in relation to the reading interventions. According to Chapman (2003), direct observations of students performing a task can assess the student’s engagement in the task and confirms students’ reported levels of engagement. The observer records whether behaviour was present or absent at the moment that the time interval ends. This method has often been used in previous studies to gather quantitative and qualitative data regarding student and child behaviour in different situations (Hanna, Risden, Czerwinski, & Alexander, 1999; Karimi & Lim, 2010). The three videos from this study’s reading sessions were imported and coded using NVivo (Creswell, 2013), and a content analysis technique was used to assess each child’s engagement level over a five-minute period during each reading session (Lazar, Feng, & Hochheiser, 2010).
The six students were mainly selected based on their attendance at every reading session and the ability to see their facial expressions in the video. Two of these students were academically high-performing (Boy A and Girl A), two were average (Boy B and Girl B), and two were below average (Boy C and Girl C). Table 3.3 below presents the six selected students in their allocated groups (TT = Trees of Tales, EB = Basic E-book application, PB = Traditionally printed books). The students’ real names have been altered to protect their identities.

<table>
<thead>
<tr>
<th>Group</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boy A, Boy B, Boy C</td>
<td>TT</td>
<td>EB</td>
<td>PB</td>
</tr>
<tr>
<td>Girl A, Girl B, Girl C</td>
<td>TT</td>
<td>PB</td>
<td>EB</td>
</tr>
</tbody>
</table>

Table 3.3: Sample of students for the observation analysis

3.6.7.1 Student descriptions

The academic performance of Boy A was excellent – he was one of the most successful and smartest students in his class. He participated in many activities in school and was one of the school’s scouts. He relayed that he loved reading and it was very easy for him to read. Boy B was an average student in his class – he could read well based on his average grading. It was noted that he was a quiet boy with a very low voice. Boy C was one of the low-performing students in his class, and was a struggling reader according to his teacher. He was also observed to be a very quiet boy that did not talk much to the other two boys from his class.

Girl A was an excellent student – she was a quiet little girl who loved to read more than talk. She relayed that she likes to write stories as well as read. Girl B was a very unique student – she was talkative, happy, hyperactive, and wanted to sit beside the researcher at all times. Although she was an average student, her teacher advised that she was smart but that her hyperactivity meant that she could not stay still or concentrated for long periods in the classroom. Girl C was a low-performing student – yet even though she was a struggling reader, she was excited about this experiment and was happy to participate.

3.6.7.2 Analysis procedure

Categories of engagement with the reading in this study are the on-task versus off-task time. On-task is defined as when the child is concentrating on the reading tool, and off-task is when the child is looking or moving around, or talking (Marks, 2000).
The behaviour of each child was analysed from the fourth minute of the video-recording up to the eighth minute, for an interval of five minutes. Observations commenced from the fourth minute because most of the children were not reading for the first few minutes – some were talking or asking questions. Most children were settled and reading from around the third minute of the video; thus, from the fourth minute, the session was quiet and the video was clear.

The content analysis technique was selected in this study to analyse the observational data. Content analysis, also known as ‘thematic coding’ is deemed useful for flexible quantitative and qualitative analysis (Krippendorff, 2004; Saldaña, 2012; Schreier, 2012). It has been widely used for analysing user behaviour in a technology and learning software context (Robertson & Howells, 2008; Spannagel, Gläser-Zikuda, & Schroeder, 2005). During the five-minute observations in this research, a whole-interval sampling approach was used which recorded the behaviour of each student every 12 seconds. This enabled the division of every one minute of observation into five intervals to obtain a constant rate of engagement over the five-minute period (Chapman, 2003; Volpe, DiPerna, Hintze, & Shapiro, 2005). While it has been acknowledged that this type of analysis often produces relatively conservative estimates of children’s engagement rates, it is still deemed likely to be more sensitive to changes in the consistency and persistence of children’s behaviour (Chapman, 2003).

As part of this study’s whole-interval sampling approach, reading engagement was only recorded as positive behaviour if it was exhibited for the full duration of an interval of 12 seconds. This means that a description of the student’s behaviour was recorded five times in a minute. During the five-minute observation of each session, 25 separate records were collected of each student’s behaviour, which were then coded using the engaged or disengaged categories. Calculating the number of times engagement behaviour appeared over a period of five minutes produced descriptive statistics analysis that is discussed further in Chapter five.

As observations like those used in this study often provide deeper insights into the context and setting of interactions between participants and the reading interventions, it was deemed necessary to explain in detail the context of the observation via
qualitative analysis (O'Reilly et al., 2013). The three most common approaches to qualitative content analysis are conventional, directed and summative (Hsieh & Shannon, 2005). Hsieh and Shannon (2005) identified the major differences between these three approaches are the coding schemes, origins of codes, and threats to reliability. In the conventional approach, coding categories are derived directly from the text data; in the directed approach, analysis starts with a theory or relevant research findings as guidance for initial codes; and the summative approach involves counting and comparisons, usually of keywords or content, followed by the interpretation of the underlying context. In this study, the most suitable qualitative content analysis approach was the summative approach, as it involved comparisons of behaviour in different reading situations and as summative approach required interpretation of context.

3.7 RESEARCH EXPERIMENT PROCEDURE

The principal of Al Waha Primary School was approached on 4 November 2013 after receiving an authorisation letter from the Ministry of Education in Oman and the ethics approval letter from RMIT University (see appendices section 2) to perform the experiment. The principal selected a fourth-grade teacher in assist with the research, and other grade-four teachers were then asked to select student participants. On 7 November 2013, the participating students gathered in the school library where the researcher explained to them the research and gave them information sheets and consent forms to take home to their parents. Should their parents agree to participate in the study, they were to return the forms at the beginning of the following week. All of the selected students obtained their parents’ signatures and were happy to participate in the study.

In the following week, the student participants were divided into six groups according to their class number. The process in which the reading sessions were performed was based on the counter-balanced design. Each week, two groups read stories from traditional printed books (PB), two groups from the basic iPad e-book Arabic Stories (EB), and two groups from Trees of Tales (TT). Figure 3.1 below illustrates the distribution of groups across each week, according to the three treatment’s counter-balanced design measures:
Following the reading sessions, children were asked to take their reading intervention home for the weekend. Children were told to read more from the intervention during the weekend if they wanted. Their user experiences and intrinsic motivation were measured when they returned their reading intervention the following week. This process was repeated for the next two reading sessions. The experiment was performed over a period of six weeks, including the first week in which the selection of participants was conducted. The experiment was performed successfully and the data was transferred to Australia directly after the data collection. Figure 3.2 details the procedure of the experiment and the time when each data collection activity occurred. Additionally, a more comprehensive weekly schedule of the experiment is attached in the appendices (section 3).

The analysis approach used in the study varied depending on the type of data collected. For the surveys, descriptive statistics were used to analyse the data obtained from the IRMS, Experience Survey, the Elementary Reading Attitude Questionnaire, the Reading Behaviour Surveys, and the Fun Toolkit instrument. Content analysis was employed to analyse the quantitative and qualitative data obtained from the
observation of the reading sessions, as recommended by Kumar and Phrommathed (2005). The number of occurrences of categories related to reading engagement over an interval of five minutes per session were recorded, as suggested by Creswell (2013).

3.8 SUMMARY

This study used a mixed-method approach to progress the design of the application, guided by a research through design approach. The reflection was based on the structure proposed by Zimmerman et al. (2007) in relation to the process of research through design, which they defined as the process of ideating, iterating and critiquing potential solutions. First, the information and guidelines needed to design the Trees of Tales application were collected. The design process was then documented, reflecting on its iterative process and interpreting any issues or considerations in relation to the design. Further details of the design process are available below in Chapter 4. For user-testing purposes, an experiment of within-subject measure design was performed, which involved mixed-method data collection including questionnaires and observations.
CHAPTER 4

THE DESIGN OF TREES OF TALES

4.1 OVERVIEW

The aim of this study was to improve the habit of reading for pleasure among Omani children. To achieve this, a reading experience was designed that Omani children could easily access and that enhanced their engagement and intrinsic motivation for reading. The widespread use of tablet computers in Oman and the steady increase of internet users in the country influenced the decision to develop the reading application for a tablet device.

A research through design approach was followed in the design process in order to produce an application that can be adapted and reused in the future. The process of ideating was completed by exploring literature on intrinsic motivation theory, SDT, OIT, concepts of flow and engagement, educational game literature, and cultural considerations specific to Oman and the Arab society. This exploration resulted into a guiding framework of principles that informed the iterative design process of the reading application. The iteration phase was achieved through design and self-reflection on the personal experience of using the application. The reflections were then recorded and documented to provide recommendations for future designs of similar applications. The following sections provide more details on the research through design approach.

4.2 THE IDEATING PHASE

4.2.1 CONSIDERATIONS

There were several considerations that had to be taken into account when designing and developing a reading application with the aim of motivating and engaging Omani children to read for pleasure. The following three areas largely contributed to the defining of these considerations:
1. The Culture: The first consideration refers to background information about Oman as an Arabic country. As already mentioned in the chapter one, Oman has some unique social, cultural and economic features. Although it is a Muslim country and its main language is Arabic. There are also specific reasons for the lack of motivation to read for pleasure among Omani children, as mentioned in Chapter two relating to the literature review. Taking these unique cultural factors into consideration will help to find a suitable solution for motivating Omani children to read for pleasure.

2. Social Experience: According to Blythe, Monk, Overbeeke, and Wright (2006, p. 75), “interactive technology is not, and should not be, socially isolating. In contrary, it should be used for important social activity”. Therefore, the design of the reading application should allow children to read and create stories that they can share with other family members and friends.

3. Enjoyable Experience: The second consideration relates to the SDT and intrinsic motivation for reading. OIT, a sub-theory of SDT, lists the internal factors that cause self-determined behaviour such as reading for pleasure as interest/enjoyment, value/personal importance and awareness/synthesis with one self. These factors therefore formed the essential principles on which the reading application Trees of Tales was designed for this study. The factors that lead to the optimal experience of flow in an activity were also considered, to build a balanced application which children are more likely to continue to use for longer periods. These considerations have been combined in this study to help to provide an enjoyable and balanced reading application.

4. Technology Platform: The medium for the study’s reading application was intended to improve access, so that the children could access the reading material anywhere and anytime they wanted to. Hourcade (2008) indicated that touchscreens are generally well-received by children because they “provide a more concrete means for selecting options on the screen and can reduce difficulties children may face in pointing and operating an indirect device like the mouse” (p. 43). In addition to their ease of use, the lightweight tablets allow more flexible transportation. The iPad was selected for this study based on its popularity
among children in Oman, and based on forecasts regarding the proliferation of portable devices in the Middle East (Gruen, 2011). This research used the iPad2 and iPad3 for the development and user testing in Oman.

Together, these considerations contributed to the development of principles that guided the design of *Trees of Tales*. Figure 4.1 summarises these three main areas that influenced the design.

![Figure 4.1: Considerations that contributed to the design of *Trees of Tales*](image)

4.2.2 DESIGN GUIDELINES

The guidelines used to design *Trees of Tales* were based on the areas of consideration, and educational game theories, as well as the main potential reasons identified in the literature review as to why there is limited reading for pleasure in Oman. Each consideration area produced a number of related guidelines. These guidelines were particularly pivotal for designing an interactive reading application for Omani children. The following diagram illustrates the areas of considerations and the guidelines. They provided the starting point for the design of *Trees of Tales*, which was further refined during the project.
The first guideline (Figure 4.2) relates to the use of culturally relevant reading content. According to the motivation theory, the experience should include a careful selection of interesting topics that relate to the children’s culture. A collection of stories based on well-known local characters provides the children with freedom to select the stories they want to read and makes the experience more interesting to them. *Trees of Tales* therefore included characters from Omani folktales, such as Joha, the Fisherman Ahmed, and Awaisha. It was envisaged that the inclusion of these three well-known characters would increase the relevance of the reading content, as well as help preserve some of the traditional Omani folktales and legends that have previously been passed on through an oral tradition of storytelling.

