**Elementary school children's acceptance and use of digital school libraries at Crawford Preparatory Pretoria School in Gauteng, South Africa**

Presented by

**Sharon Moyo**

**(Student number: 46302484)**

Submitted in accordance with the requirements for the degree of

**MASTERS OF INFORMATION SCIENCE (MINF)**

at the

**University of South Africa**

**Supervisor:** Prof T.B. van der Walt

May 2015

## SUMMARY

The use of the digital school library depends on many factors, including end-users' acceptance. The issue of designing information systems that will be used appropriately is growing and thus user acceptance of new technology is now receiving much attention by researchers. Without acceptance, discretionary users will seek alternatives, while even dedicated users will most likely manifest dissatisfaction, negating many, if not all, the presumed benefits of the digital library. Whereas the traditional focus of digital libraries has drawn research on technological developments, there is a call for user-focused research. This study sought to identify the dynamics of elementary children's (11- to 13- year olds) decision-making in the context of accepting or resisting making use of digital school libraries at Crawford Preparatory Pretoria School in Gauteng. To be accepted, the digital library must satisfy basic usability requirements and be perceived as useful by the children. The constructs of the Technology Acceptance Model, perceived ease of use and perceived usefulness were used to generate an understanding of acceptance of the digital school libraries. The study adopted a quantitative case study research approach to compare the empirical data and the TAM theory. Data triangulation of a wide range of data collection methods, including observation, questionnaires, focus groups and tasks given to the children to work on using the International Children's Digital Library was analysed. The findings revealed that, just like adults, children make decisions regarding accepting and using the digital school library based on how easy it is to use and how relevant it is to their needs. The study recommends that software designers, teachers and librarians work with the children when designing digital school libraries to ensure that their acceptance factors are taken into consideration when designing for them.

**Keyword:** *User acceptance; digital school libraries; elementary school children; Technology Acceptance Model; Crawford Preparatory Pretoria School*

## ACKNOWLEDGEMENTS

Research is not an individual undertaking. It is a grand endeavour that is supported by a "dream team" made up of a multitude of individuals that inspire one to master their abilities. Words alone cannot express my sincere gratitude to everyone who has touched my life and made this journey a memorable and rewarding one.

Thank you to my patient and endearing supervisor, Prof TB van der Walt; without you, this dissertation would never have been completed. Your mentoring, guidance, enlightenment, counselling, experience, ideas and life lessons inspired me on all occasions. Thank you for taking me under your supervisory wings, for your patience and insightful interactions.

Thank you to Crawford Preparatory Pretoria School for giving me the opportunity to conduct this research. Thank you to Charisna Swanepoel for assisting in the data collection and for allowing the research to be undertaken during the Integrated Media period.

To my former colleagues, at the Department of Information Science, Unisa, for the encouragement and the continuous efforts and opportunities afforded to us to complete our studies. Special mention goes to Dr M Ngoepe and Dr T Mugwisi for reviewing my chapters and giving valuable input regarding this dissertation.

Finally, thank you to my husband and my son, friends and family who shared many moments of joy and angst over the past years. I will always remember your support and encouragement during the challenging times and the many celebrations we shared after significant milestones had been reached.

With heartfelt gratitude

_____

# DECLARATION

I declare that **Elementary school children's acceptance and use of digital school libraries at Crawford Preparatory Pretoria School in Gauteng Province, South Africa** is my own work and that all sources that I have used or quoted have been indicated and acknowledged by means of complete references.

……. ……

Signature Date

MS SHARON MOYO

# Table of Contents

# LIST OF TABLES

# LIST OF FIGURES

# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| **A** | Attitude |
| **BI** | Behavioural Intention |
| **ICDL** | International Children's Digital Library |
| **PEOU** | Perceived Ease of Use |
| **PU** | Perceived Usefulness |
| **SN** | Subjective Norm |
| **TAM** | Technology Acceptance Model |
| **TAM2** | Technology Acceptance Model 2 |
| **TAM3** | Technology Acceptance Model 3 |
| **TRA** | Theory of Reasoned Action |
| **UTAUT** | Unified Theory of Acceptance and Use of Technology |

# LIST OF APPENDICES

# CHAPTER ONE

# INTRODUCTION TO AND BACKGROUND OF THE STUDY

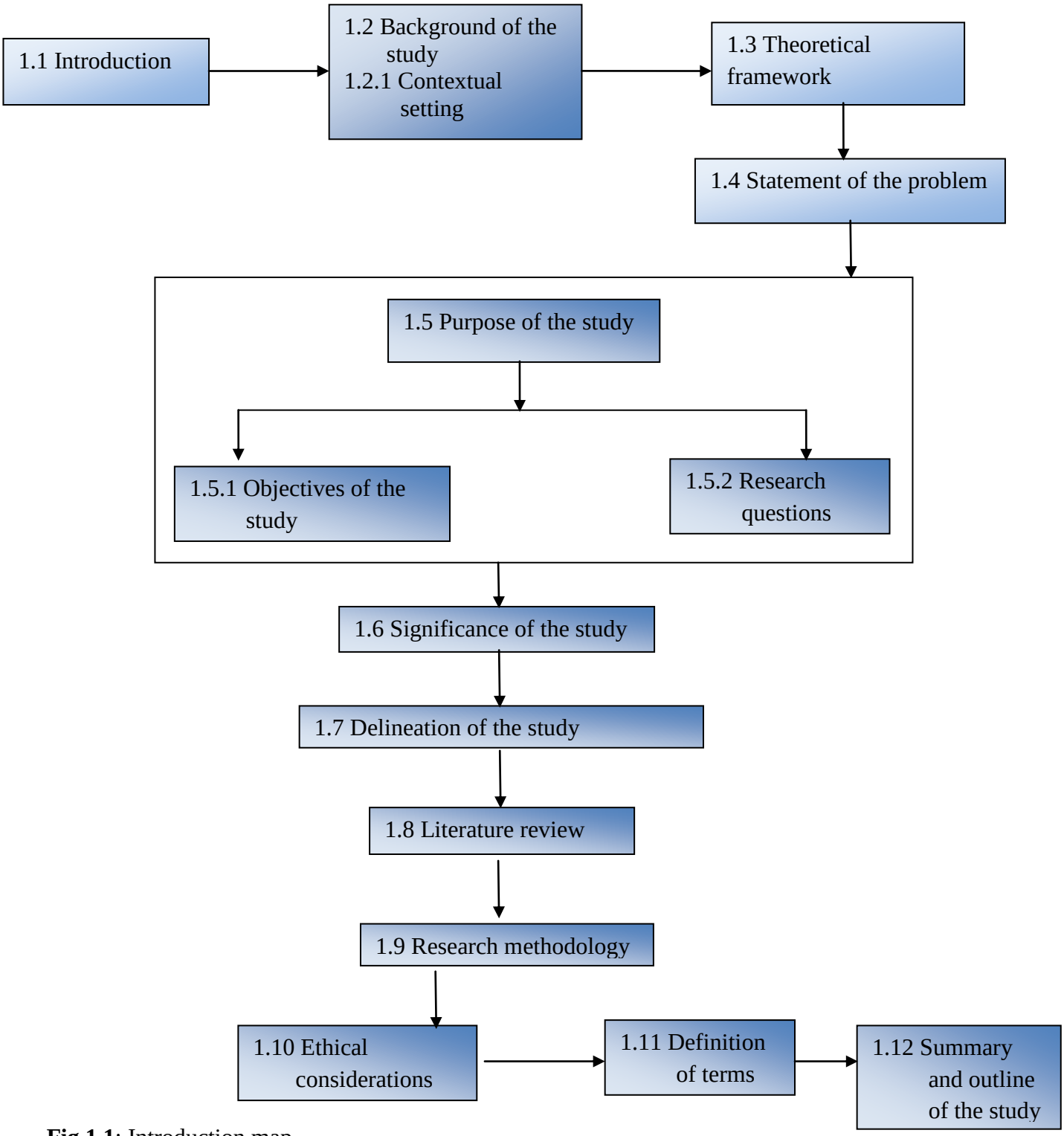



**Fig 1.1**: Introduction map

## 1.1 Introduction

This study seeks to determine children's (11- to 12-year olds) acceptance of digital school libraries at Crawford Preparatory Pretoria School. Digital libraries received must attention in research literature (Diso 2011; Druin 2005; Joeng 2011; Juma, Wamukoya and Wekullo 2014; Salange 2011; Vaidyanathan, Sabbaghi and Bargellini 2005). Designing a digital library is an expensive and resource-intensive system just like any other information system. The growth and impact of digital libraries raise the need for determining its use or rejection by users. Druin (2005:21) states that, "Recent studies have shown that children (ages 7 to 13) have a strongly positive view of technology and that technology is a key part of how they define themselves." On the other hand, Selwyn (2009:372) argues that, aside from inequalities in access and engagement, there is increasing evidence that young people's actual utilisation of digital technologies remains rather limited in scope. For many elementary school children and young people, technology use at home or at school remains less expansive and empowering than the rhetoric of the digital native leads many to believe (Selwyn 2009).

It is therefore of critical importance that the digital school libraries cater for the emerging characteristics of children (Waldman 2007). Druin (2005) further adds that the digital libraries should therefore provide search varieties to allow the children to select the one that best suits them. The content of the digital libraries also plays an important role in the acceptance and continued use. The content, like in the traditional library, should meet the information needs of the children. If the children do not use technology effectively, the time and effort spent in using the technology become a waste. This study will be informed by the Technology Acceptance Model (TAM) to determine elementary children's acceptance of the digital school libraries at Crawford Preparatory Pretoria School. Chapter 1 will discuss the background to the study, the

theoretical framework, statement of the problem, purpose of the study, significance of the study, ethical consideration, research methodology and the definition of terms.

## 1.2 Background of the study

IFLA/UNESCO (2000:3) states the mission of school libraries as, "The school library provides information and ideas that are fundamental to functioning successfully in our increasingly information- and knowledge-based present day society." Through the ages, school libraries have worked to bring together knowledge and information. They provide the opportunity for the learners to educate themselves, to learn from others and from new ideas of how to do things better and more effectively. The school library provides and promotes quality reading material to develop and sustain in learners the habit and enjoyments of reading for pleasure and to enrich their intellectual, cultural and emotional growth.

However, Hart (2012:4) states that in South Africa, "Fewer than 10% of schools have functioning libraries." This has not changed much, as the 2011 NEIMS report stated that there were 5 252 (21%) schools with libraries. Among these schools, only 1 855 had stocked libraries, which means that 19 541 schools did not have libraries at all. There were 2 031 schools in Gauteng, 1 191 (59%) of which had libraries and only 385 of these were fully stocked (Equal Education and the National Education Infrastructure Management System (NEIMS) 2011 Report). Newspaper reports refer to the under-development of school libraries in South Africa and how this placed much pressure on public libraries (Chauke 2014; Frean 2008; Hole 2013; Masigo 2010; Mtshali 2014; Ntobong 2010; Sidley 2010).

The new curriculum introduced in 1996 (Curriculum 2005) and its revision (The Revised National Curriculum Statement (RNCS) (South Africa 2002)) offer opportunities for the development of school libraries. Undoubtedly, there are profound changes taking place in the educational systems in South Africa. Active learning (a norm of the day in most South African schools) implies that learners should not limit themselves to resources supplied by their instructors, but should also search for other and new material. Libraries help learners to improve their ability to read and write (literacy), in general. It is for this reason that it is essential that every child should have access to a school library that provides age-appropriate information to meet their needs. Digital school libraries might be the solution South Africa is waiting for.

The various ICT structures of South Africa allow for internet access, which is essential to access digital libraries. In this study, *digital library* refers to a library in which collections are stored in digital format and are accessible through computers. The advantages of digital libraries include that they have no physical boundaries and can be accessed by mobile phones. Rather than being confined to school hours, the digital school library is available round the clock. Internet access allows for multiple accesses to resources, that is, the learners can read more than one book simultaneously. Digital school libraries are natural complements to the active learning environment. Roes (2001:n.d.) asserts that, "they (digital libraries) are able to integrate the freely available information on the web with the more formal literature." The pay-off for learners is an increase in information literacy and critical thinking skills. According to AnEducatedChoice (n.d), the criterion of the value of school education is the extent to which it creates a desire for continued growth and supplies means for making the desire effective. The digital school library therefore assists in adding value to school education. Information literacy offers the key to achieving digital inclusion and computer competency because it can meet

young people's specific personal and educational needs. A successful school digital library has to cater for the individual needs of the learners.

The starting point for the digital school library should be the children's needs. Thong, Hong and Tam (2002:216) state that, "an accepted system is one that appropriately satisfies the requirements of its users for utility, usability and cost." Elementary school children play games, chat with friends, tell stories and study their subjects. Today, all this can be done supported by technology. As these new technologies become critical to children's lives, librarians need to ensure that digital libraries support them in ways that make sense to them as young learners and avid technology users. Druin (n.d) states that, "Children have their own likes, dislikes, curiosities and needs that are not the same as their parents and teachers." She further quotes Berman by asserting that children are sometimes forgotten and taken as just 'short adults', yet they are 'but an entirely different user population' with their own culture, norms and complexities. Nesset and Large (2004:141) add that, "with the emergence of children as an important new consumer group of technology, it is critical that we support children in ways that are useful, effective and meaningful for their needs." Previous research (Mordis, Hoffman & Marshall 2008; Joeng 2011) shows that despite all the efforts aimed at developing 'useable' digital libraries, these could easily remain unnoticed by learners or seriously underused in spite of their availability. The better we can understand elementary children as users of digital libraries, the better we can serve their needs.

The searching and browsing interfaces are important if the children are to achieve their goal of using libraries. Hutchinson et al (2004: n.p) assert that,

> Many interfaces geared towards elementary-age children suffer from one of two common problems. First, many assume that children can spell, type, read,

navigate, compose queries, and/or select small objects. Secondly, many assume that children search for books using the same criteria as adults.

Usability is frequently linked to certain qualities of searching and browsing interfaces. Hutchinson et al (2004) state that, "children often use different criteria such as number of illustrations, preferred genres and recommendations that are not supported by most digital libraries." Children, like adults, can also become frustrated when interfaces fail to take advantage of human perceptual abilities. The reason for their acceptance of and better performance with browsing interfaces is related to their physical and cognitive development. Young people tend to overestimate their information-seeking skills. Many are still novices when it comes to searching, selecting and assessing the meaning and value of information they need (Harris 2008).

The rapid development of and, more importantly, the role that information technologies play in our daily lives are evident as many business operations, organisations, schools and individuals invest more and more money in these technologies. Children below the level of matric, including elementary school children, recorded a 4% usage of the internet as compared to the 24% usage by the matric learners in South Africa in 2010 (Research ICT Africa 2011). The South African Draft White Paper on e-Education (2003, s4.13) states that the current status of school libraries reflects is inadequate to support resource-based education. The Department of Education will promote access to digital libraries according to the White Paper report. The goal of the Department of Education is to make sure that every learner in the primary and secondary school sectors are able to use ICTs effectively and efficiently by 2013.

To ensure meeting their goal, the different provincial Departments of Education have partnered with private organisations to come up with programmes that enable the use of ICTs at various levels of the education system in South Africa (Isaacs 2007). A recent initiative has been the rollout of tablets to headmasters and the learners (Mtshali 2012; Wilson 2013). Gauteng Online is one of the programmes with an access model involving the establishment of computer labs with 25 workstations in public schools in Gauteng, which reached an estimated 1 200 schools. Other initiatives include the NEPAD e-schools initiative, Mindset Network and Thutong portal that provide access to a wide range of curriculum and support materials for secondary learners. However, if they are not used effectively the projects would be a failure. Millions of rands have been spent (about R5 678 million allocated to the Education Infrastructure Grant out of the Department of Basic Education's 2011/2012 Budget) in 2012 on ICT development and other department needs (South African budget report 2011/2012).