The second guideline in the diagram (Figure 4.2) refers to the technology available to people living in Oman and its suitability for reading. The widespread use of tablet computers among Omani children in the home environment made it a suitable medium for this study’s reading application. Additionally, the novelty of the devices was a motivating factor for children to try and explore the different applications, as it allowed easier access to reading. Children do not have to carry books from their schools to their homes when tablets are used, and they can also download new books or stories from anywhere in the country, provided they are connected to the internet. It was envisaged in this research that this would encourage the children to read anywhere and anytime they felt like reading.
The third guideline relates to the experience of the reading application itself, which needed to engage the young readers. The design was therefore based on flow theory to make the experience playful. Play is a crucial method through which we engage children to test ideas, develop new skills and participate in new social roles (Piaget, 1962; Vygotsky, 1980). Challenge, feedback and control are elements of game design – components that strengthen the engagement and ultimately allow children to experience flow if balanced with their skills. The children’s ability to select the stories they wanted to read when they wanted to read provides a sense of autonomy and control over the application. Additionally, building interactivity that involves the children with the story and causes them to experience flow has the potential to enhance enjoyment. All these factors are important to ensure that children are provided with a high-quality user experience, which motivates them to read more often. This guideline focuses on existing literature of designing engaging and motivating interactive applications and e-books for children. Based on previous research on the impact of using interactive digital books for reading among children, this project used a *mise-en-scène* game mechanic to better engage the user with the content of the reading. Additionally, recommendations and guidelines from interactive product designers that have specifically focused on designs for children, such as Druin (2009) and Hourcade (2008), were factored in to build a more effective and usable application for children. These considerations provided essential guidelines for the visual design of the interface of this study’s reading application.

The fourth guideline relates to sharing the reading experience among families and friends. It has been suggested that when parents or siblings participate in the child’s reading activity, its perceived value and the awareness of its importance increases (Clark & Hawkins, 2010). Reading from digital devices makes sharing easy and more sociable, as friends and family can read one another’s stories online and instantly comment on them. There are a number of ways to make sharing of the stories in *Trees of Tales* possible. One way is by providing a website in which children can publish their stories and read their friends’ stories. Another way is by providing a leader board in the application to rank children’s achievements of the stories they read or created.
4.3 THE ITERATING PHASE

Based on the literature review and the initial guidelines established for the design of Trees of Tales, the following are the five main guiding principles that were developed, including the actions that were taken to accomplish them:

**Guiding principle 1: Stories should be of cultural relevance.**
The stories were selected based on Omani folktales told across the generations. The resource for these stories was the researcher’s Omani mother.

**Guiding principle 2: Interface and navigation design should be child-friendly.**
The application and the story pages were based on a simple design and an easy navigation system.

**Guiding principle 3: Interactivity should support comprehension and not distract from reading.**
Interactivity in the story pages of Trees of Tales is related to the storyline, such as the scene-setting game mechanic that is based on each page’s text.

**Guiding principle 4: Children should to be able to freely select from a collection of topics.**
The children were provided with two options when selecting a story. First, the child could select one of three characters, and then they could select one of two stories related to that character.

**Guiding principle 5: The application should support creativity and sharing.**
To support children’s creativity and to help foster the creation of additional resources, in Trees of Tales children are allowed to create and add new stories that they can share with friends and family members.

4.3.1 CONCEPT DESIGN

In the initial concept design of the application, it was decided that each child would need to register before being able to read and create stories. This would allow the application to save the child’s data, such as stories they read or created, which would then be displayed whenever they signed into the application. Once registered, the
child could then select a favourite character by tapping on the character image on the screen. Once the child was on the character’s page, they could read a story from the tree branches or create a new story, which would result in the creation of a new branch, and subsequently grow the character’s ‘story tree’. This concept design emphasised the creation and sharing aspects of the stories, aiming to develop additional stories that could then be shared through a network of friends and family, which would then create more reading resources.

Figure 4.3 below illustrates the initial concept design of *Trees of Tales* in a flowchart format. At that stage, the main purpose was to enable children to play with the stories on the tree and modify them to create an entirely new story that they could save in the tree and share via a social network website called ‘Tales of Friends’. This would allow the child’s tree to grow bigger with new stories, and would encourage friends and families to read and comment on each other’s stories.

![Flowchart of Trees of Tales](image)

**Figure 4.3: Initial concept design of Trees of Tales**

This initial concept design would enable children to make major manipulations to the existing storylines. It was envisaged that children would create the scene as well as make changes to parts of the text. In this way, the children would have been able to change the narrative and create a new story that could then be shared. The development of this concept was informed by Fisch’s (2005) guidelines for designing
educational games – it aimed at providing hints to scaffold the interactions for motivating content. Figure 4.4 below shows the initial sketches of the application’s storyboard.

As shown in this initial storyboard, children would select the character to go to the character’s tree to pick a story. Once the story was opened, the story cover would appear with further information about the story, such as rankings and likes by other children who had read the story before. The children could press ‘read and play’ to read this story, or ‘I changed my mind’ to go back to the character’s tree and pick another story. If they pressed ‘read and play’, they would go to the first page of the
story where they could read the text and fill in the missing words according to the background images, such as typing ‘morning’ or ‘afternoon’ if the sun was shown. The children could also add other items and images to the scene such as the market, trees and houses. In this way, the children could create their own version of the story with some differences in storyline and images.

Although cognitive theorists recommend collaboration and communication in learning, there is very little research on the effects of collaboration among children over a social network (Hourcade, 2008). In online gaming communities for children such as Club Penguin\(^1\) and Barbie Girls’ World\(^2\), children can create an avatar, chat, and play games with other children. Parents can also use the safety tips and tools provided on these websites to monitor interactions with other children; yet there are still some social risks such as children forming online partnerships that obstruct personal relationships outside of the online community (Hourcade, 2008). The development of a social network component for *Trees of Tales* was outside the scope of this research project. Additionally, during a visit to Oman it was identified that most of the participant students in the user-testing experiment did not have internet connections or were not familiar with the concept of online social communities. Therefore, even if such social networking options had been available for *Trees of Tales*, it would not have been deemed useful for most of the participants who tested the application.

Thus, after deciding not to include the social network component, an updated, more basic concept design was developed for *Trees of Tales*, as shown in Figure 4.5 below.

\(^{1}\) [www.clubpenguin.com](http://www.clubpenguin.com)

\(^{2}\) [www.barbie.com](http://www.barbie.com)
Figure 4.5: Final concept design of *Trees of Tales*

In this updated structure, the tree page of the character was the main page where the child could select to read or to create. The existing stories in the tree were built with playful interactions in which children could set the scene of the storyline or help solve a puzzle on the page. Any new stories were saved as new branches in the tree, which allowed the tree to grow vertically, and children could go back to the new stories and modify them further.

This second stage of storyboarding concentrated on the development of the story pages and the types of interactivity and manipulations that could be provided to children while reading the story. It explored ideas such as dragging and dropping objects within the screen and creating the scene for the storyline. It also investigated mechanics to progress in the stories and move to the next pages, as shown below in Figure 4.6.

Figure 4.6: Snapshot of final set of storyboard sketches for *Trees of Tales*
4.3.1.1 Core mechanics

One of the main design considerations of *Trees of Tales* was to ensure that the children were actually reading the text on the screen. To guarantee that children read the stories, interactivity was used to assess their comprehension of the different story events. Most story pages required the children to set the scene according to the text (refer to *mise-en-scène* explanation in Section 2.6.2). In other story pages, the children were expected to perform easier actions such as tap the trees to find hiding thieves mentioned in the story, or to move a slider to change the time of day from day to night. All of the interactive mechanisms were implemented to encourage children to read the text before playing with the scene. Although some were less complicated than the scene-setting mechanics and required less time to be completed, to potentially increase engagement and lessen the boredom of children while reading the stories.

Implementing *mise-en-scène* as the interactive technique in *Trees of Tales* allowed children to build the visual scene of the story pages. Each page contained a menu of character images, objects or emotions that children were able to open, navigate and drag into the scene. Children were asked to set the scene and manage several actions in the story, such as selecting and positioning the relevant pose of the character on the scene and adjusting the emotional state of the characters in correspondence with the text. Children needed to examine the text for clues on how to assemble the scene, and had to drop the character objects into appropriate positions such as characters walking on the ground. To facilitate this placement logic, the story canvas was divided into spaces for the sky and for the ground. This meant that children could not drop characters, houses or trees into the sky, and could not drop the sun, clouds, or the stars on the ground.

Only if the scene was set in accordance with the text could the child progress to the next page. To facilitate this, a ‘next’ button was included to provide the children with feedback on the current state of the scene. Only if all the elements in the story were placed correctly on the scene would the ‘next’ button change from red to green colour, indicating that the button could be pressed to advance in the story. In *Trees of Tales*, the ‘next’ button existed on every page of each story.
Feedback was provided to the child when their choice of action was wrong. For example, character elements could only be placed on the ground part of the scene. Therefore, if a character was moved from the ground and placed in the sky, the character would return to its previous position on the ground. The application evaluated the scene creation that the children assembled through program coding that connected the text with the scene elements and the appropriate position on the scene. If the scene was set in accordance with the text, the next page of the story would unlock via the green ‘next’ button.

In addition to the mise-en-scène capabilities, the application also allowed children to create and produce several unique stories from the existing scene material. This functionality helped to maintain the interest of the young readers even after they had read all the base stories, and ensured that there were new reading resources for children throughout the application. The more stories the children created, the more branches that appeared in the character’s tree and the bigger the tree grew. Figure 4.7 below provides examples of the tree pages of different characters at various stages.
The final prototype of *Trees of Tales* contains three main characters that can be selected, and each character has its own tree with two stories. Future developments of this prototype could involve adding more characters to provide children with more options that suit their interests. Such diversity in the interactive story elements has been recognised as providing children with more motivation to read about topics and characters that interest them directly (Kellaghan et al., 1996). In *Trees of Tales*, each character’s tree page consists of two base stories that hang in the tree in the form of branches, which can be selected by the child. The child also has the option to create a new story in the tree. In the research experiment involving *Trees of Tales*, new stories that were created by the children were saved as branches in the tree in addition to the base stories. At all times, children could return to the tree page where they could select another character with stories to read and create. It was deemed important to include additional character stories, to avoid children getting bored or quitting the reading. Moreover, if a child was not able to advance in a story or complete it, they could then go back and select a new story to read.

4.3.2 VISUAL DESIGN

The visual design used in the *Trees of Tales* application was carefully studied and based on Hourcade’s (2008) basic principles of interaction design for children.
including different aspects of the visual design elements such as the icons. Hourcade (2008) guidelines specify that “icons for children should be designed so they represent actions or objects in a recognisable manner, are easily distinguishable from each other, can be recognised as interactive elements and separate from the background” (p. 39).

4.3.2.1 Tree design

Each character in *Trees of Tales* had a tree with two branches of base stories. Additionally, the children had the ability to create more stories that would appear as branches in the tree. The main purpose of the tree was to provide a motivation for children to create new stories by themselves. That is if the children wanted their trees to grow, they needed to create more stories. Additionally, the trees provided space to save the stories and for children to access them easily. The growing tree provided a sense of play and competition to the children, as it was rewarding to see and compare their growing tree with other friends and siblings. Furthermore, it was important for the design to be extendable in the future, to create a way to add more stories to the two base stories. In this case, the tree model was useful as it allowed an easy way to add stories.

Several iterations in the design of the characters’ trees occurred during the concept design process. A basic tree design with three branches was first used – two for the base stories and one for creating a new story. The rationale was that when children created new stories, the new story branch would grow taller and new branches would appear next to the new story branch. However, this initial tree design created issues in the design, as the only a branch that was going to grow was the new story branch, which caused the tree to grow awkwardly – it looked unbalanced and did not support future additions of more base stories (see Figure 4.8(a) below). There was therefore a need to design a new tree with the ability to hold more stories.

The second design of the tree featured more branches from which the child could read and create new stories. The branches with open books indicated that there were stories to be read; the branches with closed books indicated they were empty. The child could click on the closed books, and after creating the story the book would open. A problem that was recognised in this updated design was that the children were limited
in the number of stories they could create, depending on the number of branches that held closed books. However, if the application had more branches with closed books, the tree would be too crowded and the design would be too complicated for the children (see Figure 4.8(b)). It was therefore decided that a new design for the tree was required that would grow when new stories were created and still appear balanced and pleasant for the children to look at.