Wilson (2013) states that, "The provincial government in Gauteng has outlined details of a R396m 'e-learning solution' designed to replace the controversy-ridden R2,2bn Gauteng Online. It will involve the roll-out of 88 000 Android-powered tablet computers made by China's Huawei to 2 200 government schools." He further quotes the Provincial Head of Finance, Stuart Lumka, as saying, "the province has learnt its lesson from the Gauteng Online debacle. It was a large investment that left us with nothing to show for it." The City of Tshwane invested in installing free Wi-Fi spots around the city, for example, Church Square where people can access the internet through the Wi-Fi zones. It would be of great significance to ensure that such expenditure is of benefit to the children. Anandarajan, Igbaria and Anakwe (2002) assert that not much research has been done into individual-level factors that influence user acceptance of these systems. Insufficient research into digital library adoption dynamics

raises the need for its research. They further argue that a lack of research into user acceptance of information systems is partly responsible for the under-utilisation of these systems.

In view of the above, the study seeks to find the characteristics that influence the use or rejection of school digital libraries at Crawford Preparatory Pretoria School being informed by the TAM by using International Children's Digital Library (ICDL). This study was prompted by the fact that South Africa has the technological infrastructure that can be channelled to school digital libraries, as there are very few libraries in South African schools. However, the success of the school digital libraries will only be realised when they are fully used by the children. Crawford Preparatory Pretoria School, the ICDL and TAM will be discussed in detail in the contextual setting (***see*** 1.2.1) and theoretical framework (***see*** 1.3) sessions of this chapter.

### 1.2.1 Contextual setting

Crawford Preparatory Pretoria School was established in 1996 as a private school with an academic philosophy of 'Think, Understand and Apply'. The school has an integrated academic programme that encompasses the core curriculum subjects and specialised subjects, including the integrated media subject. The school comprises small classes to enable one-on-one interactions between the teacher and the learners. The targeted population for this study is the grade 6 pupils (11- to 12-year olds). Each learner has access to the media centre, which houses teachers' references, nonfiction and fiction books, computers and iPads. The learners also have access to e-books that can be accessed by using the iPads and computers in the media centre. Teachers compile these e-books making use of Demibooks and the book creator applications from Apple Inc. The Electronic Media Policy of the school allows the learners to use their

personal electronic devices on the school premises. However, they are not allowed to answer calls or respond to short message services. Under the same policy, the Code of Conduct, section 6.1.7, states that the school reserves the right to monitor materials accessed by learners.

The integrated media subject is used as a subject that helps the learners to use or integrate ICT into their regular core curriculum. This subject exposes the learners to how ICT can assist in their education. The subject was chosen as the platform on which the 11- to 12-year olds will be studied to see if they accept or reject school digital libraries. The grades 6 pupils have four periods of one hour each per week for the integrated media subject (***see*** Appendix A). The learners are given a project to work on for the year, for example, the grade 7 pupils are making Lego robots as their project for the year. The ICDL was introduced to grade 6 learners and the first perceptions they had of the library determined their acceptance and/or rejection of the digital library.

The ICDL is a children's library developed in 2002 by the ICDL Foundation, in conjunction with the College of Information Studies at the University of Maryland. It is available on the internet free of charge. The ICDL's focus is on identifying materials that can help children to understand the world around them and the global society in which they live. The materials in the collection reflect similarities and differences in cultures, societies, interests and lifestyles of people around the world (Weeks 2007:1). All the books in the collection are presented in their entirety and in the original language they were published in. This effort helps to make children's books more accessible worldwide. This can only be accomplished through the collaboration of individuals throughout the world who understand the power of connecting the right book to the right child at the right time. Unlike digital libraries that generally contain only public domain and out of copyright materials, the ICDL offers online access to historical as well

as contemporary materials, in copyright literature in multiple languages. It is for the reasons stated above that the study took advantage of its diverse collections to offer unlimited information to Crawford Preparatory Pretoria School learners using the technology they already have. It is the premise of this study that the children's acceptance of the ICDL will influence the development of a South African Children's Digital Library.

## 1.3 Theoretical framework

Ocholla and Le Roux (2011:1) define a theoretical framework as, "The structure that holds and supports the theory of a research work. It serves as the lens that the researcher uses to examine a particular aspect of his or her subject field." The introduction and acceptance of information technology has been the subject of worldwide discussions as evidenced by the extensive literature examining factors that influence its acceptance (Averweg 2008; Baskerville and Pries-Heje 2001; Comin and Hobjin 2004; Kyobe 2011). As technology use spreads across societies, young people and organisations become more dependent on information technologies. The designing of information systems that will be used appropriately is growing, thus user acceptance of new technology is receiving increasing attention by researchers. Dillon (2001:1) defines user acceptance as, "the demonstrable willingness within a user group to employ information technology for the tasks it is designed to support." Without acceptance, discretionary users will seek alternatives, while even dedicated users will likely manifest dissatisfaction, negating many, if not all, of the presumed benefits of the digital library. Whereas the traditional focus of digital libraries has drawn research on technological developments, there is a need for user-focused research. This research seeks to understand the dynamics of elementary school children's decision-making in the context of accepting or resisting using digital school libraries.

The study will be informed by the Technology Acceptance Model (TAM) to determine the acceptance of school digital libraries by 11- to 12-year olds at Crawford Preparatory Pretoria School. The TAM is an information system theory that simulates how users come to accept and use technology (Legris, Ingham and Collerette 2003). The goal of TAM is to predict information system acceptance and diagnose design problems and thereby develop better systems. TAM predicts user acceptance of any technology as determined by two factors: perceived usefulness (PU) and perceived ease of use (PEOU). Within TAM, PU is defined as the degree to which a user believes that using a system will enhance his or her job performance. Users will only accept or use a certain technology if they believe it will benefit them. As Nesset and Large (2004:149) note, "young people lack 'life experience' that could help them overcome day-to-day problems and this bestows a special importance on their need for information". It is for this reason that they (children as users) might find it hard to determine the usefulness of the digital school library. Researchers tend to focus on the impact of digital libraries on users; however, the real long-term issue is how technology will influence how the children behave and what they expect from it.

Perceived Ease of Use (PEOU) is defined as the degree to which the users believe that using the system will be free from effort. Dillon and Morris (1996:20) reveal that children tend to overestimate their information-seeking skills. Youngsters have shortcomings when operating information systems, even in electronic environments in which they are often imagined to be especially at ease. They are still novices when it comes to searching, selecting and assessing the meaning and value of the information they need and find. Since effort is a finite resource, a user is likely to accept an application when he or she perceives it as easier to use than another. A digital school library with a high level of PU and PEOU is more likely to induce positive

perceptions and thus influence its acceptance. PU has direct impact on attitude and use, while PEOU influences attitude and use indirectly through PU.

The study will also make use of one of the constructs of the Unified Theory of Acceptance and Use Technology (UTAUT) (Venkatesh, Morris, Davis & Davis 2003), the social influence construct. Social influence in the context of this study is defined as the perceived external pressure that individuals feel in the process of being informed about an innovation that influences their decision to use it, and the degree to which an individual perceives how important others believe it is that he or she should use the new system. Gender, age and experience are posited to mediate the impact of social influence on usage intention and behaviour. Age and education have been shown to influence system use in some contexts. Coupling social variables with contextual knowledge improves matters substantially and variables such as training, experience and user involvement correlate well with the acceptance of digital school libraries. When a large portion of an individual's referent social group holds a particular attitude, it is likely that the individual will also adopt it (Venkatesh et al 2003). As more and more children begin to use the digital library, the word starts diffusing rapidly and thus its acceptance in Gauteng and South Africa as a whole.

Inclusion of external variables provides the possibility of examining the contextual factors that are critical when TAM is applied in different settings. External variables provide a better understanding of what influences PU and PEOU, their presence guides the actions required to influence greater use (Legris 2003). Three external variables will be applied in this study. These involve the system characteristics, individual difference and the organisational context. Three factors for each variable will be used to understand what influences PU and PEOU of digital school libraries. For individual difference, the factors include computer self-efficacy, computer experience and domain knowledge. For system characteristics, the factors include terminology,

screen design and navigation. The factors for organisational context include relevance, system accessibility and system visibility. External variables are salient features that help the children develop favourable perceptions about the digital school library's usefulness and ease of use (Venkatesh & Bala 2008).

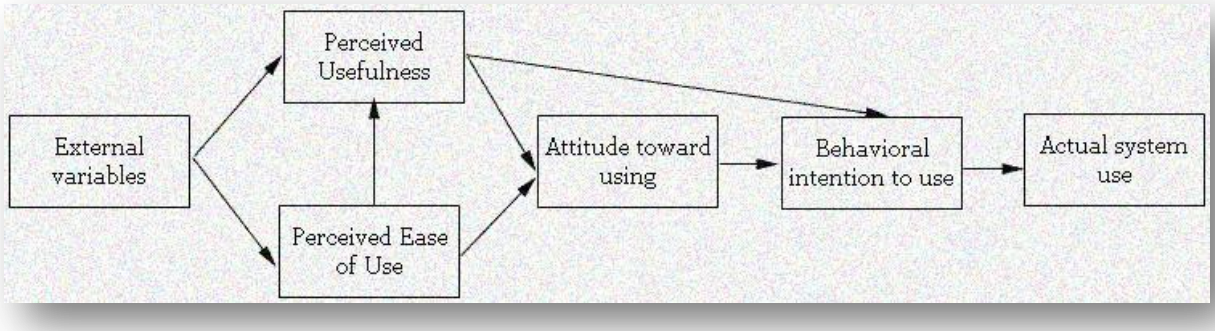



**Fig 1.2:** Technology Acceptance Model from Davis, Bagozzi and Warshaw (1989)

## 1.4 Statement of the problem

Children are among the fastest growing groups of information technology users. How they use ICT is of concern to many, including teachers and parents. The introduction of technology brought about different text formats, including digital, print and 3D books. The ways in which these different formats are accessed also vary from free access to paid for. The ICDL is a free online digital library. Research has shown that children prefer using these digital formats as they have 3D pictures and animation which is attractive to them (Bilal 2005; Bilal and Bachir 2006; Larsen 2012). The study will concentrate specifically on factors that determine user acceptance and/or resistance by learners at Crawford Preparatory Pretoria School, making use of the ICDL as an example of a digital school library.

The successful use of a digital school library is dependent on many factors related to the end-users. Using research models, considerable work was done on factors that predict whether individuals will accept and voluntarily use information systems (Davis 1989; Legris, Ingham and Collerette 2003; Venkatesh 2003). These models indicate that various social, organisational and technical aspects influence user acceptance. While large amounts of money have been spent on digital libraries, there have been debates over the extent to which such expenditures have produced benefits (Kemp and Jones 2007). Lack of user acceptance is a significant obstruction to the success of the digital school libraries.

Determining elementary school children's acceptance is a difficult but important part of social research and application. While there is currently no complete theory or model that explains and predicts acceptance, there is an emerging understanding of the key variables that affect acceptability (Gu, Zhu, Guo 2013). To be accepted, the digital library must satisfy basic usability requirements and be perceived as useful by the children. Persuading users to accept new information technology is still an important issue; thus the question "What are the perceptions of elementary children to accept digital school libraries?"

## 1.5 Purpose of the study

The purpose of the study is to determine factors that shape elementary school children's acceptance and use of digital libraries. By determining factors that shape users' acceptance, the researcher seeks to recommend guidelines for the design and implementation of digital school libraries in a manner that will minimise the risk of resistance or rejection by the children.

### 1.5.1 Objectives of the study

(i) To explore the current state of research into the acceptance of digital school libraries

(ii) To identify the patterns of digital school library use within the age group represented in the study

(iii) To determine the reasons why children use digital school libraries

(iv) To identify the skills needed by the children to use digital school libraries effectively

(v) To recommend guidelines for design processes to ensure effective use of digital school libraries

### 1.5.2 Research questions

(i) What is the current state of research into the acceptance of digital school libraries?

(ii) How often do children at Crawford Preparatory Pretoria School use the digital school library?

(iii)What are the factors that influence children to use digital school libraries?

(iv) What are the skills needed to use the digital school libraries effectively?

(v) What measures should librarians take to ensure effective use of school digital libraries?

**Table 1.1**: Summary of the research objectives, questions and possible sources of data

| Objectives | Research Questions | Possible data sources |
|---|---|---|
| (i) To identify the current state of research into the acceptance of digital school libraries | What is the current state of research into the acceptance of digital school libraries? | Literature review |
| (ii) To identify the patterns of digital school library use within the age group represented in the study | How often do elementary children at Crawford Preparatory Pretoria School use the digital school library? | Questionnaire<br>Focus group |
| (iii)To determine the reasons why children use digital school libraries | What are the factors that influence children to use digital school libraries? | Focus groups<br>Task-oriented approach<br>Questionnaires |
| (iv) To identify the skills needed by the children to use digital school libraries effectively | What are the skills needed to use the digital school libraries effectively? | Observation<br>Focus groups<br>Task-oriented approach<br>Questionnaires |
| (v) To recommend guidelines for design processes to ensure effective use of digital school libraries | What measures should librarians take to ensure effective use of school digital libraries? | Questionnaires |

## 1.6 Significance of the study

This section will discuss the importance of the study given four categories, namely children, research, libraries and digital library designers.

- As children continue to use technology in growing numbers, at younger ages, and for a greater variety of activities, it is imperative that digital school libraries should be

designed to support their skills and needs. Pupils of Crawford Preparatory Pretoria School use smartphones that can be channelled to open access digital libraries and thus children will be exposed to a variety of information that is organised age appropriately to cater for their developmental growth.

- Digital school libraries will enable the Crawford Preparatory Pretoria School's library to effectively provide variety and thus be able to meet their main objective of satisfying users' needs.
- If the digital library is not used effectively, the time and effort spent on designing the digital library becomes a waste. Understanding the relative influence of these factors is particularly important for directing policy and proper allocation of the limited resources that many South African public schools face.
- Determining the factors that influence digital library use will also enlighten designers and librarians and thus ensure that the advantages of digital school libraries are realised and used effectively.

## 1.7 Delineation of the study

The study is delimited as follows:

- The conceptual scope of the study is the acceptance of digital school libraries by elementary children aged 11 to 12 years.
- The study covers one school, namely Crawford Preparatory Pretoria School in Gauteng. The school was selected because it has a reliable computer lab with internet access, which will ensure access to the ICDL, a digital library that is available on the internet free of charge.

- The study of the acceptance of technology theory will be limited to the TAM and the social construct of the UTAUT. Reasons for choice of theory are stated in the literature review section.
- Although TAM offers comprehensive details of the acceptance of technology, there may be theories of acceptance of technology that are excluded from the study that reveal the reasons associated with acceptance and rejection of technology.
- Self-reported data is a limitation as the data gathering will be done by one person and, therefore, bias is likely to step in due to selective memory and telescoping. Questionnaires will be used to substantiate the data collected from observations and interviews. The Integrated Media teacher will also assist on the data collection.

## 1.8 Literature review

Gay (1987:16) defines related literature in educational research as, "an informed assessment of the existing research on the topic under study." This section will therefore be a comprehensive approach (as comprehensive as possible) of discovering information that is linked to elementary school children's acceptance of technology – digital school libraries. The literature will be employed to support the research questions, the design and procedures of the study. Thus, the review of related literature is important in tying up all the important points of research as it traces the development of user acceptance of digital school libraries over time and highlights critical issues at stake.