The third and final design for the tree represented the base stories in regular green branches. The creation of new stories occurred when a child selected the hole in the middle of the tree. After the child created a story, a new branch with a bright colour would appear in the tree and the tree would grow vertically. There was no limit to the number of stories the child could create, as the tree could grow infinitely. To be able to see the branches, the child could scroll up and down and select any branch to read its story. This design supported future additions of more base stories through the addition of more branches. It also produced a more stable looking tree and a fun technique to navigate through the stories. Figure 4.8(c) below illustrates this final iteration of the tree design. Additionally, Figure 4.9 below illustrates the growing phases of the final design of the tree.

Figure 4.8: Three iterations for the design of the characters’ trees
4.3.2.2 Characters and stories

There are three main characters in *Trees of Tales*: Ahmed the Fisherman, Joha, and Awaisha. Joha is the most well-known of these three characters in the Arab world – there are many adult books and children’s storybooks written in Arabic (and some translated to English) of his stories and jokes (Sorenson, Khadra, Tingley, & Jayyusi, 2007). In contrast, Awaisha and Ahmed the Fisherman are characters specific to Omani folktales – they have not been published in books, although some of their stories have been documented in online forums13. Awaisha is sometimes a young lady and sometimes a teenage girl that suffers from her stepmother or from a torment caused by witch nearby their house. Ahmed is a poor fisherman who sometimes gets lucky but loses everything as a result of his bad behaviour.

The researcher’s mother provided these characters’ stories and folktales. She narrated them over the phone to create the six stories for the *Trees of Tales* reading application. Joha’s first story was about the two thieves that tricked him to steal the new donkey he just bought from the market. The second story related to what Joha and his son encountered on the way to the market with their donkey. When Joha got on the donkey people talked about him, and when he walked and let his son ride the donkey, people still gossiped about him. People continued to talk in spite of what Joha did and at the end, he told his son to ignore what people say and to always do what makes one happy.

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13 http://avb.s-oman.net
The fisherman’s first story was about him fishing and catching a mermaid who pleaded with him to let her go. She promised to give him golden coins every night if he did not tell anyone about her. He agreed and started to become rich but his wife forced him to tell her about the source of the money. From that night on, the mermaid stopped visiting. His second story related to his wife finding a diamond inside one of the fishes he caught and him trying to sell it. However, his greed and foolishness made him lose the diamond and he returned to his wife with nothing.

Awaisha’s first story was about her stepmother who asked her to collect wood from the forest following impossible terms. Awaisha found a nice man who helped her trick her stepmother and they got married and lived happily. Her second story concerned her neighbour, a witch who turned Awaisha into a dove. She was rescued by a prince who married her at the end of the story. The stories were edited and many unnecessary details were removed in consultation with a friend who works as an Arabic teacher in a primary school in Oman. The characters’ images for this reading application were designed based on the verbal descriptions of their personalities, and their clothing were inspired by the Omani culture from which they originate.

4.3.2.3 User interface

The initial design of the story page layout divided the screen into four sections. The upper left section contained the story scene and the text. The main menu was located to the right and consisted of icons for characters, animals, objects and other items necessary to set the scene. The lower left section contained an empty space that could only be filled with objects of each menu item when a button was selected from the main menu. For example, if the child selected the character icon in the upper right menu, a menu with characters that could be placed on the scene would appear at the bottom of the screen. The lower right side of the screen contained a ‘next’ button, which children could press if they wanted to go to the next page. Figure 4.10 below represents this first iterative design of the interface of the story pages.
When the first story of Joha was ready to be tested, an informal reflection was performed by the researcher, involving her own children (aged five and nine years) to obtain their spontaneous impressions. Both children appeared to love both the character and the story – both laughed as they read it, and both particularly enjoyed the scene-setting aspect of dragging and dropping characters. In particular, the five-year-old boy enjoyed the interactivity of scaling the images, including making them as big as the screen or as small as their fingertips.

However during these observations it was realised that the interface was flawed with regard to the location of the menu icons and the location of the objects that each menu included. The children were selecting the icons of the main menu, but did not notice the new items in the lower part of the screen. According to Hourcade (2008), “high visual complexity can overwhelm any user, let alone children who cannot process visual information as quickly as adults” (p. 40). Therefore, it was decided that the navigation of the menu structures in the story page layout needed to made easier and clearer. Furthermore, placing the main menu icons separately in a box to the right of the screen and the second hierarchies of the menus in a box at the bottom of the screen reduced the space needed for the actual story and play. This made the text font small and limited the space for children to play with the scene. Hence, there was a need to increase the scene space and incorporate the menu items within it in ways that would not affect the scene or the text.

Despite the use of large icons, the researcher’s children still had difficulties in
selecting the icons with their fingers. In some parts, it was not easy for the children to recognise what the icons meant, such as the ‘cloud’ icon which represented setting the climate, and the ‘treble clef’ icon which represented setting the mood for the character. The menu layout was confusing to children and delayed their interaction time with the story. This minor reflection led to major changes of the interface and menu design in *Trees of Tales*.

The revamped interface of the story pages provided more space for the scenes, and the menu was designed to be more apparent. In addition, the menu items including the back button, home button and restart button were all contained in a yellow box in the lower part of the screen. This box could be dragged upward using the up and down arrows, so the children could click on the menu icons and view more options. Visual items such as the icons and menu were simpler, more consistent and easier to distinguish after the updates to the interface. The objects inside every menu were also shown in the space below the menu icons. Additionally, the colour of the menu icons’ border changed from black to white to indicate that a particular item had been pressed. The screenshots in Figure 4.11 below show the updated design including the interactive techniques from the first page of the ‘Joha and the thieves’ story.

![Screenhots](image)

a) The first page of ‘Joha and the thieves’ story before interaction
b) The child selects the menu icon to drag objects to the scene in accordance with the story.

c) The minimum objects (1) to be dragged into the scene, so the ‘next’ button (2) turns green.
Figure 4.11: Screenshots from ‘Joha and the thieves’ in Trees of Tales

Once these updates to the user interface had been made, the researcher once again informally observed their children reading and interacting with the story. They indicated that they liked this design better, and once again enjoyed the dragging, scaling and building of the scene with the different options available to them. It now appeared clear to them when the scene was completed, with greater understanding of when they needed to press the ‘next’ button. However, the page loading time seemed to frustrate them – they continually pressed the ‘next’ button for about three or four seconds before the page changed. While this indicated that more work on the application’s performance was necessary, the interface design was deemed suitable and was used across all of the stories.

4.4 THE CRITIQUING PHASE

The design process of Trees of Tales underwent several iterations from the concept design to the characters, stories, and layout design. While other issues were not identified until the experiment process, some flaws were identified from the initial phases and were resolved. This section outlines how the final design meets the guiding principles identified in the ideating phase. Additionally, it summaries the reflections of aspects and issues associated with the design of Trees of Tales from
which future designers of children reading application can learn.

The ideating phase of designing *Trees of Tales* started by collecting a set of design principles to be followed in the iterative phase. The first design principle was that stories should be of cultural relevance. This was achieved in *Trees of Tales* by selecting stories based on Omani folktales told across the generations. The second design principle was that the interface and navigation design should be child-friendly. The interface of *Trees of Tales* and menu design in the story pages were based on a simple design and an easy navigation system. The third design principle was that interactivity should support comprehension and not distract from reading. Interactivity in the story pages of *Trees of Tales* is related to the storyline, such as the scene-setting game mechanic that is based on text found on each page. The fourth design principle was that children should be able to freely select from a collection of topics. Providing a number of different stories in the application with the ability to introduce more stories easily in the future supports this principle. However, it is essential to mention here that testing the design principles was not the objective of this research and therefore it was not part of the evaluation process of *Trees of Tales*.

One major design alteration was the concept design, which was made simpler by removing the social networking feature from the original plan. Originally, *Trees of Tales* was planned as a social experience where children can read, create, and share their stories with friends and family. However, due to time and budget limitations, this option was removed and the only remaining sharing practice was the sharing of the iPad itself. This stemmed from a lack of knowledge on the effects of adding such features to children’s reading experiences.

One notable concern pertaining to the design of the main page of the application was that the reader was not provided with enough background information to help them select the appropriate character. This sometimes caused the children in the experiment to hesitate before selecting a character to read. The children then had to proceed to the character’s page to find information about the character, such as their name. It was initially thought that the visual appearances of the characters in *Trees of Tales* were well-known in the Omani culture. However, some of the children who used the
application did not recognise the characters despite the often-detailed descriptions in the Omani folktales. The next update of Trees of Tales will address these issues by providing more information about each character including their names and the titles of the stories.

On the other hand, the visual design such as the illustrations, compositions, and interaction design was successful to entice children to use the application. Although the interaction techniques in Trees of Tales are similar to sticker books and pop-up books in creating elements of the scene, Trees of Tales delivers better user experiences by providing more control to the user and giving children the option to rebuild the scene every time they restart the page. Children would enjoy the ability to drag the story elements and control their sizes and locations. In addition, adding animation and sound effects to the story elements that children drag could increase the fun in the reading.

The improvements to aspects such as visual communications from first to second iteration worked well in Trees of Tales. The new design of the menu system made the reading experience more user friendly. User interface such as the characters’ trees was also a successful choice to encourage children to create stories in order to see their trees grow higher. However, this feature was not tested in the experiment, as its purpose was to encourage the making of new stories and not motivate reading existing stories in the app. Therefore, future improvements of Trees of Tales can link the growing trees to the reading of stories as an incentive to motivate reading.

Chapter 7 summarises these documented flaws and identifies more issues from the observation of the experiment. Additionally, useful recommendations for future designs of similar applications are provided in Chapter 7.

4.5 SUMMARY

The reading application Trees of Tales aimed to address the lack of reading for pleasure in Oman. This design was guided by a set of guidelines that were informed by the culture of Oman, as well as theories related to the SDT, intrinsic motivation for
reading, flow, and interactive design for children. The resultant design used a *mise-en-scène* game mechanic to drive the storytelling aspect of the application.

This chapter has provided details on how the iterative design process of *Trees of Tales* progressed. It detailed the development of the overall flow of the game and provided details on the development of the user interface. In particular, the user interface went through several iterations to minimise any potential complexity for young readers. Additionally, there was a need to address rapid actions and quick feedback that are common among children. Children are often less patient to wait for actions to appear, and may get frustrated when waiting for the next move to happen (Hourcade, 2008). In *Trees of Tales*, when children pressed the ‘next’ button, the next page did not appear instantly but took a few seconds to change. This loading time was due to the high resolution of images.

Moreover, according to Hourcade (2008), any actions in interaction designs for children should be incremental. This means less complex instructions should be provided first before the complexity can increase. However, the iterative design process revealed that this was not the case in the ‘Joha and the thieves’ story in *Trees of Tales*. It was observed that the first page required complex interactions for children to build a complicated scene, while subsequent pages in the story required more direct and less complex interactions. While this was avoided in the design of the other *Trees of Tales* stories, due to time constraints it was not resolved in ‘Joha and the thieves’.

These user interface issues, together with further findings that were identified during the user testing phase in Oman, are further discussed and documented in Chapter 7. It is envisaged that these overall findings and recommendations will assist other designers of interactive reading applications for both Omani and other Arab children.
CHAPTER 5

EXPERIMENT RESULTS

5.1 OVERVIEW

This chapter presents the results from the user test of *Trees of Tales* among 18 primary school children in Oman. These results are based on the analysis of a six-week user test that resulted in six surveys and 60 minutes of video material capturing three reading sessions. The six surveys are the Reading Behaviour Survey, the Changes in Reading Behaviour Survey, the ERAS, the intrinsic reading motivation scale IRMS, the Experience Survey, and the Fun Toolkit. The observation was performed during the three reading sessions conducted in the second, third and fourth weeks of the experiment.

Figure 5.1 below illustrates all of these data collection points that were used during this study. The colour coding distinguishes the observations performed during the weekly reading session, which was followed by measuring intrinsic motivation and user experiences during the next week.

**Figure 5.1: Experiment Procedure and data collection points**

This chapter is divided into three main sections. The first section contains the survey analysis and details the results of each quantitative data collection. The second section
provides the analysis of the video observations. The final section in this chapter summarises the results of the main findings of this study.

5.2 ANALYSING THE SURVEYS

5.2.1 THE READING BEHAVIOUR SURVEY

The intention of this survey was to obtain information regarding the at home reading activities within the families of each child who participated in the study. To establish this, opinion of the parents regarding pleasure reading and how they spend their free time at home was investigated. As provided in the appendices (Section 1.1), the Reading Behaviour Survey asked the parents the following eight questions:

**Question 1: How do you usually spend your free time?**

Parents were asked to select at least three of seven activities that they usually perform in their free time. This was a multiple response question where participants could choose more than one answer. The seven activities provided were indoor physical activities with the family, surfing the internet, watching TV, using their phone, reading books or magazines, and going out. The survey also provided an ‘other activities’ option that could be nominated by the parents. Table 5.1 below shows how often each response was selected among the 18 participants.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watching TV</td>
<td>15</td>
<td>83%</td>
</tr>
<tr>
<td>Indoor family activities</td>
<td>14</td>
<td>78%</td>
</tr>
<tr>
<td>Using my mobile phone</td>
<td>9</td>
<td>50%</td>
</tr>
<tr>
<td>Surfing the internet</td>
<td>7</td>
<td>39%</td>
</tr>
<tr>
<td>Reading books/magazines</td>
<td>2</td>
<td>11%</td>
</tr>
<tr>
<td>Going out</td>
<td>1</td>
<td>6%</td>
</tr>
<tr>
<td>Other activities</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 5.1: Distribution of answers to Question 1

As can be seen in Table 5.1, most of these Omani parents prefer to watch TV in their free time, followed by performing indoor family activities, using their mobile phone, and surfing the net. Only two participants nominated reading books or magazines as an activity they do when they have free time.

**Question 2: What are the reading tools that are available at home for your child?**
This was also a multiple response question where participants could choose more than one answer. The results in Table 5.2 below indicate that the main reading media available to Omani children at home are traditional printed books.

<table>
<thead>
<tr>
<th>Reading medium</th>
<th>Frequency of children with access</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional printed books</td>
<td>17</td>
<td>94%</td>
</tr>
<tr>
<td>Computer desktops</td>
<td>11</td>
<td>61%</td>
</tr>
<tr>
<td>Tablets</td>
<td>9</td>
<td>50%</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>11%</td>
</tr>
</tbody>
</table>

Table 5.2: Distribution of answers to Question 2

It should be noted that the question was not specific enough to allow distinctions between books with religious content, school textbooks and storybooks. However, the survey also identified that half of the children in the surveyed population have access to a tablet computer at home.

Questions 3 to 8

The remaining questions relate to reading for pleasure activities in the family, as presented in Table 5.3 below.

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>8</td>
<td>16</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 5.3: Distribution of answers to questions 3 to 8

Most parents indicated that they read for pleasure, value reading for pleasure, encourage their children to read for pleasure, and that they are purchasing books as gifts for their children. However, none of the surveyed parents have taken their children to public libraries.

5.2.2 THE CHANGES IN READING BEHAVIOUR SURVEY

When the student participants had returned the last reading intervention, their parents were provided with another survey in relation to observed reading behaviour. In this
survey, parents were asked to provide information regarding the changes they had noticed in their children’s reading behaviour after the six-week experiment. This survey focused on the reading behaviour of the children at home after providing access to reading, and the influence of the three reading interventions. Answers were collected one week later. The survey is attached in the appendices (Section 1.2).

Questions 1 to 4
Questions 1 to 4 and the corresponding frequencies of answers from parents are summarised in Table 5.4 below.

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  During the study, did you read the stories that your child received?</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>2  During the study, did your child share the reading with other family members?</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>3  During the study, did your child ask you to buy him/her books?</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>4  During the study, did your child ask you to take him/her to a library?</td>
<td>6</td>
<td>12</td>
</tr>
</tbody>
</table>

Table 5.4: Distribution of answers to questions 1 to 4

The results in Table 5.4 indicate that most family members including parents had been involved in the reading that student participants took home. In addition, about one-third of the children were asking for additional reading materials and a visit to a public library.

Question 5 to 6
For each of these questions, the parents were able to choose more than one intervention. The frequencies that parents selected each reading intervention in response to questions 5 to 6 are illustrated in Table 5.5 below.

<table>
<thead>
<tr>
<th>Question</th>
<th>PB</th>
<th>EB</th>
<th>TT</th>
</tr>
</thead>
<tbody>
<tr>
<td>5  Which of the following interventions do you think your child enjoyed reading the most?</td>
<td>3</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>6  Which of the following interventions do you think is suitable for reading stories for your child?</td>
<td>9</td>
<td>0</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 5.5: Frequency of selections for each reading intervention

In both questions, the majority of parents selected *Trees of Tales* (TT) as the most suitable and enjoyable reading intervention. The most interesting finding from both questions is that the *Arabic Stories* e-book application (EB) was selected the least for enjoyment, and was never selected for suitability.
5.2.3 THE ERAS

The ERAS is a validated survey that measures children’s attitudes towards reading for pleasure and academic reading, using the cartoon character Garfield in four states of wellbeing (McKenna & Kear, 1990). These states represent a range of emotions, from ‘happiest’ to ‘very upset’ without any neutral state. In this study, only the recreational reading part of the survey was used, to assist in understanding the surveyed children’s attitudes towards reading for pleasure.

Students were given the survey in the first week of the experiment and again in the last week. The purpose of giving the students the survey twice is to compare any differences in the children’s attitudes towards reading before and after being exposed to the different reading interventions. The surveyed school children were asked to respond to each question by circling the Garfield character that was closest to their own feelings pertaining to reading based on the question. The children specified that they understood the questions and they all completed the survey in less than 10 minutes.

Figure 5.2 below displays one of the questions from the ERAS and depicts the various states of Garfield illustrations and their meaning. The full survey is attached in the appendices (Section 1.4).

Figure 5.2: Sample of ERAS questions

Scores were calculated by counting four points for each leftmost (happiest) Garfield circled, three points for each slightly smiling Garfield, two points for each mildly upset Garfield, and one point for each very upset (rightmost) Garfield. To compare the data from the pre- and post-experiment, a Wilcoxon signed rank test was performed. This Wilcoxon signed rank test revealed a statistically significant increase of positive attitude towards reading for pleasure following participation in this study:
\[ z = -3.442, \ p = .001. \] As illustrated in Figure 5.3, the median score on the ERAS increased from pre-experiment (MD = 35.5) to post-experiment (MD = 38).

![Figure 5.3: Boxplot for reading attitude scores](image)

This finding indicated that by encouraging these children to read for pleasure and providing access for reading in school and at home, their positive attitudes towards reading for pleasure had measurably increased, despite the relatively short timeframe of this study.

5.2.4 THE EXPERIENCE SURVEY

The Experience Survey was designed to explore the participants’ reading behaviour and their experiences while reading from the three interventions: the traditional printed books; the *Arabic Stories* e-book; and *Trees of Tales*. The survey was repeated three times, distributed each week after the participants returned their reading interventions. Out of the 18 student participants, only 10 completed all of the surveys. Below is more detail on this survey’s findings, based on the student participants’ reading experiences from week to week.

**Question 1: How much did you enjoy the reading from last week?**

Each time, participants had to rank their reading experience from (1) did not enjoy to (5) enjoyed it very much, by circling the smiley face that represented that ranking. Table 5.6 below provides averages of the children’s reading enjoyment rankings across the three interventions.
Question 1: Enjoyment of reading experience (ranking out of 5)

<table>
<thead>
<tr>
<th></th>
<th>PB</th>
<th>EB</th>
<th>TT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.7</td>
<td>4.9</td>
<td>4.9</td>
</tr>
<tr>
<td>Median</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>0.62</td>
<td>0.24</td>
<td>0.27</td>
</tr>
</tbody>
</table>

Table 5.6: Mean, median and standard deviation scores for reading enjoyment

A Friedman test revealed no statistical significant differences between each of the three reading interventions, based on the children’s average level of enjoyment rankings: $x^2 = 2.00, p > 0.05$.

**Question 2: Did you share last week’s reading with anyone?**

Participants had to choose ‘yes’ or ‘no’ in response to this question about sharing their reading intervention. Table 5.7 shows the frequency of participants that had shared each of the three reading interventions.

<table>
<thead>
<tr>
<th>Question</th>
<th>PB</th>
<th>EB</th>
<th>TT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharing of reading intervention (‘yes’ frequency)</td>
<td>5</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 5.7: Number of shared reading interventions

As shown in Table 5.7, *Trees of Tales* (TT) and the e-book *Arabic Stories* (EB) were similar in regard to the number of children that shared each reading intervention. Traditional printed books (PB) were shared less often.

**Question 3: How frequently did you read over the weekend?**

The participants were asked to estimate the amount of times they went back and read from the same reading intervention over the weekend. The answers ranged in a scale from zero to five times. Table 5.8 below provides averages of the children’s reading of last week’s reading intervention.

<table>
<thead>
<tr>
<th>Question</th>
<th>PB</th>
<th>EB</th>
<th>TT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading frequency</td>
<td>Mean</td>
<td>2.5</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>1.16</td>
<td>0.79</td>
</tr>
</tbody>
</table>

Table 5.8: Mean, median and standard deviation scores for reading frequency
A Friedman test revealed a statistical significant difference between reading interventions with regard to the frequency of the children reading them over the weekend: $p < 0.05$. A further Wilcoxon test revealed that the frequency that the children read from the traditional printed books (PB) was significantly less than the frequency they read from *Trees of Tales* (TT) and *Arabic Stories* basic e-book (EB) were $p = 0.025$. However, it was also noted in the above tabled results that the standard deviation for the frequency that the children read from the traditional printed books (TB) was higher than for both the *Trees of Tales* (TT) and *Arabic Stories* (EB) applications. This indicates that there was less agreement among the children on how many times they read from the traditional printed books, which should also be factored in.

### 5.2.5 THE IRMS

The objective of using this questionnaire was to measure the level of intrinsic motivation that the participants had towards reading for pleasure after reading from each intervention (appendices section 1.3). The children in this study were asked to complete the IRMS on the day they returned each of their reading interventions, which was performed in weeks three, four and five. In total, every child in this study completed the survey three times across three separate weeks after returning the traditional printed books, iPad *Arabic Stories* app, and *Trees of Tales* app. Scores were calculated by counting four points for each leftmost (happiest) Garfield circled, three points for each slightly smiling Garfield, two points for each mildly upset Garfield, and one point for each very upset (rightmost) Garfield. The survey scores were entered into SPSS for each participant, to derive at descriptive statistics for the sample population. Table 5.9 below shows the mean IRMS results based on the three reading interventions.

<table>
<thead>
<tr>
<th>Intrinsic motivation after reading</th>
<th>n=</th>
<th>Range</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>traditional printed books</td>
<td>18</td>
<td>5.00</td>
<td>34.50</td>
<td>35.0</td>
<td>1.65387</td>
</tr>
<tr>
<td>basic e-books – <em>Arabic Stories</em></td>
<td>18</td>
<td>4.00</td>
<td>34.50</td>
<td>35.0</td>
<td>1.61791</td>
</tr>
<tr>
<td><em>Trees of Tales</em> application</td>
<td>18</td>
<td>4.00</td>
<td>34.83</td>
<td>35.5</td>
<td>1.46528</td>
</tr>
</tbody>
</table>

**Table 5.9: Mean, median and standard deviation values for IRMS**
The results in Table 5.9 show that the resulting mean for the IRMS after participants read from each of the three interventions were very similar. Most student participants were intrinsically motivated to read for pleasure regardless of the medium they used. While no statistical significance differences in intrinsic motivation were found via a Friedman test, the boxplot in Figure 5.4 below shows a slightly higher median and smaller standard deviation for the Trees of Tales reading intervention, while the results for the other interventions are practically identical.

![Boxplot chart for IRMS after reading from each intervention](image)

Figure 5.4: Boxplot chart for IRMS after reading from each intervention

These findings show that children in this study are highly intrinsically motivated to read for pleasure from a younger age irrespective of the reading intervention. However, the median of the intrinsic motivation score was slightly higher after reading from Trees of Tales than for the other two reading interventions.