Digital libraries have received much attention in research and practitioner literature (Vaidyanathan, Sabbaghi and Bargellini 2005; Hutchinson et al 2005; Druin 2005). Building a

digital library is an expensive and resource-intensive system just like any other information system. The growth and impact of digital libraries raise the need of determining its use or rejection by users. Druin (2005:21) states that, “Recent studies have shown that children (ages 7 – 13) have a strongly positive view of technology and that technology is a key part of how they define themselves.” On the other hand, Selwyn (2009:372) argues that aside from inequalities in access and engagement, there is mounting evidence that young people’s actual uses of digital technologies remain rather limited in scope. For many elementary school children and young people, technology use at home or at school remains rather less expansive and empowering than the rhetoric of the digital native would lead us to believe (Selwyn 2009). If technology is not used effectively by the children, the time and effort spent on using the technology become a waste. This study will make use of TAM to determine elementary school children’s acceptance of the digital school libraries at Crawford Preparatory Pretoria School.

Kun (2008); Molefe, Lemmer and Smit (2005) argue that TAM has been studied in work-related situations and little has been done in learning environments, especially those of elementary school children between the ages 3 and 12. The decision to use TAM is based on it being easier to apply. One key benefit of using TAM to understand system usage behaviour is that it provides a framework to investigate the effect of external variables on system usage (Hong et al as cited in Vaidyanathan, Sabbaghi and Bargellini 2005). TAM provides a basis for tracing the impact of external variables on internal beliefs, attitudes and intentions. The potential of TAM to examine many factors simultaneously, is a strong advantage for studying acceptance of digital school libraries as they encompass a wide variety of technologies, services and potential users.

South Africa has both characteristics of a developed country and a developing country. TAM is fairly accepted in the developed countries' context and there is no consensus on whether and how TAM functions in the developing countries' context (Miller and Khera 2010; Averweg 2008; Musa 2006). It is important to consider the influence of local conditions on the acceptance and assimilation of digital school libraries in South Africa. Contextual issues play a significant role in the applicability of TAM. One difference in contextual conditions between developed countries and developing countries is that to the vast majority of potential users in developing countries, acceptance is not about choice, because universal access to technology is not available (Musa 2006). Literature pertaining to digital school libraries in South Africa, the TAM and determinants of user acceptance will be discussed. Primary and secondary sources will be consulted. The detailed literature review of these issues is discussed in Chapter 2 of this dissertation (***see*** Chapter 2).

## 1.9 Research methodology

Research methodology is the overall approach to research linked to the paradigm or theoretical framework (Mackenzie & Knipe 2006). The study made use of a quantitative research approach. Quantitative research is an inquiry into a social or human problem based on testing a theory composed of variables, measured with numbers and analysed with statistical procedures, in order to determine whether the predictive generalisations of the theory hold true (Creswell 1994). The research employed a case study design as it aims to assess -in-depth knowledge of the perspectives of children at Crawford Preparatory Pretoria School on the use of digital school libraries.

Triangulated data collection methods, that is, both qualitative and quantitative data collection tools to research the same issue with the same unit of analysis, were employed. This study applied the use of questionnaires, observations, task-based approach and focus groups. How to use questionnaires, focus groups and task-based activities with children and how the tools can be adjusted to meet the understanding levels of children are discussed. By using the different data collection methods, the study gathered comprehensive data on the factors that influence children to accept digital school libraries. Statistical analysis of the data collected was carried out using computer software. The qualitative data was coded and analysed to interpret the lessons learnt from the data gathered. Tables, graphs and different charts were used to allow the researcher to systematically examine relations in the data gathered, as well as communicate results to the reader.

The target population consisted of all 100 of the grade six pupils (100%) at Crawford Preparatory Pretoria School. However, only 91 of these pupils were able to participate because they had signed consent forms. Of the 91 participants, only 81 (89%) took part in the answering of questionnaires.

**Table 1.2** Summary of the research methodology applied in this study

| **Phases** | **Data collection** |
|---|---|
| Observing the acceptance of the digital school library | Observation<br>Task-based approach |
| In-depth understanding of acceptance of both users and non-users of the digital school libraries | Focus groups |
| Quantitative data of the user population | Questionnaire |

(***see*** Chapter 3 for a detailed discussion on the research methodology)

## 1.10 Ethical considerations

There are ethical considerations involved in all research studies that involve human beings. In order to carry out this study, the researcher sought permission to conduct research at Crawford Preparatory Pretoria School. The researcher balanced the interests of the individual child with the best interests of the children as a group (Unisa Research Involving Children Policy – 2009). A parent's consent form (***see*** Appendix B) was distributed to obtain permission for the children to be involved in the study. The consent of the individual child (***see*** Appendix C), adapted to the understanding level of the child, was sought for research participation. Lewis and Lindsay (2000:39) assert that children are competent and can decide whether or not to participate in a research study, provided they have sufficient understanding of what participation entails and how it may affect them. The youngest age at which the child can decide on his own whether to participate is arbitrarily set at 7 years (Unisa Research Involving Children – 2009), which is the age of most grade one children. This research proposal fulfils the Unisa Policy on Research Ethics – 2\007.

All works consulted and quoted were acknowledged. Adherence to the policy ensured professionalism. The children's privacy was respected and this was reflected in the way the researcher interacted with them, in the tasks they performed and in the information that was gathered. In this context, the researcher subjected a project proposal, an ethical clearance form and the consent document to the Unisa Ethics Review Committee (ERC) for approval for the intended research. The consent of the principal (***see*** Appendix D) to undertake research during school hours was also sought.

## 1.11 Definition of terms

This section will define the key concepts in this study so as to clarify the way they are used in this study. Below are the key concepts that were identified in this study:

### 1.11.1 School Library

The school library is an educational resource centre for all learners and teachers in a school environment or setting (Fourie 2002:22). Boelens (2012:3) defines the school library as, "A learning environment that provides space (physical and virtual), access to resources, and services to encourage and support student and teacher learning." The UNESCO/IFLA School Library Manifesto 1999 lists the goals of a school library:

- Supporting and enhancing educational goals as outlined in the school's mission and curriculum
- Developing and sustaining in children the habit and enjoyment of reading and learning, and the use of libraries throughout their lives
- Offering opportunities for experiences in creating and using information for knowledge, understanding, imagination and enjoyment
- Supporting all students in learning and practising skills for evaluating and using information, regardless of form, format or medium, including sensitivity to the modes of communication within the community
- Providing access to local, regional, national and global resources and opportunities that expose learners to diverse ideas, experiences and opinions
- Organising activities that encourage cultural and social awareness and sensitivity

- Working with students, teachers, administrators and parents to achieve the mission of the school; proclaiming the concept that intellectual freedom and access to information are essential to effective and responsible citizenship and participation in a democracy
- Promoting reading and the resources and services of the school library to the whole school community and beyond

For the purpose of this study, a school library refers to a learning environment that provides access to educational and recreational resources to learners, teachers, administrators and parents.

### 1.11.2 Digital libraries

Digital libraries refer to a library in which collections are stored in digital format and are accessible through computers. The Digital Library Federation (n.d.) defines it as, "Organisations that provide the resources, including the specialised staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities". Digital libraries retain several qualities of traditional libraries such as focused collections, long-term availability and resource sharing. For the purpose of this study, a digital library will be defined as a resource that provides books and services of the traditional library in a digital form accessible through computers.

### 1.11.3 User acceptance

User acceptance is the demonstrable willingness within a user group to employ information technology for the tasks it is designed to support (Dillon and Morris 1996:1). Thus, the concept is not being to situations in which users claim they will employ it without providing evidence of use. Clearly, defining what acceptance of technology is and how it should be measured is an important step to understanding the factors that influence acceptance. In this study, user acceptance is also extended beyond a usability study by seeking to understand the reasons that might affect users' decision to accept or reject an information system.

### 1.11.4 Perceived Ease of Use

Perceived Ease of Use (PEOU) is the degree to which the users believe that using the system will be free from effort (Davis 1989). This construct of TAM assumes that users will only accept a system that is user-friendly. In this study, PEOU will be defined as the belief that the digital school library is easy to use.

### 1.11.5 Perceived Usefulness

Perceived usefulness (PU) is the degree to which a user believes that using a system will enhance his or her job performance (Davis 1989). This construct assumes that users will accept a system when they see that it improves their work performance. In this context, PU will be the construct that assumes that children will accept the school digital library because they believe that it will assist them perform better in school.

## 1.12 Summary and outline of the study

The aim of this chapter is to sketch the background and motivation of children's acceptance of digital school libraries and to lay the groundwork for the discussion in the rest of the dissertation. Determining factors that influence acceptance and/or rejection are an essential process as it will inform librarians and designers of the factors they should consider when building digital school libraries, thus making the libraries easy to use and useful to the children. The research problem is defined and research questions set.

The rest of the dissertation will comprise the following chapters explained briefly:

In a literature review, children's acceptance of digital school libraries is discussed. The literature review included issues such as digital school libraries in South Africa, TAM and determinants of elementary children's acceptance will be discussed. A critical outline of user acceptance theories that led to the development of TAM and the reason why TAM was chosen over other models were discussed. The use of TAM in a developing country context and in a learning environment involving elementary children was discussed.

The research methodology is discussed in greater detail in Chapter 3. This entails a discussion of why quantitative research, case studies and data collection methods are chosen and how the target population was sampled.

In Chapter 4, the findings of the study are presented on the extent to which PEOU and PU can influence the use and/or non-use of digital school libraries. Graphs, pie charts and line graphs are used to present the data gathered. In Chapter 5, the findings of the study based on research

questions and objectives of the study are discussed. Conclusions are drawn and recommendations made based on the results of the study.

References and appendices complete the dissertation. The next chapter will review related literature.

# CHAPTER TWO

# THEORETICAL FRAMEWORK AND LITERATURE REVIEW

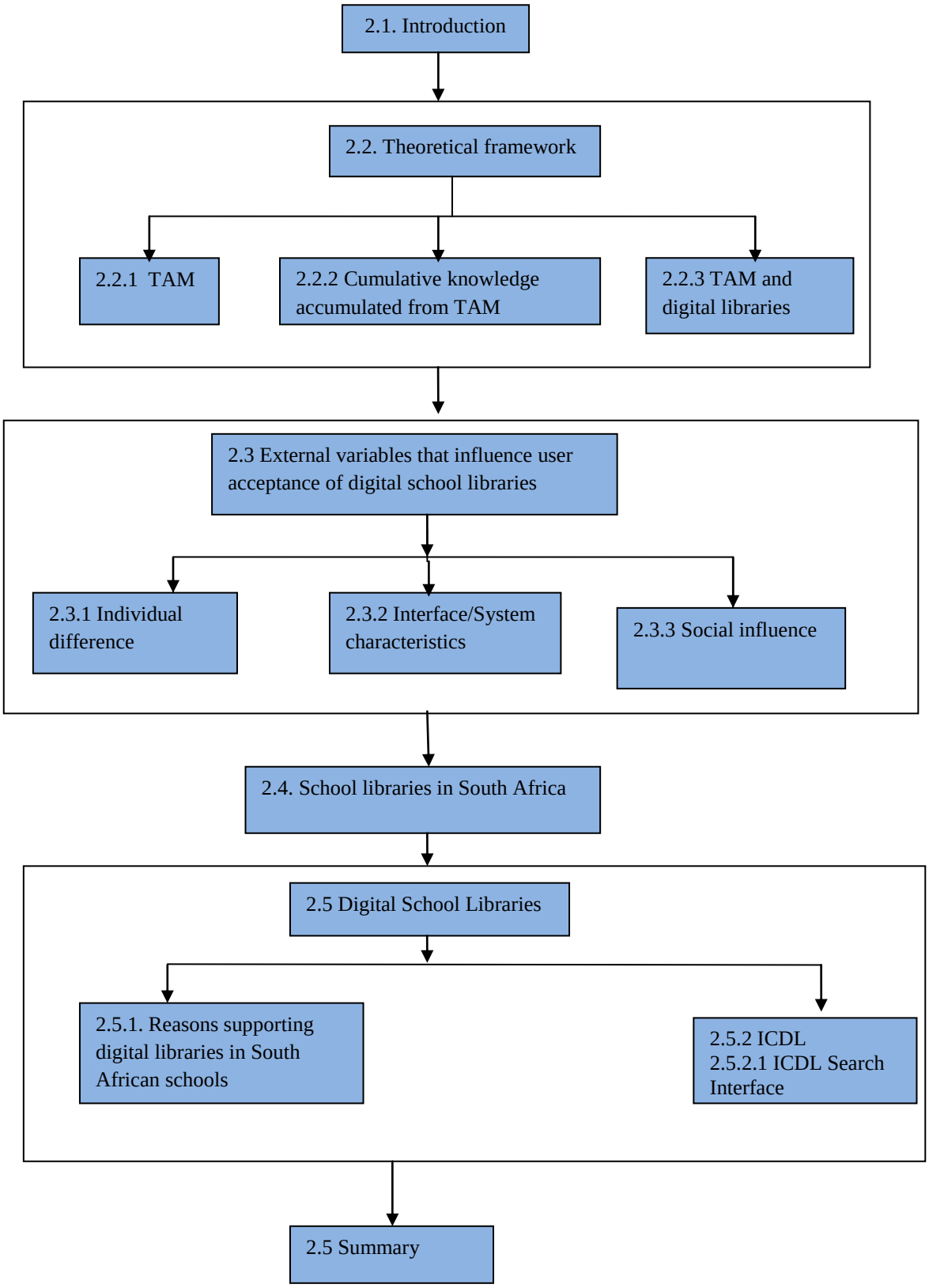



**Fig 2.1:** Literature review map

## 2.1. Introduction

Neuman (2012:74) defines a literature review as, "a carefully crafted summary of the recent studies on a topic with key findings and research methods." The goals of a literature review are to show the path of prior research and how the current project is linked to it. The literature rests on the assumption that knowledge accumulates, and we can learn from and build on the work of others (Neuman 2006; 2012). This chapter presents comprehensive information which is linked to elementary school children's acceptance of digital school libraries. The review will trace the development of user acceptance of digital school libraries over time and highlight critical issues at stake and thereby identifying the gaps this study will fill. Literature pertaining to digital school libraries in South Africa, theoretical framework and literature pertaining to user acceptance of digital school libraries will be discussed.

## 2.2. Theoretical framework of the study

Sinclair (2007:39) states that a theoretical framework can be regarded as a map or travel plan. When travelling to an unfamiliar country, people seek as much knowledge as possible about the best way to travel by making use of previous experience and accounts of others who have been on similar trips. Research is a journey towards destination (to develop new knowledge that will contribute to practice) and a theoretical map provides a guide. The theoretical framework is therefore the structure that holds and supports the theory of a research work. It serves as a lens that the researcher uses to examine a particular aspect of his or her study (Ocholla & Le Roux 2011). The theoretical framework will aid in examining how key variables may or may not differ in different backgrounds. It will also provide a context for interpreting study findings and

clarifying concepts, and propose relationships among the concepts in the study (Ocholla & Le Roux 2011). This study will utilise the TAM to determine children's acceptance of digital school libraries. PU and PEOU constructs of TAM (***see*** Section 2.2.1.1) will be examined to find the key variables that influence children's acceptance of digital school libraries.

### *2.2.1. Technology Acceptance Model*

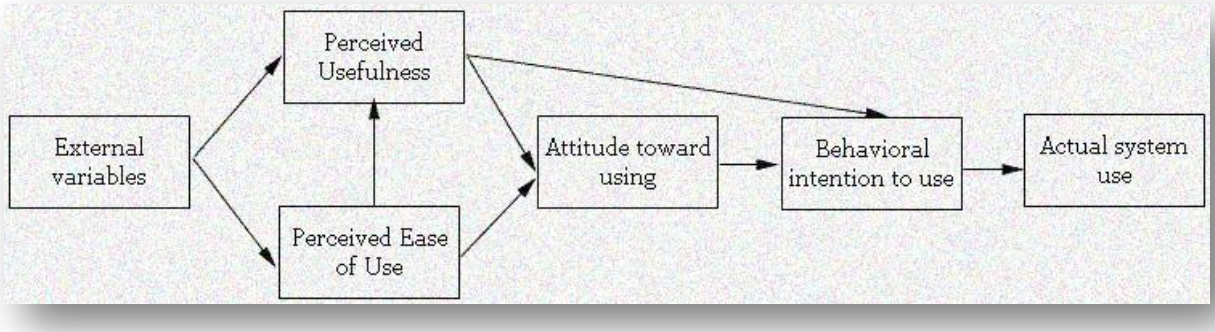



**Fig 2.2**: Technology Acceptance Model (TAM) by Davis et al (1989)

TAM was developed by Davis in 1989 to determine initial acceptance of information systems. Ajzen (1991) as cited in Liao, Palvia & Chen (2009:310) defines Behavioural Intention (BI) as, "A measure of the strength of one's willingness to try and exert while performing certain behaviour. Attitude refers to the degree of a person's positive or negative feelings about performing the target behavior (Davis 1989)." BI and Attitude (A) are internal variables that have a direct effect on use. TAM states that BI and A are motivated by two constructs, namely PU and PEOU, which predict information systems' acceptance and thus influence the design of better systems (Davis 1989; Legris, Ingham & Collerette 2003; Venkatesh & Bala 2008). TAM is an adaptation of the Theory of Reasoned Action (TRA) proposed by Fishbein & Ajzen (1975) to explain and predict the behaviours of people in a specific situation (Legris, Ingham & Collerette 2003). A key purpose of TAM is to provide a model of tracing how external variables

influence beliefs, attitudes and intentions to use information systems (Hong, Hwang, Hsu, Wong & Chen 2011). TAM has received wide attention in information systems research due to the following three reasons as stated by Liao, Palvia & Chen (2009:310):

a) It has a strong foundation in psychological theory (Chau 1996; Taylor & Todd 1995). This enables examination of behaviour and attitude.

b) It is parsimonious and can be used as a guideline to develop successful information systems (Venkatesh & Davis 2000)

c) Past research supports the robustness of the model across time, settings, populations and technology (Davis 1989; Venkatesh & Davis 2000)

It is because of the reasons stated above that TAM was chosen as a theoretical framework to examine the children's acceptance of digital school libraries at Crawford Preparatory Pretoria School in Gauteng. TAM provides a theoretical basis for determining external variables that affect users' beliefs, attitudes and intentions, and thereby affecting IT usage behaviour (Hong et al 2011).

#### 2.2.1.1 TAM constructs

PU is defined as the degree to which a user believes that using a system will enhance his or her work (Davis 1989). In this study, PU will be defined as the belief that children believe that using the digital school library will enhance their school work and literacy. Bar-IIan, Peritz and Wolman (2003); and Baruchson-Arbib and Shar (2002) call this factor benefits, that is, the

children will only accept or use the digital library if they believe that it will benefit them either in their school work, or in life, or both. The value of benefits that the school digital library has for the user is largely influenced by the relevance of the material for the children's needs. He (n.d.) states that, "the construct of PU has been consistently proved as one of the most powerful factors for predicting the user's intention to use information systems. The integrity of the actual books, users' comfort and confidence in the system, security, and the fast response time belong to this construct.

PEOU is defined as the belief that using a system is free from effort (Davis 1989). The PEOU construct spells out the usability of the digital library. Usability implies that the system can be used without encountering problems. Vaidyanatha, Sabbaghi and Bargellini (2005:281) posit that the key ingredient for successful use of a digital library may well be the user's expertise with search functions. Nicholson (2004) also views users' use of library services as being affected by their awareness. Usability is often linked to certain qualities of the user interface, such as clear instructions, the help menu, font, images and navigation, which are under the control of the designers. User interface is the connection between the users and the system. It is the first thing they see. As the English saying goes, 'first impressions last the longest.' Children often use different search criteria such as the number of illustrations, preferred genres and recommendations, which are not supported by most digital libraries (Kuhlthau, 1998; Fleener, Morrison, Linek & Rasinski, 1997 and Cooper, 2002). Users need to be able to navigate through the digital library with a certain sense of ease, or else they may become frustrated and decide not to use the digital library.

Within TAM, PEOU will indirectly impact on PU and A. Hong et al (2011:2087) assert that, "We often discuss people's acceptance of new information technology, but overlook an

individual's values and habits, as well as social influence." TAM takes into consideration the individual beliefs of users. Attitude (A) in turn leads to BI using (accepting) or rejecting the technology. Attitude is a more stable, enduring and vital determinant of BI. It also appears to be a good variable to explain long-term user continuance behaviour (Liao, Palvia & Chan 2009). Attitude and PU predict the individual's BI to use technology. PEOU is the antecedent of PU because, through PU, PEOU indirectly influences A and BI (Hong et al 2011). Research has shown the positive effect of PU on A and BI (Davis 1989; Hong et al 2011; Legris, Ingham & Collerette 2003; Liao, Palvia & Chen 2009; Venkatesh & Davis 1996 and 2000).

### *2.2.2 Cumulative knowledge from TAM research*

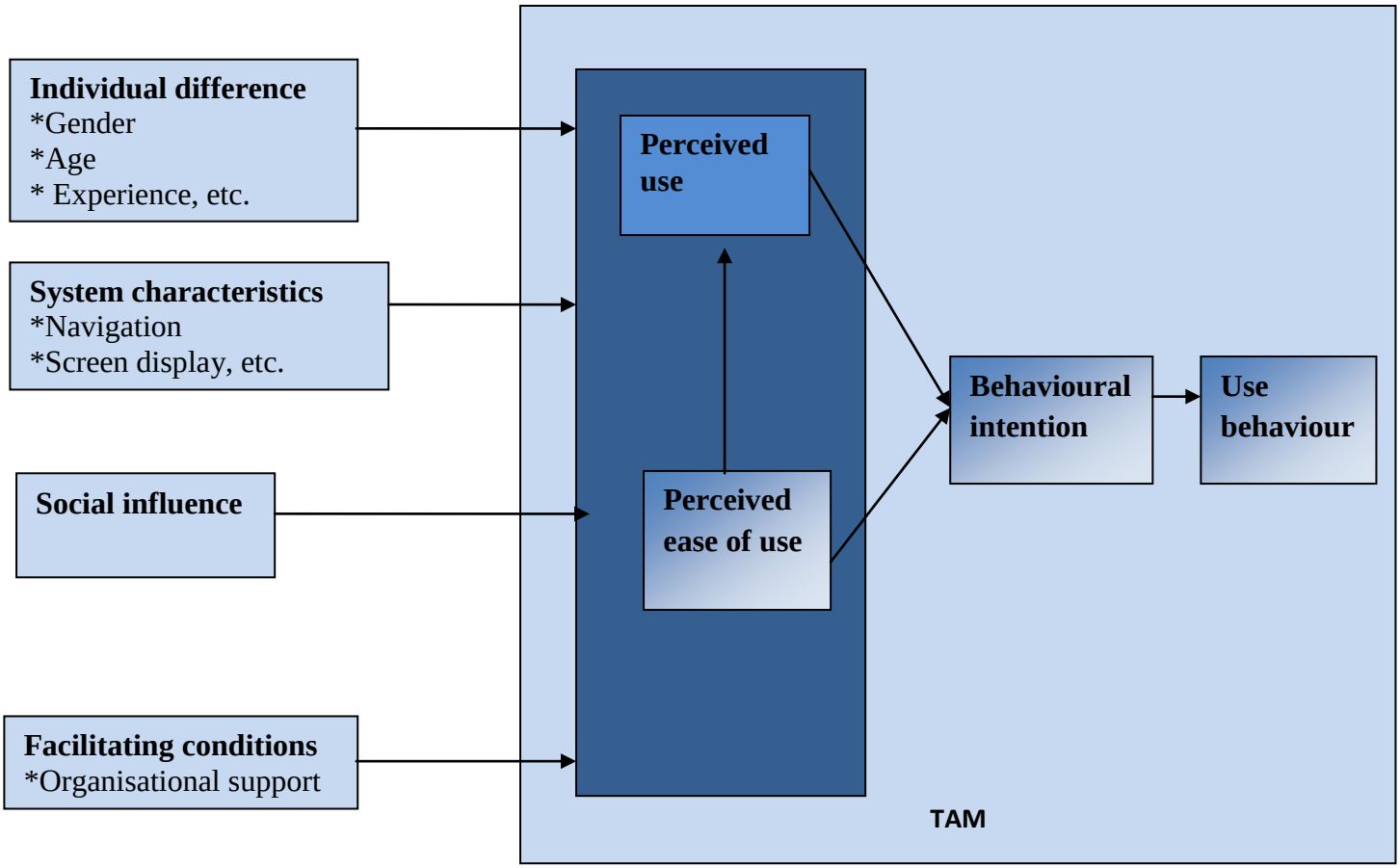



**Fig 2.3**: Theoretical Frameworks that represent the cumulative knowledge from TAM research (Venkatesh & Bala 2008)

The introduction and acceptance of information technology in business and education have been the subject of worldwide discussion as evidenced by the extensive literature examining factors that influence its acceptance (Averweg 2008; Baskerville & Pries-Heje 2001; Comin & Hobjin 2004 and Kyobe 2008). TAM has been well tested and proven to be quite reliable and robust in predicting user acceptance (Chrisma & Wiley-Patton 2003). Venkatesh and Davis (2000) conceptualise acceptance as an outcome variable in a psychological process that users go through in making decisions about technology. Inclusion of external variables provides the possibility of examining the contextual factors that are critical when TAM is applied in different settings. TAM has been extended to cater for these external variables and this has led to the development of TAM2 by Venkatesh and Davis (2000) and TAM3 by Venkatesh and Bala (2008).

Venkatesh and Davis (2000) proposed an extension of TAM – TAM2, by including social influence (subjective norms, voluntariness and image) and cognitive instruments (job relevance, output quality and result demonstrability) as variables for predicting perceived usefulness (PU) and PEOU. The two moderators for PEOU are experience and voluntariness. The construct subjective norm (SN) is adapted from Theory of Reasoned Action and is a direct determinant of behavioural intention. It is defined as “a person's perception that most people who are important to him think he should or should not perform the behaviour in question”. Subjective norm includes the belief that using an information system will enhance how people view each other and therefore translates to the image. These social influences have an effect on the attitude to use.

It is clear from the literature review and Venkatesh and Davis’ (2000) results that SN has a significant effect when the use of the new information system is mandatory and not voluntary. Job relevance is the individual’s perception of the degree to which technology is applicable to

their job. Output quality is an individual's perception of how well a system performs tasks necessary to their job. Result demonstrability is the tangibility of the results of using the technology. TAM2 theorises that an individual's mental assessment of the match between important work goals and the consequences of performing job tasks using a system serves as a basis for forming perceptions regarding the usefulness of the system (Venkatesh & Davis 2000). TAM2 posits that perceived ease of use and resultant demonstrability will have a positive direct influence on perceived usefulness. Job relevance and output quality will have a moderating effect on perceived usefulness such that the higher the output quality, the stronger the effect that job relevance will have on perceived usefulness. According to the authors, TAM2 explains up to 60% of variance. Venkatesh and Davis (2000) found strong support for TAM2 in longitudinal field studies conducted at four organisations.

Venkatesh (2000) argues that individuals will form early perceptions of PEOU of a system based on several anchors related to the individual's general beliefs regarding computers and computer use. These beliefs include computer self-efficacy, computer anxiety, computer playfulness and perceptions of external control or facilitating conditions. This leads to the development of TAM3 that posits that the effect of PEOU on PU will be moderated by experience. One of the most important theoretical contributions of this study is the role of experience as a moderating factor. The effect of perceived ease of use on behavioural intention may diminish across time, but experience plays an important role as the effect of PEOU on PU becomes stronger across time. The determinants of PEOU (computer self-efficacy, perceptions of external control, computer anxiety, computer playfulness, perceived enjoyment and objective usability) will not have any significant effect on PU over and above the determinants of PU (Venkatesh and Bala 2008).

Within TAM3, computer self-efficacy is the degree to which an individual believes that they have the ability to perform a specific task using the computer. Perception of external control is the degree to which an individual believes that organisational and technical resources exist to support the use of the system (Venkatesh, Morris, Davis & Davis 2003). In this study, the perception of external control implies the belief that the learners have that the school supports the use of the digital school libraries. Computer playfulness is the degree of cognitive spontaneity in computer interactions. Perceived enjoyment is the extent to which the activity of using a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from system use (Venkatesh 2000). Objective usability is a comparison of systems based on the actual level (rather than perceptions) of effort required to completing specific tasks (Venkatesh 2000). TAM3 posits three relationships:

a) That, with increasing hands-on experience with a system, a user will have more information on how easy or difficult the system is to use. While PEOU may not be as important in forming BI in a later period of system use (Venkatesh et al 2003), users will still value PEOU in forming perceptions about usefulness.

b) Experience will moderate the effect of computer anxiety on PEOU, such that with increasing experience, the effect of computer anxiety on PEOU will diminish. We expect that, with increasing experience, system specific beliefs, rather than general computer beliefs, will be stronger determinants of PEOU of a system.

d) Experience will moderate the effect of PEOU on behavioural intention such that the effect will be weaker with increasing experience. PEOU – that is, how easy or difficult a system is to use – is an initial hurdle for individuals while using a system (Venkatesh 2000).

In their study, Venkatesh and Bala (2008) found that experience moderated the effect of PEOU on PU such that with increasing experience the effect became stronger. TAM3 was able to explain between 52% and 67% of the variance in PU across different time periods and models.

TAM has been studied in work-related situations and little has been done in learning environments, especially those of elementary children between the ages 7 and 13 (Kim, 2008; Molefe, Lemmer & Smit 2005). The decision to use TAM in this study was based on the fact that it is easier to apply, as compared to other acceptance theories. One key benefit of using TAM to understand system usage behaviour is that it provides a framework to investigate the effect of external variables on system usage (Hong, Thong, Wong & Kar-Yantam 2002 as cited in Vaidyanathan, Sabbaghi and Bargellini 2005). Hong et al (2002) adapted TAM to examine the acceptance of digital libraries. They introduced external variables which affect perceived usefulness and perceived ease of use. Variables of individual differences include computer self-efficacy and knowledge search domain, and variables for system characteristics include relevance, terminology and screen design. The result of Hong et al's (2002) study was an augmented TAM explaining the 52 per cent of variance in behaviour intention with perceived usefulness as the most significant core construct. TAM provides a basis for tracing the impact of external variables on internal beliefs, attitudes and intentions. The potential of TAM to examine many factors simultaneously is a strong advantage for studying acceptance of digital school libraries as they encompass a wide variety of technologies, services and potential users.