Other researchers have found that girls on average have higher reading motivation than boys (Baker & Wigfield, 1999; Marinak & Gambrell, 2010; Wigfield & Guthrie, 1997). When comparing genders based on this study’s scores obtained across the three IRMS surveys, interesting results were found, as shown in Figure 5.5 below. For example, the scores for the male students were mostly concentrated around the same range for the three reading interventions – the only noticeable difference was that the median score of intrinsic motivation after reading from the printed books was slightly higher than after reading from both iPad applications. These results indicate that the
format of the reading intervention has little influence on the intrinsic motivation for reading among boys. In contrast, females scored lower on intrinsic motivation than the males after reading from the printed books and the basic e-book. Yet the median score for females’ intrinsic motivation was higher than for males after reading from *Trees of Tales*. The males’ intrinsic reading motivation was higher than the females when they read from the basic e-book stories and the printed storybooks.

![Boxplot chart for IRMS after reading from each intervention, by gender](image)

**Figure 5.5: Boxplot chart for IRMS after reading from each intervention, by gender**

Furthermore, the effects of using different reading formats on intrinsic reading motivation in correlation with reading skills was also investigated, to compare the reading abilities of the participants and their intrinsic reading motivation scores after each reading intervention. In these results, the participants with higher reading abilities scored higher in regards to the intrinsic reading motivation than those with lower or average reading abilities. Moreover, reading from *Trees of Tales* did not seem to further impact on the intrinsic motivation of high- or low-performing participants than the other reading formats. Figure 5.6 below shows the level of intrinsic motivation based on correlations between reading skills and reading formats.
Figure 5.6: Boxplot chart for IRMS after reading from each intervention, by reading skills

5.2.6 THE FUN TOOLKIT

In week six, the researcher conducted an activity to assess the children’s experiences with the three reading interventions they used during the experiment. A Fun Toolkit (Read, 2008) was used for this final evaluation. The Fun Sorter component of the Fun Toolkit required the children to rank the three interventions in order of preference based on three criteria: (1) fun; (2) ease of use; and (3) best content. In the again-and-again component, students were asked to specify which one of the three tools they would choose to read from again, and which one they thought their parents would choose for them. This involved giving each child a form to fill in that contains a table and spaces for each question. To answer the questions, the children used the provided stickers depicting the different tools and stuck them in the suitable space. Figure 5.7 below illustrates how the activity was performed in the school library, and a copy of the Fun Toolkit activity is attached in the appendices (Section 1.5).
The children were asked to rank the three interventions based on each of the criteria by sticking the three stickers into the spaces on the form in the appropriate order. All of the children did this successfully after a brief explanation. Most of them ranked the tools differently for each criterion, indicating they were able to distinguish between the criteria.

5.2.6.1 Analysing the Fun Sorter

The Fun Sorter was used to assess which reading tool the children liked the most, which one they found the easiest to read, and which one contained the best stories. The Fun Sorter forms completed by the children were ranked in an ordinal manner of 1–3 for each of the criteria – fun, ease of use, and best content – where 3 represented ‘most fun’ and 1 ‘least fun’. The last statement in the Fun Sorter (‘I would choose to read from …’) was counted according to how many children chose that intervention. Table 5.10 below provides a summary of the answers in relation to the Fun Sorter criteria and final statement.

<table>
<thead>
<tr>
<th>Measure</th>
<th>TT</th>
<th>EB</th>
<th>PB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fun</td>
<td>11</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Ease of use</td>
<td>2</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>Best content</td>
<td>12</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Preference</td>
<td>13</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 5.10: Frequency each intervention was ranked first in the Fun Sorter

Friedman and Wilcoxon tests both revealed some statistically significant differences between the answers across the three interventions. *Trees of Tales* (TT) achieved the significantly highest ranking for best content and preference for reading. Although the difference between *Trees of Tales* (TT) and *Arabic Stories* (EB) on perceived fun was
not significant. In contrast, traditional printed books (PB) scored significantly lower on perceived fun, best content and preference for reading. However, there were no significant differences in relation to the children’s ratings on ease of use across the three interventions. Table 5.11 below shows the median children’s ranking scores, and chi-square and significance values for each intervention.

<table>
<thead>
<tr>
<th>Measure</th>
<th>TT</th>
<th>EB</th>
<th>PB</th>
<th>$\chi^2$</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fun</td>
<td>3.0</td>
<td>2.0</td>
<td>1.0</td>
<td>22.33</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Ease of use</td>
<td>2.0</td>
<td>3.0</td>
<td>2.0</td>
<td>4.11</td>
<td>0.128</td>
</tr>
<tr>
<td>Best content</td>
<td>3.0</td>
<td>2.0</td>
<td>1.0</td>
<td>20.81</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Preference</td>
<td>1.0</td>
<td>0.0</td>
<td>0.0</td>
<td>14.33</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Table 5.11: Median, chi-square and significance values of children’s rankings

5.2.6.2 Analysing the again-and-again table

It was perceived as easy for the students to complete the again-and-again table task. There was one question on the top of the page: Do you want to read from the following again? For each of the three reading interventions, the students had to answer ‘yes’, ‘maybe’ or ‘no’, and had the option to select the same answer for more than one intervention. For example, some students chose to answer ‘maybe’ for both reading from printed books and from Trees of Tales. Table 5.12 illustrates the frequencies of answers among the 18 students based on the again-and-again table.

<table>
<thead>
<tr>
<th>Answers</th>
<th>PB</th>
<th>EB</th>
<th>TT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>0</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Maybe</td>
<td>5</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>No</td>
<td>13</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 5.12: Frequencies of answers to reading the interventions again

It is interesting that the number that answered ‘yes’ is equal for Trees of Tales (TT) and the other more basic e-book stories Arabic Stories (EB). Although the main difference between these two similar reading applications is that Trees of Tales had one more answer for ‘maybe’ and zero answers for ‘no’.

5.3 ANALYSING THE OBSERVATIONS

Guthrie et al. (1998) considered reading motivation and reading engagement to be interchangeable terms. Although Baker and Wigfield (1999) differentiated research on motivation theory from research using the more integrated concept of engagement, which exhibits the interactions of cognitive, motivational and social aspects of
In support of Turner (1992), Baker and Wigfield (1999) discovered that motivation is integral to reading engagement, as motivated readers engage more in reading and are more positive about reading. This indicates the powerful relationship between reading engagement and reading motivation – that is, when reading engagement exists, there is more chance of positive reading motivation.

Hence, the purpose of this study’s observation sessions and their analysis was to evaluate and compare the reading engagement rate and behaviour of the children while reading from the three interventions. Three observational sessions were conducted during 20 minutes of the school recess time of 25 minutes, in which 18 children participated throughout the experiment. In each session, every child read from a new reading intervention. Thus, by the end of the third observational session, all 18 children had read from each of the three reading interventions.

The observational sessions were conducted in the school library near the books section. It was a spacious area with tables and chairs, enough for 20 students. In each session, the children were divided into three groups consisting of six participants to distribute the reading interventions in a counter-balanced approach. Each group sat together at one table and read from the same reading intervention. Figure 5.8 below illustrates the structure of the reading observation sessions.

Figure 5.8: Participants in one of the reading observation sessions
Categorisation of reading engagement were based on on-task versus off-task time – that is, engaged versus disengaged. Further details of the coding framework of the two categories are provided in Table 5.13 below.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engaged</td>
<td>When the participant is looking at the reading material</td>
<td>Reading, focused, engaged, looking at book, looking at iPad screen</td>
</tr>
<tr>
<td>Disengaged</td>
<td>When the participant is not looking at the reading material</td>
<td>Talking to a friend, talking to the researcher, looking away, looking at a friend's material, moving, yawning, flipping pages very fast</td>
</tr>
</tbody>
</table>

**Table 5.13: Coding framework for content analysis of the reading observation sessions**

The first category essential for the analysis was ‘engaged’, which aims at describing the engagement rate of reading. The behaviour of those in the room was recorded as engaged only if the student observed was concentrating at the reading intervention for a complete interval of 12 seconds. It was not recorded this way if the student was yawning, touching the screen too many times, obviously distracted, or flipping the pages very fast. Engaged students were the ones that looked engaged and peacefully read throughout the whole interval (Marks, 2000).

The second category in this analysis was ‘disengaged’, which was used to describe the behaviour of the student if they were distracted from the reading during an interval. That is, the behaviour was recorded as disengaged if at any time during the 12-second interval the student looked away from the reading, talked, moved, yawned, flipped pages quickly, or touched the screen consistently. Disengaged students in an interval of time are the ones that are most likely to get distracted at any time during the interval.

### 5.3.1 QUANTITATIVE ANALYSIS

As this study was concerned with the engagement rate of each child and its relationship to the reading intervention, it was necessary to compare the intervals coded as engaged out of the 25 observed intervals for each student. This provided an insight into which reading intervention was more engaging for each of the children. Table 5.14 below presents the total number of intervals that were recorded as engaged for each student during the three reading sessions.
In Table 5.14, the highest engaged intervals for each child are highlighted in green, and the lowest are highlighted in red. The results show that the highest number of engaged intervals for all of the boys was while reading the Arabic Stories e-book app (EB). While for the girls it was the Trees of Tales (TT) session that recorded the highest reading engagement. Quantitative analysis of these results indicates that male children are more likely to engage with basic e-book applications, while girls are more often engaged when reading from more complex and interactive applications.

Table 5.15 below shows that the mean value based on each student’s engaged interval was slightly higher for Trees of Tales (TT) than for Arabic Stories (EB), and significantly higher than for printed books (PB). In contrast, the median value for Arabic Stories (EB) based on engaged intervals was higher than both Trees of Tales (TT) and printed books (PB). Furthermore, the standard deviation for Trees of Tales (TT) was smaller than for both Arabic Stories (EB) and printed books (PB), which indicates there were more discrepancies in the children’s engagement rates during Arabic Stories and printed book sessions.

<table>
<thead>
<tr>
<th>Name</th>
<th>TT</th>
<th>EB</th>
<th>PB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boy A</td>
<td>20</td>
<td>22</td>
<td>14</td>
</tr>
<tr>
<td>Boy B</td>
<td>14</td>
<td>19</td>
<td>8</td>
</tr>
<tr>
<td>Boy C</td>
<td>17</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>Girl A</td>
<td>23</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>Girl B</td>
<td>15</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Girl C</td>
<td>12</td>
<td>9</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 5.14: Number of ‘engaged’ intervals out of the 25 observed

Table 5.15: Mean, median and standard deviation values for engaged intervals

<table>
<thead>
<tr>
<th></th>
<th>TT</th>
<th>EB</th>
<th>PB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>16.83</td>
<td>16</td>
<td>9.83</td>
</tr>
<tr>
<td>Median</td>
<td>16.0</td>
<td>17.5</td>
<td>11.0</td>
</tr>
<tr>
<td>STD</td>
<td>4.07</td>
<td>4.97</td>
<td>6.34</td>
</tr>
</tbody>
</table>

5.3.2 QUALITATIVE ANALYSIS

In this study, the summative approach was deemed the most suitable qualitative content analysis approach, as it enables comparisons of behaviour in different reading situations and it needs interpretation of context. For each student, their reading
behaviour during the three reading sessions was noted and compared. The potential impact of the underlying environment of the reading experience was then interpreted in relation to individual behaviours, gender and academic performance. Details of each student’s reading behaviour can be found in the appendices (Section 4).

In the boys group, Boy A, who was an excellent and active student, appeared to be most comfortable while reading from the *Arabic Stories* application. The average and quiet student, Boy B, was not interested in reading from printed books, while *Trees of Tales* also appeared to be too challenging for him. He was observed to be calmer during his reading of the *Arabic Stories* application. In contrast, the reluctant and very quiet student, Boy C, was observed to engage similarly across the three reading sessions. Although it was difficult to obtain from his facial expression whether he was struggling with reading any of the three interventions.

The main distraction from reading among the three boys was talking to each other and mostly talking about the reading.