South Africa has the characteristics of both a developed and developing country, it has good infrastructure and buildings but there are many social economic problems thus making it a developing country. TAM is fairly accepted in the developed countries' context and no consensus can be reached on whether and how TAM functions in the developing countries' context (Averweg 2008; Miller and Khera 2010; Musa 2006). It is important to consider the

influence of local conditions on the acceptance and assimilation of digital school libraries in South Africa, hence this study. Inclusion of external variables provides the possibility of examining the contextual factors such as language incompatibility and low system accessibility, which are often important in developing countries (Park, Roman, Lee & Chung 2009). Contextual issues play a significant role in the applicability of TAM. One difference in contextual conditions between developed countries and developing countries are that, for the vast majority of potential users in developing countries, acceptance is not about choice, because universal access to technology is not available (Musa 2006). In developing countries the value given to ICT by individuals (embodied either in perceived usefulness or perceived ease of use) is greatly influenced by many external factors, particularly the availability of resources and other pressing basic needs (Anandarajan, Igbaria and Anakwe 2002; Kyobe 2011; Musa 2006). This study aims to advance the literature by applying TAM in a developing world and in an elementary learning context. The conclusions of this study are therefore relevant to further research and practice both dealing with digital school libraries and IT implementation in developing countries.

### *2.2.3 TAM and digital libraries*

Numerous studies have been done that involve the acceptance of digital libraries using TAM (Hong et al 2002; Miller & Khera 2010; Nov & Ye 2008; Nov & Ye 2009; Park et al 2009; Pratminingsih & Hendei (n.d); Thong, Hong & Tam 2002; Tibenderana, Ogao, Ikoja-Odongo & Wokadala 2010; Vaidyanathan, Sabbaghi & Bargellini 2005). Most of these studies were undertaken with university learners and the survey method was used. Thong, Hong & Tam (2002) and Hong et al (2002) used telephone interviews to gather the data. Of the studies, the one by Tibenderana et al (2010) is the only one that used observation as a data-gathering tool.

Park et al (2010); Miller & Khera (2010) and Tibenderana et al (2010) undertook their studies at universities in developing countries as they believed that external factors in developed countries and developing countries differ and thus acceptance of technology differs.

However, very few studies have been undertaken of the acceptance of technology by elementary children (ages 7 – 13 years). Five studies were identified, namely Joeng (2011); Lin (2009); Mordis, Hoffman & Marshall (2008); Shen & Chuang (2009); and Shih, Shih, Li1, Chen, Chen & Chen (2011) that studied the acceptance of different technologies by elementary school children. Mordis, Hoffman & Marshall (2008) and Joeng (2011) studied digital libraries specifically. Joeng (2011) established that interface characteristics (terminology, screen display and navigation) can indirectly influence PU via PEOU. This is in line with all the studies that have been undertaken using TAM to understand acceptance of technology. Joeng also observed that system quality positively influences both PU and PEOU. He concluded that the total influence of PEOU can be singled out as a primary determinant of BI by elementary school children to use technology. However, all five the studies used the survey method to collect data. This study therefore seeks to fill the gap by using multiple data collection tools to study the acceptance of digital school libraries by children.

### 2.3. External variables that influence user acceptance of digital school libraries

External variables provide a better understanding of what influences PU and PEOU, their presence guides the actions required to influence greater use (Legris 2003). External variables help explain user acceptance in developing countries as issues of culture, language and access are dealt with, thus ensuring the applicability of TAM in developing countries (Averweg 2008; Brown 2002; Kyobe 2011 and Park et al 2009). There are three main external variables that

influence user acceptance – interface/system characteristics, individual difference and organisational context. External variables provide the bridge between the internal beliefs, attitudes and intentions represented in TAM and the various individual differences, situational constraints and managerially controllable interventions impinging on behaviour (Davis 1989). Individual attributes that ease and motivate users to search for library systems and system characteristics that assist these activities are critical in increasing users' BI to use computers (Park et al 2009). Interface characteristics as the system interface, are the door through which users access a digital library; organisational context in which the digital library operates; and the individual differences users hold in the ultimate acceptance of a digital library. Some of the determinants, such as system characteristics, computer playfulness and computer anxiety should be considered as salient features that can help individuals develop favourable perceptions of the usefulness or ease of use of a system (Venkatesh & Bala 2008). Various factors of the external variables have been identified that influence user acceptance and summarised in the **Fig 2.8** below.

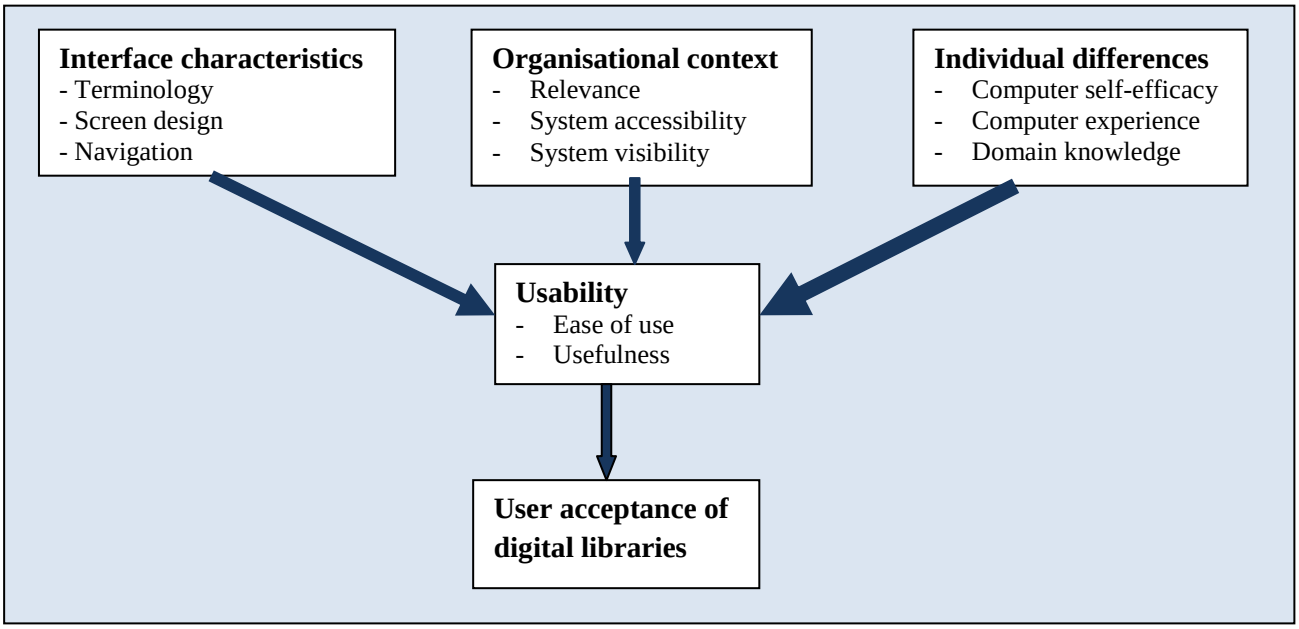



**Fig 2.4:** Model of user acceptance of a digital library (Thong, Hong & Tam 2004:80)

### *2.3.1 Individual difference*

The acceptance of digital libraries may vary from individual to individual, depending on personal characteristics of the individual. Previous studies have examined the impact of various individual factors on information system adoption behaviour (Chou et al 2009; Joeng 2011; Martens 2012; Nov & Ye 2008; Thong, Hong & Tam 2002; Thong, Hong & Tam 2004; Venkatesh & Davis 2000). The term 'Individual difference' entails the different characteristics of the user that affect their acceptance of technology. Personality traits such as the need for achievement, degree of defensiveness, locus of control, and risk-taking propensity are frequently proposed as important predictors of acceptance (Dillon (n.d.)). Thong, Hong and Tam (2004) identify three main factors for individual difference. These include computer self-efficacy, computer experience and domain knowledge. Computer self-efficacy is defined as an individuals' judgement of his capability to use new information systems (Thong, Hong & Tam 2004). They further state that computer self-efficacy measures the confidence the individual has when using a digital library they are not familiar with. Computer experience reflects how long a person has used computers and his or her level of expertise (Thong, Hong & Tam 2004). Computer self-efficacy has been shown in several studies to influence perceived ease of use of technology (Venkatesh and Davis 1996, Venkatesh 2000). Users will be more exposed to software and this will enable them to accept new systems easily.

Domain knowledge is the ability to separate relevant information from irrelevant information when using a system. Miller and Khera (2010:5) define domain knowledge as, "The person's knowledge of the respective discipline, domain or area that is relevant to the database search". In the virtual environment of digital libraries, unlike in a physical environment where end-user support or managerial support is generally available, there is nobody the user can consult. Under such conditions, the user's background knowledge of search domain can support easier

interaction with digital libraries immensely (Thong et al 2000). Children may also experience confusion after accessing information that is inconsistent with their existing mental constructs and this sensation may lead to the emergence of more information needs (Shenton & Hay-Gibson 2010). When users have better knowledge of the subject domain, they are more proficient in producing suitable queries, interpreting outputs of those queries, and adjusting their searches accordingly. Consequently, they will be more eager to use a digital libraries (Thong, Hong & Tam 2004).

Further, Venkatesh (2000) suggests that individuals form PEOU about a specific system by anchoring their perceptions to the different general computer beliefs and later adjusting their perceptions of ease of use based on hands-on experience with the specific system. Brown (2002) also adds computer anxiety as an individual difference factor. He defines it as a user's general concern about having the ability to succeed with a new system (Wexler 2001 as cited in Brown (2002: 6). Venkatesh (2000) argues that computer anxiety will influence the perceptions of PEOU, especially during the early periods of adoption. Learners who experience a high level of computer anxiety have been found to avoid computers or general areas where computers are found, be extremely cautious with computers, possess negative feelings about computers and shorten the necessary use of computers (Bozionelos, 2001 as cited in Teo 2007). Venkatesh and Bala (2008) also add demographic information, such as age and gender, to the individual characteristics variable.

Venkatesh (2000) also adds computer playfulness as an individual difference variable. Webster & Martocchio (1992) as cited in Venkatesh and Bala (2008:279) defines computer playfulness as "The degree of cognitive spontaneity in microcomputer interactions." It is the enjoyment that the users get when they use a system, regardless of its functionality. Those who are more "playful" with computer technologies in general are expected to indulge in using a new system

just for the sake of using it, rather than just for the specific positive outcomes associated with use. Such playful individuals may tend to "underestimate" the difficulty of the means or processes of using a new system because they quite simply enjoy the process and do not perceive it as being an effort compared to those who are less playful (Venkatesh 2000). The perceptions of control (over a system), enjoyment or playfulness related to a system, and anxiety regarding the ability to use a system do not provide a basis for forming perceptions of instrumental benefits of using a system. Therefore, determinants of perceived ease of use (individual differences) have no influence for perceived usefulness (Venkatesh and Bala 2008).

'Individual difference' plays an important role, especially for children as they are often overlooked when technology is designed (Druin 2005). Druin (n.d) states that, "Children have their own likes, dislikes, curiosities and needs that are not the same as their parents and teachers." Berman (1977) as cited in Druin (n.d.) asserts that children are sometimes forgotten and taken as just 'short adults' yet they are 'but an entirely different user population' with their own culture, norms and complexities. Children have different developmental stages, they might be of the same age but their cognitive and motor skills differ and therefore PEOU (Bilal 2005; Bilal & Bachir 2007; Gelderblom 2008; Martens 2012 and Waldman 2007). Hourcade (2004) as cited in Waldman (2007:8-9) notes that motor skills can lead to a huge difference in design and accessibility of documents from a digital library meant for children: the youngest children have the most difficult time adjusting the mouse to move it in the intended direction and are better able to "click" on their target. Those with much experience with computers would have mastered how to use the mouse and would therefore be able to use the digital library.

Cooper (2002) as cited in Druin (2005:23-24) found that children looked primarily at the book's cover, pictures and title when selecting books from a shelf and used these as selection criteria. Most children knew about looking at the table of contents, index or glossaries but still looked

primarily at covers. Bilal and Bachir (2007) as cited in Martens (2012:159) state that while children enjoy using technology they experience difficulties formulating adequate search strategies, commit spelling errors, use Boolean operators incorrectly, and employ search syntax that is not supported in the system used. Therefore, the domain knowledge for children differs, as they would consider a relevant book based on its cover, illustrations and title. The ICDL have multiple query interfaces designed for different levels of users.

### *2.3.2 Interface / System characteristics*

Interface characteristics enable users to interact with the system. Thong, Hong and Tam (2002:212) state that the interface is a medium between the users and the system and thus serves as a platform for users' actions. How well a user interface is designed greatly influences how effectively users can achieve desired goals with a computer system. A well-designed interface can help users to use the system more easily by reducing the effort to identify a particular object on the screen, or providing smooth navigation among screens (Meadow, Wang and Yaun (1995) as cited in Thong, Hong and Tam (2002). Interface characteristics are important in the acceptance of technology behaviour as users access an information system through its interface. The design of the digital library plays a pivotal role in its acceptance and use by the users. Three system characteristics –navigation, terminology and screen design – are critical external determinants of TAM. They were selected because they have frequently been mentioned in the library science literature as being pertinent to the digital library context and inherent in information retrieval systems.

Terminology refers to the words, sentences and abbreviations used by a system (Lindgaard as cited in Hong et al 2002). Thong, Hong and Tam (2002:219) state that, "The success of a digital

library, which is a new generation of information retrieval systems, depends very much on how users interact with the system through structured queries, which in turn depends on how users understand the terminology used by the digital library". They further explain how terminology can result in retrieval of undesired information, as they will be a mismatch of the words from the user and the digital library. It is crucial that the terminology used in the databases should be adapted to the user's vocabulary. Eliminating jargon on a search form can be one solution (Kim 2006). The searching and browsing interfaces are important if the children are to achieve their goal of using libraries. Hutchinson (2004: n.p) asserts that,

> Many interfaces geared towards elementary-age children suffer from one of two common problems. Firstly, many assume that children can spell, type, read, navigate, compose queries, and/or select small objects. Secondly, many assume that children search for books using the same criteria as adults.

Usability is frequently linked to certain qualities of the searching and browsing interface. Kuhlthau (as cited by Hutchinson 2004) states that, "children often use different criteria such as number of illustrations, preferred genres and recommendations that are not supported by most digital libraries." Children, like adults, can also become frustrated when interfaces fail to take advantage of human perceptual abilities. The reason for their acceptance for and better performance with browsing interfaces are related to their physical and cognitive development. Young people tend to overestimate their information-seeking skills. Many are still novices when it comes to searching, selecting and assessing the meaning and value of information they need (Harris 2008). The fact that the interface-related system characteristics only have significant effects on perceived ease of use of the digital library suggests that users will hardly find the digital library more useful simply because they like its interface. A user-friendly interface can help users to use the digital library more easily, but by itself, will not make the digital library

more useful (Hong et al 2002). Clear terminology increases the ease of use of digital libraries by providing effective communication of system instructions and responses to users.

Screen design is the way in which information is presented on the screen (Lindgaard as cited in Thong, Hong & Tam 2002). A good screen design can create a comfortable virtual environment where users can easily identify functional groups and navigation aids, freely move around and scan search results, and make more efficient searches (Hong et al 2002). Screen design is essential in younger children (under age eight) who may be non-readers, emergent readers or beginning readers, and who rely heavily on visual and auditory cues (Cooper as cited in Druin 2005). Therefore, having tools that ignore children's unique user requirements can severely limit not only children's ability to find what they are looking for, but also their possibilities for future cognitive and social development (Druin 2005). Thong, Hong and Tam (2002:220) add that, "The way that information is arranged on the screen can influence the users' interaction with digital libraries beyond the effect of the information content". Bilal's study (2005) on the information seeking of children concludes that, " In children's eyes, the visual design of a successful portal is one with a fun name, colourful background and foreground, large fonts, graphics and animation, recognisable characters, suitable vocabulary, well laid out screens and no advertisements". However, while the graphics on the digital library are very colourful and fun to use, the fact of response time should not be overlooked as it is also a variable that influences acceptance.

Navigation is defined as, "The ease with which users can move around the system" (Thong, Hong and Tam 2004). Navigation offers the users of a site easy access to information of interest, the ability to move around within the system, or the ability to access other sites (Ramayah, 2006 as cited in Jeong 2011). As the information storage structure in systems becomes more complicated, users can easily become lost in their efforts to navigate such

information-intensive systems (Dillon, 2000). The cognitive load necessary to navigate a conceptual space with a complex structure and few unique landmarks is the major reason for disorientation (Marchionini et al as cited in Thong et al 2002). In their study, Thong et al (2004) concluded that navigation clarity has a relatively smaller but significant effect on PEOU of digital libraries. The design of a digital library's interface should enable easy navigation among different modules. Proper cues, such as navigation aids, can be provided for users to prevent disorientation by indicating where they come from and where they are going to in a sequence of query screens. Descriptive labels can also help users make more efficient navigational decisions when searching for information. Successful navigation of an information system and accurate searching of the resources depend on the clarity of the terminology used.

Navigation is an issue with young children who have not yet mastered the use of the mouse. In a study by Ellis and Blashki (2004) it was observed that younger children have difficulty with fine motor skills and control necessary to remain within the boundary of the screen, therefore the cursor often remains at the edge of the screen for a considerable length of time. To deal with the specific constraint of non-linear presentation, the children need to acquire specific strategies, as the knowledge of where they are, deciding which will be the next step, and constructing a cognitive representation of the content structure. Thus, the interface features, as the graphical representations in hypertext areas, show a structuralised information context, the main function of which is to help navigation (Carusi & Mont'Alvao (n.d.)). They further conclude that the inquiry of the cognitive processes generated by the delineation of the external behaviour in the navigation is a basic need for the system's success. Navigation is an important aspect as access platforms are changing and children can now access the internet on mobile phones (Bederson, Quinn and Druin 2009; Hall 2010).

The review of the ICDL by Link (2011) states that from the item record screen, the user can click to “Read this Book.” The initial screen in the screen reader shows thumbnail images of all the pages in the book, and the user can click on any page to begin reading. The books are easy to navigate with buttons that appear on the top right of the main navigation bar at the top of the screen. Users can make the book full screen, zoom out, zoom in, view one page or two adjacent pages, turn one page back and turn one page ahead. Forward page turns can also be done by clicking on the book itself. Users can easily navigate back to the “About This Book” item record or go back to their original search by clicking on the appropriate link in the breadcrumb trail. The digital library builds navigation skills and digital literacy. Hall (2010:5) adds that, “Through the use of this site, users are able to gain a better understanding of how internet systems work”.

### *2.3.3. Social influence*

The study will also make use of one of the constructs of the Unified Theory of Acceptance and Use Technology (UTAUT) (Venkatesh et al 2003), the social influence construct. Social influence in the context of this study is defined as the perceived external pressure that individuals feel in the process of being informed about an innovation that influences their decision to use it, and the degree to which an individual perceives how important others believe she or he should use the new system. Gender, age and experience are posited as factors mediating the impact of social influence on usage intention and behaviour. Age and education have been shown to influence system use in some context. Coupling social variables with contextual knowledge improves matters substantially and variables such as training, experience and user involvement correlate well with the acceptance of digital school libraries. When a large

portion of an individual's referent social group holds a particular attitude, it is likely that the individual will also adopt it (Venkatesh et al 2003).

## 2.4 School libraries in South Africa

A school library is a library in a school where learners and staff have access to a variety of resources. Its main goal is to ensure that all members of the school community have equal access to books and reading materials, information and information technologies to support their studies and leisure activities. The school library manages a central collection of diverse learning resources to support a school's curriculum, meet individual learners' needs and interests, and ensure that young people develop information literacy skills within the school's curriculum. Thuthong Portal (n.d.) defines a school library as a service that provides access to education in the use of a wide range of learning, information and reading resources in different formats. The three fundamental purposes of school libraries are to develop lifelong learning, information literacy and to develop a reading culture (Thuthong Portal). The IFLA/UNESCO School Library Manifesto (1999) states the mission of a school library as:

> The school library provides information and ideas that are fundamental to the functioning successfully in today's information and knowledge-based society. The school library equips learners with lifelong learning skills and develops the imagination, enabling them to live as responsible citizens.

The above mission of school libraries shows how critical it is for all schools to have libraries. The National Norms and Standards for School Infrastructure (Department of Education 2008) posit that libraries are part of the learning space and therefore every school must have one. The

Department of Education has also taken on a developmental approach towards equipping every school with a library with the issuing of the National Guidelines for School Library and Information Services (2012). The guidelines provide information that is important to the provision of school libraries.

NEIMS states that in 2011, South Africa had 5 252 (21%) ordinary schools with libraries. Ordinary schools are those that do not offer special education, such as the school of the deaf. They further state that among these schools, 1 855 (7%) have stocked libraries. The report also states that in Gauteng there are 2 031 schools and 1 191 (59%) of them have libraries, and of these 1 191 school libraries only 385 (19%) were fully stocked. This therefore leaves 840 (41%) schools without stocked libraries in Gauteng and 19 541 (79%) in South Africa (NEIMS 2011 Report & Equal Education). Kotlolo & Grobbelaar (2011) quote the Minister of Basic Education, Angie Motshekga, saying that, "Fewer than 4 000 of South Africa's 22 000 primary schools have libraries. Only about 18% (3 960) have libraries." Gauteng has the highest number of school libraries (59%), however; it is difficult to interpret the figure since many schools have rooms originally intended to be libraries being used otherwise (Dlamini & Brown 2010; HSRC audit 1999; Thuthong). Dlamini and Brown (2010:2) state that, "In a survey in Gauteng in 2010, 25% of the schools in the province had functional libraries, 11% of the disadvantaged schools were found to have libraries. This is far better than the estimated national average of schools with libraries." The National Reading Strategy 2008 also states that the many existing libraries are often used as classrooms or are closed for the biggest part of the day because the librarian is also a full-time teacher. This therefore implies that the situation has not changed much from 2008 to 2011 when the NEIMS report was written.

Several newspaper articles (Besta 2012; Grobbelaar 2011; Kotlolo & Grobbelaar 2011; and Monama 2012; Cape Town Staff Writer 2013; Phakathi 2013) refer to a shortage of school

libraries. Grobbelaar (2011) quotes Prof Genevieve Hart of the University of Western Cape saying, “School library statistics are ‘scandalous’.” Dlamini and Brown (2010) also assert that school library surveys in South Africa are notoriously unreliable as the definition of functionality is left to the readers’ discretion. Hart believes that the lack of libraries has a direct impact on poor literacy levels in the country. Improving literacy is the number one reason to have libraries (Grobbelaar 2011). Hell (2005:15) states that, “School libraries could be important agents in the understanding and teaching of information literacy in several aspects, if they are used as agents in schools with learner-centred pedagogy, promoting democracy and human development, against inequality and social exclusion.” Streatfield & Markless (as cited in Hell 2005:18) assert that the library is sometimes seen as a way of ‘opening up’ the school to more flexible teaching methods and as a centre for cross-curriculum activity within the school.

The new curriculum introduced in South Africa in 1996 (Curriculum 2005) and its revision (The Revised National Curriculum Statement (RNCS) (South Africa 2002)) advocate for outcomes-based education, that is, the process of learning is as important as the content. Both the process and the content of education are emphasised by spelling out the outcomes to be achieved at the end of the process. The outcome and assessment standards emphasise participatory, learner-centred and activity-based education. The South African version of outcomes-based education is aimed at stimulating the minds of young people to enable them to participate in economic and social life (Department of Education (n.d)). Curriculum 2005 and the RNCS offer opportunities for the development of school libraries as active learning implies that learners should not limit themselves to materials supplied by their teachers, but that they also have to search for information themselves. De Vries (2002), as cited in Hart & Zinn (n.d.), asserts that Curriculum 2005 needs adequate resources (for the new outcome-based approaches) and that adequate provisioning of school libraries was being accelerated.

The National Department of Education has instituted measures to accelerate library provision. One of the measures is the provision of mobile libraries to remote schools in the country. Kotlolo & Grobbelaar (2011) report that there are 32 mobile libraries in the country, with five being used in Gauteng. The mobile library travels around the province and provides poor schools with free books. Each bus contains 2 500 books in all 11 official languages for children between the ages six and 11 (Kotlolo & Grobbelaar 2011). Dmitri Hotzman, as cited by Kotlolo & Grobbelaar (2011), states that mobile libraries are a positive move but the ultimate goal should be that every school should have a library. The different provisional Departments of Education have partnered with private organisations to establish programmes that enable access to learning resources. Among these initiatives is the NEPAD e-schools initiative, Mindset Network and the Thuthong Portal. These provide access to a wide range of curriculum and support materials for learners. Below is a table that summarises the events and developments of school libraries in South Africa.

| Date | Development |
|---|---|
| **Pre-1994** | Lack of library facilities in public schools in black schools in particular (Dick, 2002). |
| **1996** | The *South African Schools Act* marks the beginning of our new education system, but makes no reference to school libraries (Hart & Zinn 2007:92). |
| **1997** | The first of five draft policies on school libraries was circulated by the Department of Education (DoE) (Equal Education (EE 2010a:7). |
| | The government's *School Register of Needs* estimated that 8 million out of 12 million learners did not have access to libraries (EE 2010a:18). |
| **1999** | The *Human Sciences Research Council* (HSRC) audit found that many school libraries were often used as classrooms or were closed for most of the day as the person in charge was a full-time teacher. (South Africa DAC 2009: 43). |
| | The *School Library and Youth Services Interest Group* (SLYSIG) of the Library and Information Association of South Africa (LIASA) is established recognising the "common ground between public and school libraries" (Hart & Zinn 2007:96). |
| **2002** | The DoE's School Libraries Unit was closed (EE 2010a:18). |
| | The *Review of Curriculum 2005* found that the new curriculum was doing well in former white schools because they were better resourced (Hart & Zinn 2007:100). |

| Date | Development |
|---|---|
| **2004** | *White Paper on e-Education: transforming learning and teaching through information and communication technologies* commented that school libraries were collections of books that were inadequate to support resource-based learning (South Africa DoE 2004). |
| **2005** | SLYSIG compiled information literacy guidelines rooted in the *Revised National Curriculum Statement* (RNCS) for Grades R to 12 in order to influence educational policy (Hart & Zinn 2007:96). |
| **2007** | The *Education Laws Amendment Act 31* of 2007 listed the availability of a library as a minimum uniform norm and standard for school infrastructure (South Africa DAC 2009). |
| | The *National Education Infrastructure Management System report (NEIMS)* indicated that only 7.23% of public schools have a functioning library and 13.47% have a library room that is not stocked. (South Africa DAC 2009:41; EE 2010a:7). |
| **2007** | The *National Survey into Reading and Book Reading Behaviour* of adult South Africans showed that half of South African households had no books and that there was "little articulation between homes, schools, and communities as sites of reading" (South Africa DAC 2009: 79). |
| **2008** | The *National Norms and Standards for School Infrastructure* assumed that a school library is part of a learning space that every school must have (South Africa DAC 2009:43). |
| **July 2009** | The 6th draft of the LIS *Transformation Charter* was published by the DAC and the National Council for Library and Information Services (NCLIS). |
| | Equal Education (EE) initiated *The Campaign for School Libraries.* |
| **September 25, 2009** | Member of Parliament, Dr J.C. Kloppers-Lourens (DA) asked the Minister of Basic Education about the current state of affairs of school libraries and what steps were been taken to address the problem (South Africa National Assembly 2009). |
| **October, 2009** | The *Report of the Task Team for the Review of the Implementation of the National Curriculum Statement* of October 2009 presented to Minister Motshekga of the DBE, makes reference to the importance of books but does not make any recommendations to this other than the provision of textbooks (South Africa DBE 2009). |
| | The Minister of Basic Education stated that the department had recently finalised the sixth draft policy on school libraries, *National Guidelines for school library services* (South Africa National Assembly 2009). |
| **January 2010** | EE published *We Can't Afford Not To* outlining the situation with regard to school libraries and costing the provision of libraries in South African public schools. The Bookery is established by EE in Cape Town to address the shortage of libraries in the short term. |
| **April 2010** | The Development Bank of Southern Africa hosted a discussion between representatives of corporate South Africa, Department of Basic Education's (DBE) national and provincial representatives and Equal Education (EE). |
| **June 11, 2010** | The DBE adopted a policy on school infrastructure, *National Policy for an Equitable Provision of and Enabling School Physical Teaching and Learning Environment* (NPEP), which includes school libraries. |
| **August 2010** | 10 000 learners wrote postcards to government leaders as part of the EE campaign and were supported by 100 global education leaders who wrote to President Zuma. |

| Date | Development |
|---|---|
| **August 17, 2010** | Minister Motshekga of the DBE wrote to EE and assured them that there is 'approval for library posts.' In its Action Plan 2014 the DBE commits itself to a 'library in every school.' (EE 2011, June). |
| **March 31, 2011** | A large march to the Union Buildings in Pretoria in support of EE's campaign. |
| **April 2011** | EE sent hundreds of follow-up letters to the DBE venting their frustration (EE 2011, June). |
| **May 12, 2011** | 1 300 mothers of EE members sent an open letter to Minister Motshekga in her capacity as president of the ANC Women's League. |
| **June 2011** | Countrywide assessment tests administered to over 9 million pupils in public schools in February 2011 found that literacy and numeracy rates of grade 3 and grade 6 pupils were between 43% (Western Cape) and 19% (Mpumalanga) with Gauteng at 30% (Mtshali & Smillie 2011:1) |
| **June 20, 2011** | Debate at Wits School of Education on School Libraries in South Africa: International Debate where local academics, government officials and international speakers outlined the issues faced by school libraries in South Africa. A second debate was held in Cape Town later in the month. |
| **June 21, 2011** | The Gauteng Education Department's Showcasing School Libraries highlighted schools with functional libraries. |
| **November, 2011** | Eleven new mobile libraries delivered. Currently, there are 32 – 13 in KZN, 7 in Free State, 7 in Western Cape & 5 in Gauteng ( Kotlolo and Grobbelaar 2011) |

**Table 2.1:** Summary of events and development of school libraries in South Africa (Paton-Ash2012)

## 2.5 Digital school libraries

A digital library is a library in which the collection is stored in digital formats and accessed via computers. The digital content can be stored locally or accessed remotely via the internet. Baohua, Xiaoyan and Fei (n.d) define a digital library as, "The basic model of the new Internet management information resources, and it is becoming a kind of a trend of the world library, which adapts the requirements of the information society and knowledge technology time." They further state that the aim of the digital library is to make people access man's knowledge through digital instruments anywhere at anytime. Byamugisha (2010:42) asserts that, "digitization of library resource materials opens up new models of use, enabling a much larger potential audience." A vision that has been presented repeatedly advocates that digital libraries should enable any multi-modal, efficient and effective way, by overcoming distance, language and culture, and by using multiple internet-connected devices (Antolini 2009; Arms 2000; Baohua, Xiaoyan & Fei (n.d); Byamugisha 2010; and Roes 2001).

From the definitions stated above, it follows that the characteristics of digital libraries are that they possess collection materials in digital format and these are accessed over a network. The digital school library encompasses all traditional processes, that is, acquisition, storage, preservation and retrieval. The difference is that all these processes are carried out digitally. Access to the entire collection is globally available directly or indirectly over the internet. The development of digital school libraries requires technological equipment like computers, scanners, storage devices, internet connections, library management system software and printers.

Converting books into digital format has legal implications, and thus the resources on the digital school library have to comply with copyright laws to include the books into the digital library.