In regards to the girls, Girl A, who was an excellent student, was a very good reader who engaged with the reading material immediately and was less talkative during the *Trees of Tales* session. Girl B was also a good student, but she was over-active and moved a lot during the reading sessions. She refused to read from the printed books and chose to leave the room during that session. Despite her hyperactive behaviour, she was the quietest during the *Trees of Tales* session; and then during *Arabic Stories*, she asked to change the iPad to the one that had *Trees of Tales*, mentioning that it was more fun. The third student was Girl C, who was a low-performing student and was active at the same time. She did not show any interest in reading from any of the interventions, and was the least engaged with reading among all of the participants, girls and boys. She talked to her group members a lot and was the main source of distraction for them.

**5.4 SUMMARY**

To summarise the results of these surveys and observations, the main findings from each element are individually discussed below.
**The Reading Behaviour Survey**

Although Omani parents value reading for pleasure as an important activity, most of the families spend their free time watching TV. Printed books are the most available reading intervention for Omani children both at home and at school. About half of the participating children own tablet computers at home, and none of the participating children have been to a public library.

**The Changes in Reading Behaviour Survey**

Parents and families were generally involved in the reading that participants took home during the experiment. Children asked for more reading after they were given reading material to take home. There was support from parents for *Trees of Tales* and printed books, but not for the *Arabic Stories* e-book.

**The ERAS**

In general, the children who participated in this study had a positive attitude towards reading for pleasure. Their positive attitude increased significantly after providing them with access to reading both in school and at home.

**The Experience Survey**

Children enjoyed reading from all of the interventions that were given to them. However, printed books were shared the least in comparison with the other two reading interventions in which the iPad was used. The frequencies in which children read from *Trees of Tales* and *Arabic Stories* were significantly higher than with regard to reading from printed books.

**The IRMS**

Children in the sample were highly intrinsically motivated to read for pleasure regardless of the medium they used. Although the median intrinsic motivation score after reading from *Trees of Tales* was slightly higher than for both the *Arabic Stories* e-book and traditional printed books. The format of the reading material did not affect the intrinsic motivation for reading among the boys; but the median score for girls’ intrinsic motivation was higher after reading from *Trees of Tales* than the other two formats. These results showed that participants that already had higher reading abilities obtained higher intrinsic reading motivations than those with lower or average reading abilities.
The Fun Toolkit

*Trees of Tales* was ranked highest on both best content and preference for reading, while printed books were ranked lowest on perceived enjoyment, best content and preference for reading. The difference between *Trees of Tales* and *Arabic Stories* in terms of perceived enjoyment and ease of use was not significant.

The observations

Boys were more engaged when reading from the *Arabic Stories* app, while girls were more engaged when reading from *Trees of Tales*. Both boys and girls were least engaged when reading from printed books. The average-performing students engaged more with tablets than printed books; although low-performing students resisted reading across all three interventions. In contrast, active and outgoing students preferred interactivity to printed books, while the quieter students behaved and engaged in a similar manner across the three sessions.
CHAPTER 6

DISCUSSION

6.1 OVERVIEW

This chapter discusses the overall results of this research project, which examined the impact of three reading interventions on the reading behaviour and opinions of 18 Omani primary school children in regards to their user experience and intrinsic motivation to contribute to the development of a reading for pleasure habit among Omani families.

This discussion uses five lenses that relate to the children’s reading experiences and the constructs of reading motivation such as access to reading and intrinsic motivation that were discussed in the literature review (Chapter 2). They were also informed by the guidelines reported in Chapter 4 such as the importance of family sharing and designing user friendly and engaging interactive applications. First, the impact of reading from the three interventions on providing greater reading access to Omani children is discussed. Second, the impact of the interventions on sharing and participation of the family is discussed; while the third lens focuses on the impact of reading from the three interventions on the children’s intrinsic motivation. The fourth lens reviews the effects of the three interventions on the children’s engagement and user experience, and the final lens concentrates on the six observed children to illustrate relationships in order to compare the overall impact of the three reading interventions.

6.2 LENS 1: ACCESS TO READING

Access to reading material such as printed books and online readings is highly important to maintain the habit of reading for pleasure. According to Clark and Poulton (2011), young people that own books are twice as likely to say they enjoy reading compared with those that do not own books. Parent responses to the second question of this study’s Reading Behaviour Survey indicated that 94% of the
participating children have access to print books at home. However, it is not clear if these books are relevant for children or owned by them – they could be religious or schoolbooks that are not motivating for children, and may be not suitable for their age. Upon reflection, it is difficult to draw the conclusion that Omani children have access to appropriate children’s books at home, the question should have been clearer in regards to the types of books that are available for Omani children at home.

Another common way to provide access for children to read is via public libraries. Clark and Hawkins (2010) found that public library users are twice as likely to enjoy reading and hold a more positive attitude towards reading compared with non-users. Yet the results of this study’s Reading Behaviour Survey indicated that none of the participating children had been to a public library; although not surprising when there are only three public libraries in Oman and only one of them contains children’s books. Therefore, the access that Omani children have to reading resources is limited to bookshops or school libraries, which are not as motivating, as highlighted in the literature review. Hence, it is reasonable to surmise that Omani children lack access to adequate reading material. Therefore, it was assumed in this study that designing an age and culturally targeted reading app like Trees of Tales could have a significant impact on providing Omani children with more access to reading for pleasure.

Despite a lack of apparent reading materials, the results of this study show that Omani children are highly motivated and have a positive attitude towards reading for pleasure. As identified in the ERAS, the children’s positive attitudes increased significantly after providing access for reading in school and at home. Additionally, the results from this study’s Experience Survey highlighted that the children enjoyed reading from all of the reading interventions that were given to them. Furthermore, a comparison of the three IRMS measures provided evidence that regardless of the format the children read from, their intrinsic motivation scored highly for pleasure reading. High reading motivation for young children has also been recognised by previous research, which has found that while children at early ages are motivated to read, as their age increases their motivation starts to decline (Clark & Foster, 2005). This all indicates that Omani children between the ages of nine and ten have the motivation and the positive attitude towards reading for pleasure, but they are often deprived of access to the reading material. If this access is not provided from a young
age, younger children’s motivation and positive attitude towards reading is likely to have diminished, as they grow older.

The outcomes of this study’s IRMS and ERAS further indicate that Omani children are likely to improve their behaviour and attitude towards reading if they are provided with access to reading materials. It is this study’s finding that easy access to reading materials is a key prerequisite to motivating Omani children to establish reading for pleasure as a sustainable activity. This could be investigated further with a longitudinal experiment in which one group of children is provided access for reading for a long period of time and another group continues with the existing access situations to uncover any real long-term changes in the motivation and attitude towards reading as a result of providing access.

6.3 LENS 2: SHARING AND FAMILY PARTICIPATION

In this study, reading appeared to be the least favourite free time activity in Omani family homes. Instead of reading, most families preferred to engage in shared activities such as watching TV shows in the lounge room where all members of the family can join in. Although this is not necessarily a cultural factor, as similar findings have been identified among families surveyed in Western countries. For example, the US Bureau of Labor Statistics (BLS) released in its 2012 American Time Use Survey a statistic, which indicated that US parents spend far more time per day watching TV than reading or exercising (Kurtzleben, 2014). Finding time or choosing to read as a recreational activity may well be a global problem. Nevertheless, the average amount of time Arabs spend on reading per year is significantly lower than for Westerners (Al-Yacoub, 2012). Therefore, even though Arabs and Westerners are deemed similar in regards to their preference for watching TV over reading, many Westerners still read more than their Arab counterparts. This means that more Western children observe their parents read for pleasure than Arabic children.

Other research has indicated that when parents value reading, their children are more likely to become self-motivated to read (Baker, Scher, & Mackler, 1997; Baker, Serpell, & Sonnenschein, 1995). It was therefore positive to uncover from the Experience Survey part of this study that when the student participants were provided
with reading materials, they shared what they took home with their parents and siblings. This active involvement of the parents in the reading activities, as reported by Baker and Scher (2002), might have had a strong influence on the positive attitudes towards reading in general, and the significant gains in positive attitude after the study.

Shared reading has been acknowledged as important as it promotes reading motivation for children from an early age (Baker, Scher & Mackler, 1997). However, the results from this study’s Experience Survey also indicated that shared reading is more likely to occur if the reading material is provided on a tablet computer. The parents of this study’s participants also better supported the use of the interactive application. According to the parents, both Trees of Tales and the printed books were similarly suitable for their children to take home and read for pleasure. There could be several explanations for this finding, including that parents may have a prejudice against e-books. However, most of the parents also realised there is potential for interactive reading applications if they are designed correctly. The overriding question here is: How effective is the novelty of the device to motivate children and people in Oman to read more for pleasure? Interviewing children’s parents with semi-structured questions in relation to the effects of the device on reading for pleasure at home could provide increased chances of obtaining answers that clarify much of the result for this type of question. Similar questions may need to involve a longitudinal investigation that tracks behaviours associated with the use of the digital reading devices for a longer period of time.

In this study, parents and other family members appeared interested in reading the materials their children brought home from school. Research shows that the involvement of parents in their children’s reading activities at home has a significant positive influence on the children’s attitude and interest in reading (Rowe, 1991). This is therefore a significant finding, as Omani parents had not usually been involved in reading activities with their children, until the children started to bring their reading material home as part of this experiment. This indicates that if schools in Oman allow the children to take reading material home, the entire family is more likely to be engaged and support the child’s reading activities.
6.4 LENS 3: INTRINSIC MOTIVATION

As identified in the literature review, intrinsic motivation is a key driver for reading for pleasure (Cox & Guthrie, 2001; WANG & Guthrie, 2004). After analysing the IRMS results based on gender, it was found that the girls’ intrinsic reading motivation improved remarkably after reading from *Trees of Tales* when compared with the other reading interventions. This indicates that females are influenced to read more if the reading is playful and challenging. In contrast, the boys were more intrinsically motivated to read from printed books than from an electronic device. Previous research has commonly contended that females have in general a higher reading motivation compared with males (Baker & Wigfield, 1999; Marinak & Gambrell, 2010; McGeown et al., 2012; Wigfield & Guthrie, 1997). In this study, it was also found that the reading format influenced the intrinsic motivation differently based on gender. The girls’ intrinsic motivation was influenced more by the playful reading application, while the boys’ was stimulated slightly more from traditional printed books. The reasons behind these gender differences could be further investigated via follow-up interviews with the participants.

This study’s IRMS also indicated there is a relationship between intrinsic motivation and reading skills among children. That is, the children with higher reading abilities obtained similarly high intrinsic reading motivation scores after reading from the three interventions. This finding confirms previous research about the correlation between reading skills and motivation (McGeown et al., 2012; Unrau & Schlackman, 2006). Another more general finding was that the students with better reading skills had higher intrinsic reading motivation than those with lower reading skills. This means that children who can read well are more likely to be highly motivated to read irrespective of whether they use playful digital applications or traditional print books. These are critical findings that illustrate the importance of understanding the abilities and gender preferences of children before conducting experiments to study the effects of different interventions or treatments.

Furthermore, previous literature has pointed to the relationship between higher reading frequency and intrinsic motivation for reading among children. It has been
suggested that children tend to read more frequently when their intrinsic motivation for reading is high (Guthrie, Wigfield, Metsala, & Cox, 1999; Wigfield & Guthrie, 1997). Based on this study’s Experience Survey, the frequency of which the children read from the *Trees of Tales* and *Arabic Stories* at home was higher than for the traditionally printed books. Therefore, reading from a tablet computer was associated with a higher positive intrinsic motivation than reading from printed books, which implies that e-book designers that are targeting children should investigate interactivity techniques that improve the reading frequency to support higher intrinsic reading motivation. Again, this result may be influenced by the novelty of the device which may not last if the novelty wears off, which requires a longitudinal study in the future to clarify this.

Additionally, the Fun Toolkit illustrated that children found *Trees of Tales* the most enjoyable reading experience out of the three interventions tested. This could be due to the playful and interactive elements in the application that encourage children to build the scene of the stories in a playful sense. The results from the Fun toolkit indicated that children found the stories in *Trees of Tales* more interesting than the stories in the other interventions.

It is noteworthy to point here that the stories in *Trees of Tales* were carefully selected from traditional folktales in Oman, whereas the printed books were selected from the school library. Hence, providing the children with stories and characters that relate to their culture may have made it more interesting for them to read. This finding supports the view that interest is a factor of intrinsic motivation for reading (Wigfield & Guthrie, 2000). It is also worth mentioning here that interest and enjoyment are the key influencers of the intrinsic regulation of self-determined behaviour (Ryan & Deci, 2000). This proves that *Trees of Tales* was successful at enhancing the internal factors of the children’s reading behaviour.