Given the widespread changes and use of these technologies by children, there is a need that digital libraries meet the capabilities of the emerging children. The children need to acquire certain skills that will enable them to operate effectively in the digital age. Rowlands and Nicholas (2008) as cited in Asselin and Doiron (2008:3) state that,

> Although today's students are savvy in many aspects of the new literacies of the internet, research shows that they are not proficient as popularly thought. When presented with an information search/ question, they go first to the internet, tend to rely exclusively on Google as their search engine…This pattern shows their limited understanding of the internet.

**Table 2.2: Advantages and disadvantages of digital libraries for children**

| Advantages | Disadvantages |
|---|---|
| - No physical boundary (Dhakal 2012; Walters 2013)<br>- Round the clock availability (Gharibpanah & Zamani 2011; Walters 2013; Yalman & Kutluca 2012)<br>- Multiple Access (Dhakal 2012; Zipke 2012)<br>- Structured approach transfers responsibility of information access on the internet to parents and/or teachers (Loertscher 2007; Walters 2013)<br>- Preservation and conversation – an exact copy of the original can be made any number of times without altering its quality (Loertscher 2007)<br>- Provides for individual differences in ways print libraries could not do very well. Using specialized contribution tools, the digital library can save age ranges, ability levels, personal preferences, language, etc. (Berg et al 2010; Loertscher 2007; Walters 2013)<br>- Ease of information sharing (Walters 2013)<br>- Different forms of access allows the school to expand its potential user community, by offering, for example, convenient access to disabled users or offering access to remote populations (Huntington 2011; Loertscher 2007 and Masigo 2010)<br>- Digital school libraries can be device-enabled thus making the information they store compatible with a wide range of devices like computers, mobile phones, iPads, etc. (Bederson, Quinn & Druin 2009; Loertscher 2007) | - Copyright – there is a difficulty of digitizing and distributing information without violating the copyright of the author (Nicholson 2010; Sun &Shi 2011)<br>- Speed of access – it may slow down when they are many users online (Walters 2013)<br>- Initial costs are very high (Walters 2013)<br>- Environment – they cannot reproduce the environment of traditional school libraries. Many people still find reading printed materials more appealing and relevant (Berg et al 2010; Woody et al 2010)<br>- Preservation – due to rapid technological developments the digital school library can rapidly become out of date and its data may become inaccessible (McGowen 2010)<br>- General – computer virus, different display standards, health hazard of the radiation from computers (Huand et al 2012; Jeong 2010) |

### 2.5.1 Reasons supporting digital libraries in South African schools

From the advantages stated above it is clear that digital school libraries can contribute to the development of school libraries in South Africa. UNESCO (1995) as cited in Kavulya (2007:303) states that, "Even so there is evidence that in Sub-Saharan Africa print-based library services have failed in providing relevant timely information for different purposes." Newspaper articles (Frean 2008; Masigo 2010; Ntobong 2010 and Sidley 2010) (***See*** Section 2.3.1) all refer to the under-development of school libraries in South Africa and how this has put pressure on public libraries. If learners have access to the digital school libraries' curriculum-relevant material, the pressure on public libraries will be relieved.

Some of the factors that support the change from traditional to digital school libraries include:

1. The school library has to compete for funds with other departments in the school, and the schools usually have limited buying power ( Equal Education 2011; Monama 2012; NEIMS 2011 and Paton-Ash 2012)

2. The school library, if available, is usually allocated a small area in the school making extension of the library a mere fantasy. The only way out is for the school library to digitize so they can extend their collection and solve their storage problem (Corbett 2011; Dlamini & Brown 2010; Equal Education 2011; Monama 2012 and NIEMS 2011)

3. Many learners, especially those in lower grades (elementary school learners) are unable to use the catalogue to find material in the library collections (Bilal 2005; Cheng et al 2013; Druin 2005; Druin, Weeks, Massey & Bederson 2010; Houston 2011 and Paton-Ash 2012). The digital school library has user-friendly interfaces which allow for use of any search terms.

4. The information explosion, that is, thousands and thousands of items of information on the internet make it difficult to manage, especially for elementary school children. The structured nature of the digital school library makes it easy for users to move from the catalogue to the book and then to the particular chapter by use of links, thus making it manageable to retrieve information (Ellis & Blashki 2004; Druin et al 2010; Druin 2005 and Houston 2011).

5. There is also a shift in the needs of users. School libraries have to compete with the internet as learners prefer it to the traditional library (Ellis & Blashki 2004; Druin et al 2010; Huntington 2011 and Paton-Ash 2012). The digital school library will help organise the electronic resources and thus ensure that the needs of the users are met efficiently. In South Africa, statistics in 2012 showed that 57% of learners had internet access (de Lanerolle 2012).

### *2.5.2. International Children's Digital Library*

The ICDL was launched on 18 November, 2002 and at that stage included 181 books from 14 countries (among them Egypt, Croatia, Singapore, South Africa, Australia,

New Zealand, the United States and more) in 20 languages. The ICDL was designed specifically for use by children of ages 3 to 13. Currently, the database includes freely accessible, full-text colour versions of 4 649 children's books in 61 languages. Since 2002, people from 228 different countries have visited the library online. The library, which is housed by the International Children's Digital Library Foundation, now offers iPhone and iPad applications (Salem 2013). The mission of the International Children's Digital Library Foundation (ICDL Foundation) is to support the world's children in becoming effective members of the global community who exhibit tolerance and respect for diverse cultures, languages and ideas by making the best in children's literature available online free of charge (ICDL Foundation). The foundation pursues its vision by building a digital library of outstanding children's books from around the world and supporting communities of children and adults in exploring and using this literature through innovative technology designed in close partnership with children for children.

The materials in the collection reflect similarities and differences in culture, societies, interests and lifestyles of people around the world (Weeks 2007:1). All the books in the collection are presented in their entirety and in the original language they were published in. This effort helps to make children's books more accessible worldwide. Weeks (2007:3) further assert that, "Ever since its inception the ICDL has truly become a library 'for the world's children". This can only come through the collaboration of individuals throughout the world who understand the power of connecting the right book to the right child at the right time. The main goal of the ICDL is to create a collection of more than 10 000 books in at least 100 languages that is freely available to children, teachers, librarians, parents and scholars

throughout the world via the internet. The materials included in the collection reflect similarities and differences in cultures, societies, interests, lifestyles and priorities of people around the world.

A unique aspect of this work is the process of collaboration and partnership that has been established. Interdisciplinary researchers from computer science, information studies, education, art and psychology work together with children (ages 7 – 11 years) to design the ICDL. In addition to partnerships in interface development, the ICDL has also established partnerships with national libraries, public library systems, professional associations, commercial publishers, authors, illustrators and school districts around the world. Collection development guidelines are being created jointly, and materials identified and digitized (Druin, Bederson, Weeks, Farber, Grosjean, Guha, Hourcade, Lee, Liao, Reuter, Rose, Takayama & Zhang 2003). Children's ideas are heard throughout the entire technology design process. Unlike digital libraries that generally contain only public domain and out of copyright materials, the ICDL offers online access to historical as well as contemporary, in copyright literature in multiple languages.

#### 2.5.2.1 ICDL Search Interface

Fig 2.5 Simple search interface (ICDL website)

The ICDL has four search tools: simple, advanced, location and keyword search. Kendall (2011:32) asserts that, “The homepage for ICDL is a busy site but there is a distinctive target in the middle of the page that says **Read Books!** This takes the user directly to a colourful search page (shown above).” Initially, the ICDL had two ways in which books could be accessed and retrieved. The first was where the book was published and the globe was used. The globe (location search tool in new interface) would allow users to spin and then select a region. The second way was through a visual search interface – Simple search. Simple search is the default search tool. Thirteen top-level search categories represented by icons were chosen based on research with children and librarians concerning how children want to look for books (Druin et al 2003). The icons link to different parameters including age groups, length of book, award winners, characters, picture books and book covers by colour (Kendall 2011; Link 2011). Weeks (2007), as cited in Link (2011:4), states that the unique search categories on the ICDL came to be as a result of the research team’s collaboration with children.” The children can use multiple icons and the system will

perform a Boolean search for them, thus enabling users to retrieve books more easily.

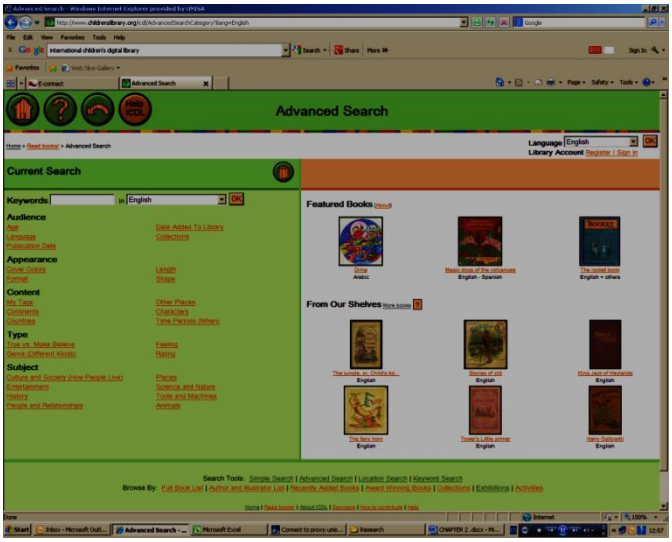



**Fig 2.6 Advanced Search (ICDL website)**

The Advanced search also offers users several text-based options. Kendall (2011) alludes that it gives the users an opportunity to investigate how the books are catalogued and indexed. It allows users to search the collection, use keyword search and browse the exhibitions. The keyword search allows the users to search in different languages. To use the Advanced search, users must click on a higher-level category to see the search within it. This makes it a bit more difficult to use (Link 2011). The Advanced search also includes subject search. Each page of the search tools has a help button that gives details on successful searching.

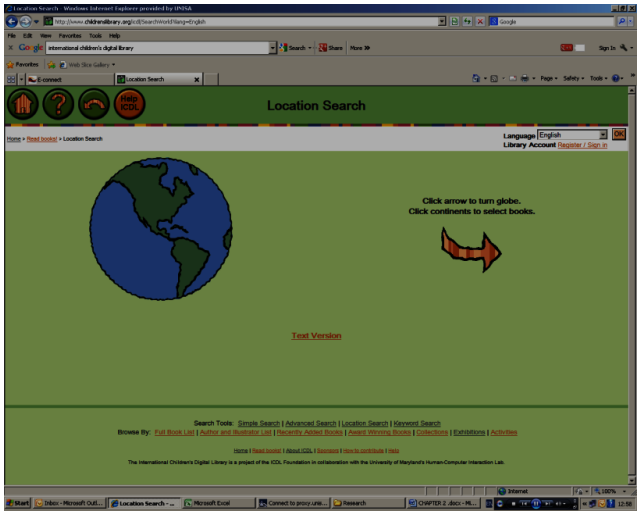



**Fig 2.7 Location Search (ICDL website)**

The location search tool emphasised the international aspect of the library (Link 2011). Druin et al (2003:n.p) states that, "from the process, the search results provide a subset of the collection that is about the region, set in the region, or written by an author from the region."

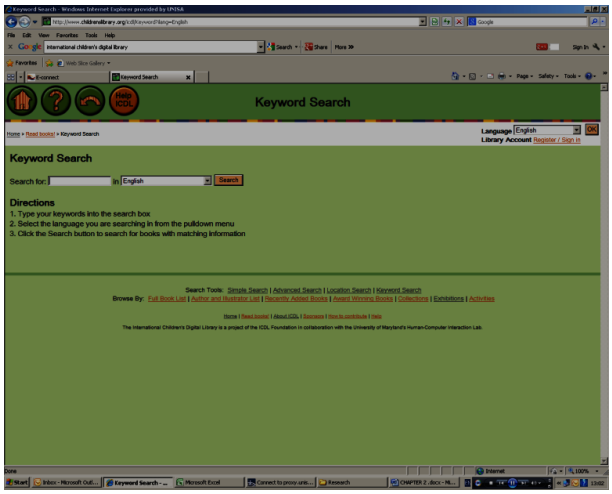



**Fig 2.8 Keyword Search (ICDL website)**

The Keyword search can be used along with the Simple and Advanced search methods. It is the only method by which users can search for titles or authors or any other keywords (Link 2011).

In the Simple search results are presented visually through book covers in the search result area. The search results are listed alphabetically according to title and there are no other sorting options. Link (2011) adds that it is the book cover and title that are likely to be noticed and used as a basis of selection by the children. In the Advanced, Keyword and Location search users can view the results in the book cover or in text-based format with bibliographic data. Clicking on the search results brings the users to the book preview with a short summary and sometimes reviews by other children (Kendall 2011; Links 2011). The user can then read the book using Zoomable User Interface. Users can create free user accounts that enable them to bookmark the books they have read and then return later to the last page that they were reading.

**Table 2.3** Benefits of using ICDL (Hall 2010)

| Who ICDL benefits | How |
|---|---|
| **Teachers** | This is a quick, easy, free resource to access pre-scanned books to incorporate into lessons |
| | The ICDL is a resource for learners in the classroom who speak a language other than English |
| | Books are available that have bilingual pages, which cater to learners who speak another language |
| | The website is a great resource to engage learners |
| | When teaching learners how to locate books, many skills are enhanced (such as following directions and sorting, based on various classifications) |
| | The ICDL can be used to teach learners graphic literacy and thinking visually |
| **Learners** | By using the ICDL, users have the ability to create and maintain a personal account |
| | Users have the option to use spiral reader, so they can have a sense of place, or visual context while reading |
| | Users have the choice to read books in their preferred way (e.g. beginning to end or skipping around) |
| | The ICDL strengthens cultural awareness of various regions around the world and gives users access to historically relevant books |
| | The text inside of each page can be enlarged for users who have visual impairments |
| | The books can be located easily. For example, if a student remembers seeing the colour of the book, they can sort based on this classification |
| | Users have the ability to choose which books they would like to read, including genre and theme |
| **Parents** | The ICDL provides a way for parents to expose their children to their family's native language/ heritage |
| | This website is a resource to read with their children outside of school and/or during school holidays |
| **Librarians** | The ICDL can be used to help learners develop a sense of how to locate items online |
| | This site can be used to show that other forms of books can be used besides tangible books |
| | The ICDL can be used to teach language screen literacy, helping learners understand how messages and instructions are represented in a visual way (Berger 1999) |
| | This site can be used when teaching learners how to use technology responsibly (Berger 1999) |
| | This website can be used to teach learners how to make connections in non-linear exploration (Berger 1999) |

## 2.6. Summary

A distinction was made between technology acceptance and adoption. To reiterate, the focus of this study is principally on assessing acceptance of digital school libraries.

A lack of literature relating to the acceptance of digital school libraries by children is evident. There is a scarcity of research exploring the acceptance of digital school libraries applying TAM in conjunction with external acceptance factors. The literature review takes into account determinants of technology acceptance (perceived ease of use and perceived usefulness) from TAM.

There are three gaps, as identified from literature, which will be addressed throughout this research:

1. The use of TAM in a learning environment of elementary school children

2. Applying TAM in a developing country context with children

Furthermore, a categorised list of acceptance factors will be evaluated and a final list of digital school library acceptance factors will then be proposed as an outcome of this study. The next chapter will discuss the research methodology of the study.