The discussion in this section suggests that *Trees of Tales* has provided a worthy example of what interactive stories should be like for children in Oman and other Arab countries. It is a suitable balance in terms of its use as a didactic tool and its ability to engage and entertain small children. It is also a good example of using playfulness, in that it provides rewards on every page by completing the scene via
sound effects and unlocking new pages in the story that gets the readers going and interested. This use of balanced interactivity and playfulness helps to form habits that result in more intrinsic motivation for reading.

6.5 LENS 4: EASE OF USE AND ENGAGEMENT

Based on the Fun Toolkit phase of this study, Trees of Tales showed a lower score in relation to its ease of use when compared with the other interventions. This may be due to the playful interactivity in Trees of Tales, which requires the child to do more than just flip the pages. Although Trees of Tales could be simplified further, it would no doubt still be more complex to use, as the other two interventions do not require much interactivity at all. It is therefore predicted that the ease of use would not significantly improve for Trees of Tales. However, despite the participants’ perceptions of its ease of use, Trees of Tales was still rated the most enjoyable reading intervention and most preferred to be read again. This indicates that the challenges in the interactivity of Trees of Tales were appropriately balanced against the abilities of the children, as they still wanted to use it again. Although it is recognised from these findings that children should be given the choice to select the level of challenge in the reading interactivity, dependent on their reading abilities and challenge preferences. It also therefore concluded here that more children will be able to engage with reading for a longer period of time if they are able to choose the challenge that suits their skills (Csikszentmihalyi, 1990).

Wigfield and Guthrie (2000) believed that engagement in reading increases the amount of positive reading outcomes such as achievement, knowledge and practices. The observations of six of the children in three different reading sessions provided insights on how the individuals engaged with each reading intervention, and indicated that while the girls had higher engagement scores when reading from Trees of Tales, the boys scored better when reading from the e-book. The results also showed that the printed books achieved the least engagement scores for both genders.

Although it was also observed in these sessions that the boys did not have as many issues with reading from the printed books as the girls did. For instance, Girl B refused to read from the printed books and instead chose to move around the room without reading. This behaviour could indicate that the girl was not sufficiently
challenged by the printed material. Although Girl B’s average reading skills also suggested that the challenge provided in *Trees of Tales* was more stimulating for her, and that it may have created a flow experience for her in particular. These individualised observations determine that designers need to treat interactive stories like games and provide different challenge levels for different users. In relation to gender differences, such customisation would mean that males could choose easier interactive challenges, while females could select more challenging options in the stories. This is a concept that is well-understood in game design, but is something relatively new in relation to the design of interactive reading experiences.

**6.6 LENS 5: CONNECTING THE FINDINGS**

To better define the overall results, the findings from the surveys for the six students observed in the reading sessions were focused on. Table 6.1 below illustrates these results in relation to observations (observed engagement rate), the Fun Toolkit (children’s reported enjoyment, best stories, and preference for reading), and the IRMS scores for the six students. The green-coloured cells represent highest values for *Trees of Tales* (TT), orange-coloured cells represent highest values for *Arabic Stories* (EB), and purple-coloured cells represent highest values for printed books (PB).
<table>
<thead>
<tr>
<th></th>
<th>PB</th>
<th>EB</th>
<th>TT</th>
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<tbody>
<tr>
<td><strong>Girl A</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Observed engagement</td>
<td>17</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>Reported enjoyment</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Best stories</td>
<td>1</td>
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<tr>
<td>Preference</td>
<td>0</td>
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<td>1</td>
</tr>
<tr>
<td>IRMS</td>
<td>35</td>
<td>36</td>
<td>36</td>
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<tr>
<td><strong>Girl B</strong></td>
<td></td>
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<tr>
<td>Observed engagement</td>
<td>0</td>
<td>11</td>
<td>15</td>
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<tr>
<td>Reported enjoyment</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Best stories</td>
<td>1</td>
<td>3</td>
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<tr>
<td>Preference</td>
<td>0</td>
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<tr>
<td>IRMS</td>
<td>31</td>
<td>32</td>
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<tr>
<td><strong>Girl C</strong></td>
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<td></td>
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<tr>
<td>Observed engagement</td>
<td>6</td>
<td>9</td>
<td>12</td>
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<tr>
<td>Reported enjoyment</td>
<td>1</td>
<td>3</td>
<td>2</td>
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<td>Best stories</td>
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<tr>
<td>Preference</td>
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<td>IRMS</td>
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<tr>
<td><strong>Boy A</strong></td>
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<tr>
<td>Observed engagement</td>
<td>14</td>
<td>22</td>
<td>20</td>
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<tr>
<td>Reported enjoyment</td>
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<td>3</td>
<td>2</td>
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<tr>
<td>Best stories</td>
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<td>Preference</td>
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<td>IRMS</td>
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<td><strong>Boy B</strong></td>
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<td>Observed engagement</td>
<td>8</td>
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<td>14</td>
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<tr>
<td>Reported enjoyment</td>
<td>1</td>
<td>3</td>
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<tr>
<td>Best stories</td>
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<td><strong>Boy C</strong></td>
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<td>Best stories</td>
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<tr>
<td>IRMS</td>
<td>36</td>
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</tbody>
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Table 6.1: Connecting the findings for the six observed participants

As shown in Table 6.1, none of the children voted the printed book stories as the best stories, none of them preferred to read from these books again, and the observed engagement with these books was the lowest of all reading interventions. Overall, five of the six participants had engagement scores that related to their reported enjoyment. There also appeared to be a relationship between their highest observed engagement...
score, and their highest IRMS score. The interventions that the children selected to read again, which were observed to have better engagement scores, were associated with the interventions that scored the highest in relation to intrinsic motivation.

There is a clear distinction in the results between female and male participants. Among the girls, *Trees of Tales* had a better impact on experience, behaviour and preference; while the impact of *Arabic Stories* resulted in better experiences for most of the boys. Nevertheless, when given the choice, two of the three boys preferred to read from *Trees of Tales*. Interviewing the six children could have clarified this issue further. However, the results show that it is necessary to provide children with their preferred reading to ensure more continuous positive enjoyment, engagement and motivation as they grow older (Wigfield & Guthrie, 2000).

It has been recognised both in this study and in previous literature that when a student struggles in the reading experience, their motivation for reading can be affected. This was apparent based on the observation of Boy B who had a bad reading experience with *Trees of Tales* and a slight decrease of motivation in the corresponding IRMS results. Girl C also exhibited poor reading engagement with all three reading interventions, which one can assume is due to her poor reading skills. Her intrinsic motivation was also lower than the majority of students. However, her nomination of *Trees of Tales* as the intervention with the best content, and her higher engagement score for *Trees of Tales* warrants further investigation. One way to overcome Girl C’s apparent difficulties in using *Trees of Tales* would be to allow her to take the application home to gain more experience and increase her familiarity with it. More confident reading from this preferred application would likely engage her more with reading in general and improve her overall reading skills.

Interactive reading proved to be a helpful feature for some children who had a more unique attitude, such as the hyperactive Girl B. This girl reported that she enjoyed *Trees of Tales* the most and that she would like to read from it again. She also achieved a slightly better intrinsic motivation score after reading from *Trees of Tales*. Although she preferred the *Arabic Stories* e-book content, she opted not to read from it again, which is another behaviour that is worthy of further investigation.
6.7 SUMMARY

This chapter has discussed the overall research results. It has reviewed these results in relation to their impact on providing access for reading among children, sharing and family participation, intrinsic motivation, and engagement and flow. This chapter has also provided deeper analysis of the six children that were observed in the reading sessions in which their observed engagement was connected with their recorded answers for the surveys.

In general, Omani children have high intrinsic motivation and a positive attitude towards reading. Specifically, Trees of Tales improved the children’s reading experiences and provided more interesting reading content than the Arabic Stories e-book and the printed books. However, these assertions are not significant, and the differences in impact between the two tablet applications were marginal. When comparing with the traditional printed books available in the school’s libraries, the Omani children generally preferred using the tablet applications and e-books. This could be due to the novelty of the tablet devices, which may decrease as they become more commonplace. Overall, the results have illustrated that providing Omani children with access to any format of reading at an early age is likely to enhance their intrinsic motivation and increase their positive attitude towards reading.

In a gender context, Trees of Tale was found to have a more positive impact on female students’ reading behaviour – it was more effective in increasing their intrinsic motivation for reading. The girls were also found to score higher engagement rates with Trees of Tales. In contrast, the intrinsic motivation of the boys in this study was not affected by the reading intervention, and their observed engagement score was similar when using Trees of Tales or Arabic Stories applications. This study therefore suggests that male children in Oman prefer easy, straightforward reading, while female children prefer more challenging and interactive reading. However, this difference in gender regarding reading motivation requires further investigation.
CHAPTER 7

CONCLUSION

7.1 OVERVIEW

This research project has identified and discussed issues related to the lack of reading for pleasure that exists in Oman and by extension in other Arabic countries. The potential reasons for these issues have been examined, with a consequent reading intervention developed to motivate Omani and other Arabic children to read for pleasure. This reading intervention was designed as an enjoyable reading experience, using stories with cultural relevance to Omani children. The reading intervention was tested to assess its impact on Omani children’s reading experiences and compared against other available reading resources. The following provides answers to the research questions that are a result of this study.

7.2 ANSWERING THE RESEARCH QUESTIONS

7.2.1 THE MAIN QUESTION

This research project’s main question was defined as: What is the impact of an interactive reading application on the reading behaviour and motivation of Omani children in relation to reading for pleasure?

In this study, a mixed-methods evaluation procedure and qualitative and quantitative data were collected to evaluate the impact of the reading application. This involved surveys as well as observations through video-recordings and the Fun Toolkit, to compare the impact of three types of reading experiences on 18 school children at Al Waha Primary School in Oman. The reading experiences consisted of printed books, basic e-books and the interactive reading application developed in this research. Each reading intervention provided the participants with multiple stories to read. The collected data was analysed and compared to determine the impact of the three reading interventions on the behaviours and motivations of Omani children in relation to reading for pleasure.
These findings indicate that the reading application *Trees of Tales* positively impacted on the intrinsic motivation of reading among the female participating children, which was indicated by a significant increase on the girls’ intrinsic motivation score after reading from *Trees of Tales*. It was also identified that reading from *Trees of Tales* had a positive impact on children’s interest and preference for reading. Such a positive impact is a promising signal of continued reading in the future. In addition, most of the participating parents preferred *Trees of Tales* along with the printed books as interventions that are enjoyable and suitable for their kids to use at home.

*Trees of Tales* also caused a noticeable difference in regards to its impact on reading engagement among the female students. That is, the female students engaged significantly more with the interactive reading material in *Trees of Tales* – they concentrated more and their movements and distractions were noticeably less during the *Trees of Tales* session. Conversely, the male students engaged more with the *Arabic Stories* e-book. This difference in reading engagement may be due to gender differences in relation to preferences for challenges in reading interaction. It was therefore surmised in this study that providing diverse levels of challenges to choose from could resolve this.

Interactivity in the *Trees of Tales* did not have any notable impact on reading behaviour among those children that already had a good reading ability. Most of those children enjoyed and engaged with the three reading interventions similarly. However, those children who had average or low reading abilities generally had a different experience reading from the interactive app, mainly based on their characters. For example, active or hyperactive children were observed to enjoy interactivity, as they sat and read for longer periods while using *Trees of Tales*. Additionally, they were least engaged with the printed books. In contrast, the quieter children did not show much interest in reading during the three reading sessions. Yet it was found that these quiet children generally preferred to take home the interactive application. These results indicate that the children’s individual characters and opinions were essential to better understanding their reading preferences – observation was not enough. It was recognised in this study that investigating
children’s reading behaviour through a mix of qualitative and quantitative methods was useful to learn about their reading habits and interests.

The findings of this research project are highly important to families, schools, the Omani Government and the Arabic world in general. This research has highlighted an urgent need for the government, schools and families in Oman to provide children with opportunity and access to a wider variety of reading resources. These include storybooks, e-books and interactive reading material on tablet computers, which are already widely used by children in Oman for non-reading purposes.

7.2.2 SUB-QUESTION 1

The first sub-question was defined as: **What are the design guidelines of an interactive reading application designed for Omani children?**

This question was answered by collecting information on how to design a motivating interactive application for children. Existing research indicates that motivation for reading, self-determined behaviour, game elements, and interaction design for children are important considerations when designing an interactive reading experience. This research therefore developed guidelines aligned with these considerations to inform the design of the *Trees of Tales* reading intervention. These guidelines implied that the reading experience should use technology, provide enjoyable experiences, social activities, and relate to the children’s culture. The guidelines resulted in principles that were used as a foundation for the design, and these principles were the first outcome of this research, as discussed in Chapter 4.

To answer this research question, an interactive reading application designed for Omani children should be designed with the following characteristics in mind:

1. Stories should to be of cultural relevance to Omani children.
2. Children should to be able to freely select from a collection of topics.
3. Interface and navigation design should be child-friendly.
4. Interactivity should be enjoyable and at the same time support comprehension and not distract from reading.
5. The application should support creativity and sharing among family and friends.

7.2.3 SUB-QUESTION 2

The second sub-question was defined as: **What are the design issues that were identified during the iterative design process of *Trees of Tales* that may be of relevance to the design of future reading applications?**

This question was answered through the reflection and identification of flaws and issues that stemmed from the process of designing *Trees of Tales*. A result of this project, *Trees of Tales* is the first reading application designed specifically for Omani children to motivate reading for pleasure. Chapter 4 provided details on the iterative design process of this application. Upon reflection of this design process, flaws were identified in regards to the interface design of the application and were documented in Chapter 4. Unfortunately, this research project could not address all of the identified issues due to time constraints.

One example of the design issue that was identified but was not resolved was the need for rapid actions and quick feedback. Children are often less patient to wait for actions to appear, and they may get frustrated when waiting for the next move to happen (Hourcade, 2008). In *Trees of Tales*, when the surveyed children pressed the ‘next’ button, the following page did not appear instantly – it often took a few seconds to change. This loading time was a result of the high resolution of images. Moreover, according to Hourcade (2008), the actions in the interaction designs for children should be incremental. This means that the complexity needs to be scaffolded so that the complexity of the interactions increases over time. Regrettably, this did not occur in the initial story of ‘Joha and the thieves’, as the first page required complex interactions from the reader to build a complicated scene as a result of the story, while the subsequent pages required more direct and less complex interactions.

It is acknowledged that these flaws, technical issues and considerations have been identified and will be addressed in future extensions of the prototype. To answer the research sub-question, the process of iteratively designing *Trees of Tales* identified a
number of problems and led to four recommendations that may be of relevance to the design of future reading applications for Omani and Arabic children.

**Recommendation 1: Keep the interface design simple.**

The space for the story scene should be of sufficient size to allow easy interactions. The menu design should be clear and icons should be suitable for children to navigate.

**Recommendation 2: Implement rapid actions and ongoing feedback.**

It is necessary to provide ongoing feedback for the different actions done by the children. This feedback should be quick and clear so children do not lose interest.

**Recommendation 3: Implement rewards and clear goals.**

The sound effects and the green ‘next’ button were rewarding enough for the children reading *Trees of Tales* to continue. The growing character tree also made creating new stories more fun. It is important for children to know what to expect from using the application, and what their reward will be when they complete reading a story.

**Recommendation 4: Interactivity to support the reading and comprehension.**

Playful elements make the reading more fun and last longer. Interactive techniques such as the *mise-en-scène* enhance playfulness and support the reading of text. Designers of children’s reading applications should consider creative ways of using interactivity to enhance enjoyment and reading comprehension.

### 7.3 CONTRIBUTIONS

**7.3.1 CONTRIBUTIONS TO THE BODY OF KNOWLEDGE**

From this study, the national government, and local schools and families have been provided with valuable information and recommendations regarding Omani children’s behaviour and experiences when provided access to reading through different book formats. These recommendations can be summarised in the following points:

- Omani children in fourth grade are intrinsically motivated to read for pleasure. Based on the outcomes of this study, it is believed that these children will engage with more reading if provided with greater access and the freedom to choose from a wide selection of reading material.
Children base their decision to read on how much fun and how interesting a story is perceived to be. For this reason, the stories should be of cultural relevance to children.

Tablets computers are far more successful than print books to engage children and to increase reading frequency and sharing with family members.

Children will go back to the reading material if it is interactive and fun to read.

Omani girls are attracted to more challenging and interactive reading, while boys prefer easier, more straightforward reading.

Omani parents support both interactive reading applications and printed books.

There is a need for more Arabic reading applications that are playful and interesting for children.

These recommendations can be distributed from micro to macro levels throughout the Omani community. Figure 7.1 below illustrates the suggested distribution of the contributed recommendations from this study.
At the macro level, it is critical for the government, society, and the industry to provide children with increased access for reading by building more public libraries, initiating reading campaigns and implementing playful applications that support reading for pleasure, which will essentially influence primary school children to read more often. The designers of Arabic children’s e-books and reading applications need to consider creative ways for designing interactivity that provides fun and engaging reading experiences, such as using the *mise-en-scène* as a playful interactive technique. However, designers need to consider balancing the children’s abilities in reading and using the application with the challenge required to advance in the application.

At a meso level, schools should provide children with access to a variety of reading resources, including tablet computers which are already widely used by Omani
children for purposes other than reading. They also need to encourage and improve the environment of school libraries. In addition, Omani parents need to encourage their children to read more by involving them in reading activities at home, such as reading before bed and reading together. It is necessary for families to offer children the freedom to choose what they want to read in order to elevate their interest in reading for pleasure. This means providing children with access to reading materials through the purchase of either printed books or e-books. When parents show interest in what their children read and perhaps take part in the reading activity, the children’s reading habits and overall achievements in school are likely to improve.

At the micro level, when children are provided with reading resources, all they have to do is read.

This study can be considered as a serious step in investigating possible solutions that could be used to motivate Omani children to read for pleasure. The contribution of this study can be summarised in the following points:

- This study has established the current family reading behaviour of 18 families in Oman.
- This study has obtained the opinions of 18 Omani primary school children and their parents with regard to reading from three interventions.
- This study has provided recommendations to the Omani Government and its schools and families.

7.3.2 CONTRIBUTIONS TO DESIGN AND THEORY

This study was initiated and based on the theories of motivation, SDT and OIT. The purpose of using these theories was to gain knowledge and guide the process of designing a motivating and enjoyable reading application for Omani children. This study focused on the SDT, which specifies that self-determination is enhanced by enjoyment, agency and mastery. Additionally, its sub-theory OIT proposes internal factors that enhance autonomous reasons for performing an activity, such as enjoyment/interest, self-awareness and value/importance. These factors were measured using the IRMS after the surveyed children read from *Trees of Tales* and the other interventions. The results indicated that the IRMS scores are higher for the female children after reading from *Trees of Tales*. Girls enjoyed the challenge of
building the scene more than the boys. Additionally, the feedback of the surveyed children confirmed that this design is more enjoyable than the more basic e-books and printed books, as *Trees of Tales* includes more choices and interesting topics.

The findings from this study confirm that playful interactivity that supports the text is preferred among children when it is enjoyable to interact with. However, the degree of enjoyment can be affected by the children’s gender and their abilities to read. In addition, providing children with a variety of interesting topics to choose from and the ability to create new stories enhances their level of agency and increases their reading time. Furthermore, a simple menu and interface design with easy interactions increases children’s mastery of the application, which may be a reason to make children come back and use the application again. Enjoyment, agency and mastery are factors that enhance self-determination, and their influence of intrinsic reading motivation was confirmed through the user testing conducted in this study.

7.3.3 CONTRIBUTIONS TO MY COMMUNITY

As part of the Omani community, I have responsibilities and duties that result from the knowledge I have gained from this research. I understand after undergoing this study that there is no one solution or one application that can change the reading situation in Oman. However, there are a number of areas that I feel can be introduced to my own community, to transfer my increased knowledge as well as my worries about the future of Omani children’s reading motivation. I can start making changes within my own family by providing access to a variety of reading materials to my children and stressing the importance of reading for pleasure. Within my larger family that includes my parents, sisters and brothers, I will inform them about this study and my findings, and advise them to read with their kids and pay attention to what their children are doing on tablet computers. Instead of using these tablets to play commercial games, I will recommend to them to search for interactive reading applications such as the one that I have developed as well as e-books, to provide their children with more reading access and a wider variety of stories to choose from.

I have also spoken to the principal of Al Waha Primary School and she agreed that I visit the school to talk to teachers and parents about the results of this study and the
importance of reading for pleasure among young children. I will advise them to provide reading materials, and participate and encourage their children to read for pleasure as much as they can. I will also attempt to approach the Ministry of Education and the Omani Research Council to hand in reports of this study’s findings. If taken into consideration, the recommendations of this study may be useful to improve the reading situations among children in Oman.

7.4 LIMITATIONS AND FUTURE WORK

This study has a number of limitations that need to be addressed in the future. The main limitation is the small number of participants, which was due to the number of iPads available for the study. The small sample of participants in this study made it difficult to provide generalisable statistical results; a larger sample could support and add to its findings. Likewise, the user testing was performed in one primary school in Oman, which is located in a middle-income community. The findings could have been different if the study was performed in other parts of the country where the community is less fortunate or belongs to high-income families. Future extensions of this work can involve testing the impact of Trees of Tales in different schools around the country.

Another limitation was not being able to compare the medium of reading separately from the content, as there were different stories in the different interventions, which was necessary as the study involved a within-subject design. If the same stories had been used in the three interventions, the surveyed students would have grown bored of the reading. Additionally, there were not many options in regards to existing Arabic e-books in the Apple AppStore, which is why Arabic Stories was chosen. In the future, if the number of iPads used for testing increases, a between-subject design method could be performed. Students could be divided into three groups and the same stories in Trees of Tales could be distributed in the three formats of printed books, non-interactive and interactive applications.

As a result of this research, more specific questions regarding home reading behaviour could be asked in the future to help investigate what type of reading Omani families prefer and what kind of topics they already read. Additionally, questions about the usage of technology such as mobile phones and the internet could have
clarified whether Omani families actually read more than they currently appear to. It is believed that most Omani people would consider reading from their phones, such as reading messages in WhatsApp, as one type of reading for pleasure.

More research is needed to ascertain what aspects of Trees of Tales children liked the most and what the most interesting features of the stories were. More information about the difficulties the children encountered while using Trees of Tales would also be beneficial to inform future development of such applications. Trees of Tales is a prototype that was designed for the purpose of evaluating the impact of interactive, cultural-based reading apps on the reading behaviour and experiences of Omani children. Due to limitations of time, it was not possible to assess the extent to which Trees of Tales was successful in meeting the principles that guided its design process. It would have helped to understand the extent to which reading from Trees of Tales supported comprehension and did not distract from reading as mentioned in principle 4. However, in regards to user experience, Trees of Tales was found to be more enjoyable and preferred among the participating children and their families, but it was more challenging to some low-academic performing children. Taking into account the results of this study, the prototype can be developed further and evaluated on Arabic children from other Arabic countries.

7.5 SUMMARY

Although the Omani children are intrinsically motivated to read for pleasure and they have a positive attitude for reading, they lack access, family involvement and school encouragement. Omani people understand the value of reading for pleasure, but most parents do not read enough and do not encourage their children to read for pleasure. Furthermore, the government and schools in Oman do not play an active role in encouraging and providing children with enough access to reading material. This is a critical issue, particularly if we consider that children’s motivation for reading might decrease as they grow older if it not fostered at a young age (Wigfield & Guthrie, 2000).

This study confirmed that Omani children will read the material if they find it interesting/enjoyable, if they perceive value/self-importance from reading, and if their reading abilities and self-awareness are enhanced. Therefore, Omani children need to
be provided with access to reading material that enhances their intrinsic motivation for reading and continually encourages them to read by involving their families and schools in the reading activities.

This research is the first of its kind to investigate the reading behaviour for Omani children and their families. It also led to the design and development of the first playful Arabic reading application *Trees of Tales* for Omani children inspired by Omani folktales. *Trees of Tales* is currently in the Apple AppStore in a prototype version.
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