# CHAPTER THREE

# RESEARCH METHODOLOGY

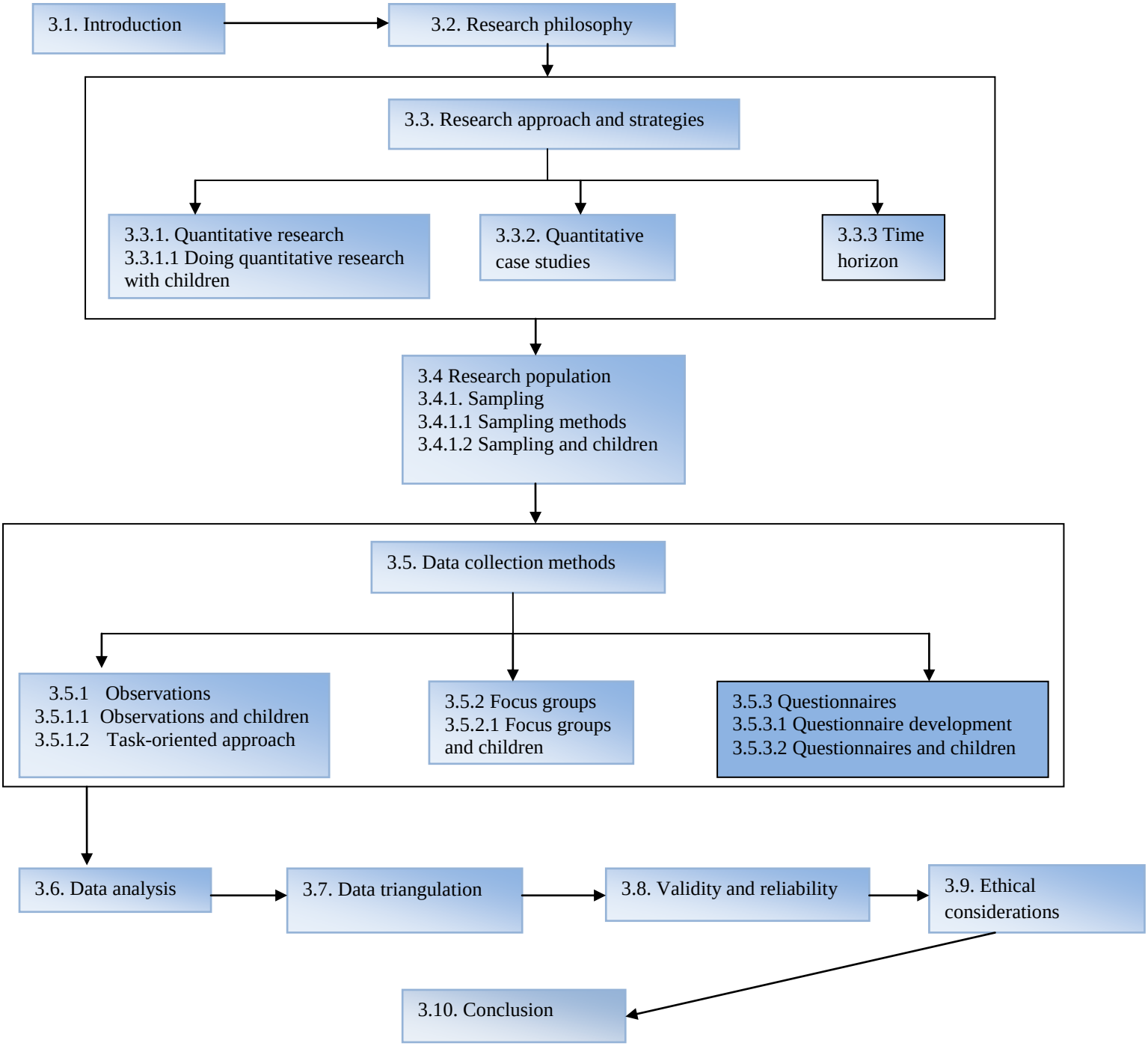
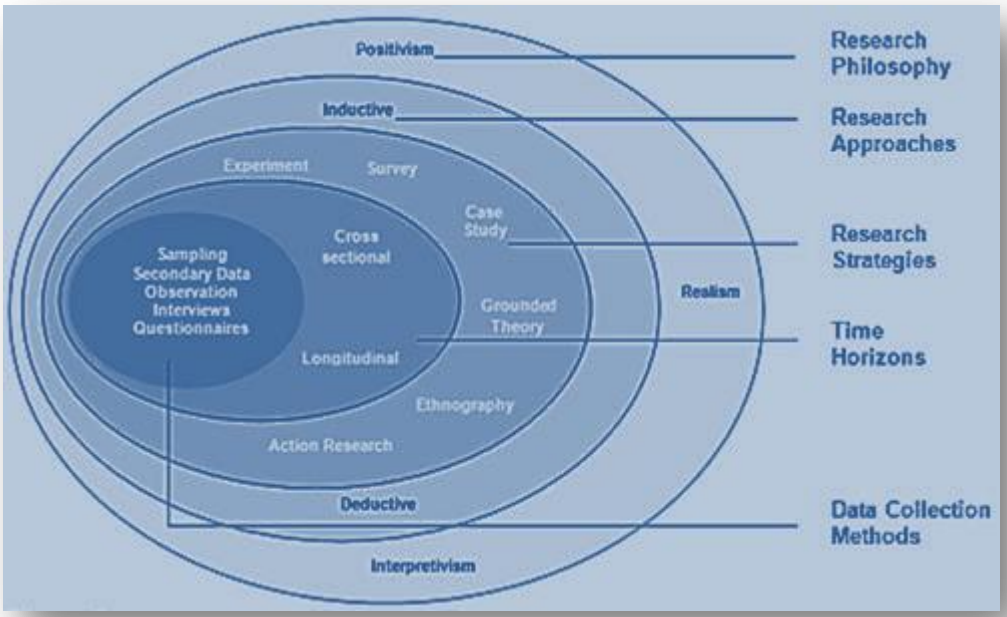



**Fig 3.1**: Research Methodology map

## 3.1 Introduction

The previous chapter dealt with the theoretical framework and literature review of this study. Chapter 3 entails the research methodology applied in the study. Below is the model representing the research process adapted from Saunders, Lewis & Thornhill (2003) that explains the research methodology in a study.

**Fig 3.2:** The research process onion (adapted from Saunder et al 2003)




Saunders et al (2003) refer to this model as the research process onion. The research process onion will be the guide on how the research methodology chapter is structured. The main layers in the research onion include the research philosophy, research approaches, research strategies, time horizons and data collection methods. These layers are the important aspects to be considered in determining the research

methodology for a particular research study. Each layer of the onion will be peeled away, starting from the outside layer to the inner core of the onion, that is, from the research philosophy to the data collection methods applied in this study.

### 3.2 Research philosophy

A research philosophy is how the researcher views the world, their taken-for-granted assumptions about human knowledge and about the nature of the realities encountered (Saunders and Tossey 2012). The belief or ideas centre on the collection, interpretation, research questions and analysis of the data collected in a study. The research philosophy influences the choice of design and strategies as well as the way in which the data will be deemed useful and important. Below is a table that summarises the research philosophy worldviews:

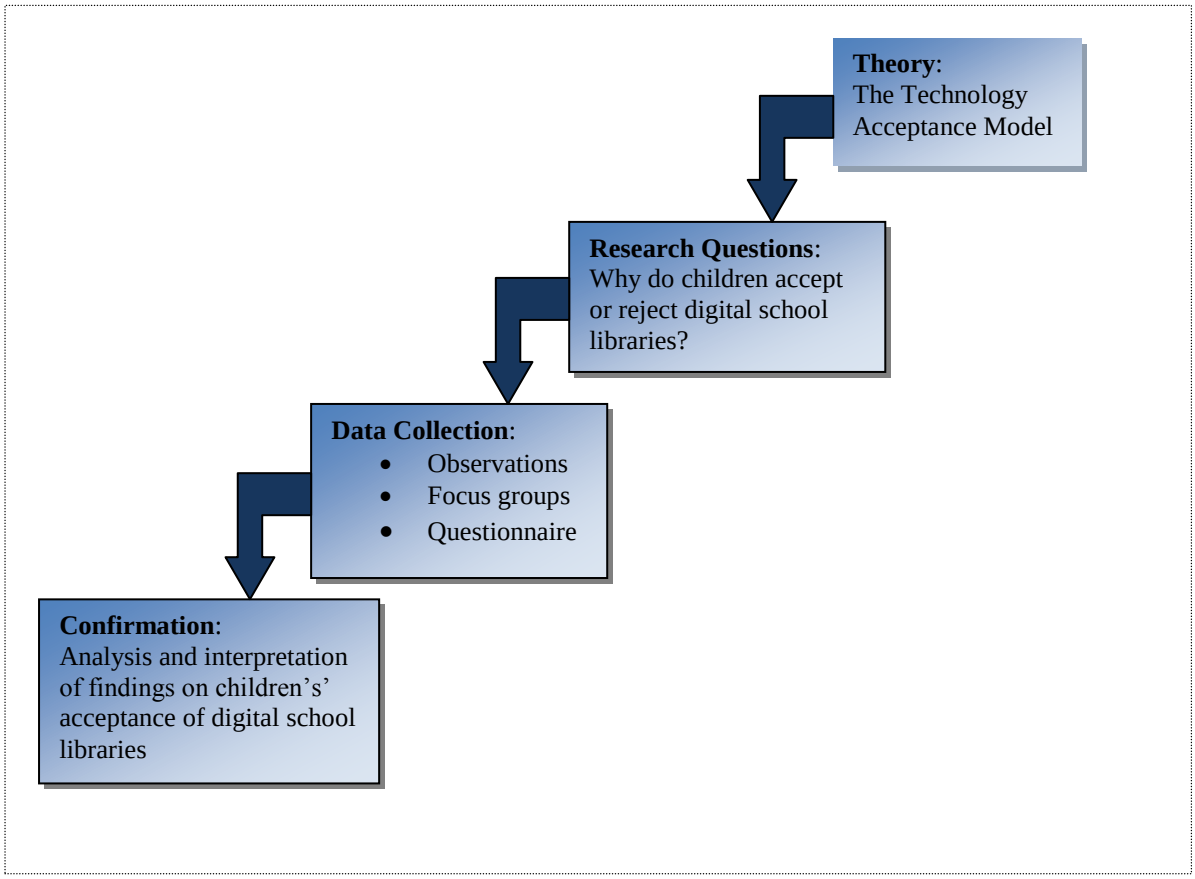
| **Four worldviews** | |
|---|---|
| **Post-positivism** | **Constructivism** |
| • Determination<br>• Reductionism<br>• Empirical observation and measurement<br>• Theory verification | • Understanding<br>• Multiple participant meanings<br>• Social and historical construction<br>• Theory generation |
| **Advocacy/ Participatory** | **Pragmatism** |
| • Political<br>• Empowerment issue-oriented<br>• Collaborative<br>• Change-oriented | • Consequences of action<br>• Problem-centred<br>• Pluralistic<br>• Real-world practice oriented |

**Table 3.1**: Research philosophy four worldviews (Creswell 2008:6)

### 3.3 Research approach and strategy

There are two main research approaches,: the inductive research approach and the deductive research approach. The inductive approach is a 'bottom-up' approach where the research works from the specific observation to broader generalisation and forming of theories. This approach is mainly used in qualitative research. The deductive approach is a 'top-down' approach where the researcher works from the general to the particular. Theory and hypothesis are checked first and then the research moves to the results that are more specific. In the deductive approach, researchers test or verify a theory by examining research questions or hypotheses derived from the theory. These research questions contain variables that are defined, and instruments that are developed to measure/observe behaviours or attitudes of the respondents in the study (Bahari 2010).

**Fig 3.3**: Summary of the applied research approach in the study



### *3.3.1. Quantitative Research Approach*

This study will make use of the deductive approach. The deductive research approach explores a known theory or phenomenon and tests if that theory is valid in a given circumstances. The deductive approach allows for collecting literature and data to refute or confirm the theory under study. The quantitative approach is used mainly in the deductive approach. Quantitative research methods involve quantifying relationships between variables. Quantitative research is an inquiry into a social or human problem based on testing a theory composed of variables, measured with numbers, and analysed with statistical procedures, in order to determine whether the predictive generalisations of the theory hold true (Creswell 1994).

Neuman (2006) lists the characteristics of quantitative research as the following:

- Tests hypotheses that the researcher begins with
- Concepts are in the form of distinct variables
- Measures are systematically created before data collection and are standardised
- Data are in the form of numbers from precise measurement
- Theory is largely casual and deductive
- Procedures are standard and replication is frequent
- Analysis proceeds by using statistics, tables or charts, and discussing how what they show relates to hypotheses

Summary of the strengths and weaknesses of quantitative research:

**Strengths**

- Testing hypotheses that are constructed before the data are collected. Can generalise research findings when the data are based on random samples of sufficient size (Johnson and Onwuegbuzie 2004)
- Research finding can be generalised when it has been replicated on many different populations and sub-populations (Johnson and Onwuegbuzie 2004; Ford and Gonzales 2010)
- The researcher may construct a situation that eliminates the confounding influence of many variables, allowing one to assess cause-and-effect relationships more credibly (Amaratunga, Baldry, Sarshar & Newton, 2002 and Johnson and Onwuegbuzie 2004)
- Data collection using some quantitative methods is relatively quick (Zawawi (n.d.);
- Data analysis is relatively less time-consuming (Amaratunga et al 2002; Zawawi (n.d.)
- The research results are relatively independent of the researcher
- It is useful for studying large numbers of people (Zawawi (n.d.)

**Weaknesses**

- The researcher's categories that are used may not reflect local constituencies' understandings (Amaratunga et al 2002; Silverman 2006; Zawawi (n.d); Ford and Gonzales 2010)

- The researcher's theories that are used may not reflect local constituencies' understandings (Johnson and Onwuegbuzie 2004)
- The researcher may miss out on phenomena occurring because of the focus on theory or hypothesis testing, rather than on theory or hypothesis generation (confirmation bias) (Johnson and Onwuegbuzie 2004; Silverman 2006; Ford and Gonzales 2010)
- Knowledge produced may be too abstract and general for direct application to specific local situations, contexts, and individuals (Zawawi (n.d.))

#### 3.3.1.1 Doing quantitative research with children

Employing quantitative methods to focus on children as a distinct population group typically provides statistical information on social issues (Mason and Hood 2011). Mason and Hood (2011) further state that quantitative methods can play an important role in understanding how children, as social agents, live their lives and it can also contribute to efforts to improve children's lives as a whole. Christensen and Prout (2002), as cited in Mason and Hood (2011), observe that the success of research with young children lies in watching, listening to, reflecting and engaging in conversation; seeking to enter the child's world in just a small way. They use the phrase 'ethical symmetry' to refer to engaging with the local cultures of communication among children, paying attention to the social actions of children, their use of language and the meanings they put into words, notions and actions.

Shaw, Brady and Davey (2011:13) state that research methodology should not be altered because children are going to be involved as research participants. The

challenge for the researcher is to ensure that the process is enjoyable, acceptable and appropriate for participants, while at the same time maximising the robustness and utility of the data collected. The age of children you wish to include in the research will have a significant impact on the method you choose and the design of research tools. For children of primary school age, very formal or structured methods are less appropriate (Shaw, Brady and Davey 2011). Given the nature of the primary school age, Shaw, Brady and Davey (2011) summarised the important methodological points to consider when doing research with children:

- Keep data collection brief and to the point and bear in mind that children have a shorter attention span than adults
- Aim to create an open and informal atmosphere
- Stress the point that there are no right or wrong answers (and reiterate this message during data collection as appropriate)
- Use short questions and simple language, avoiding abstract concepts wherever possible
- Ensure that tools are accessible (in terms of length, format, content, language), given the age and cognition of the sample in question
- It may be necessary to produce different versions of the tool for different age and ability groups
- Thorough piloting is essential

### *3.3.2 Quantitative case study*

Saunders, Lewis & Thornhill (2009:600) describe a research strategy, "as a generic plan guiding the researcher to answer the specific research questions". Saunders et al (2009) mention that an appropriate research strategy has to be selected based on research questions and objectives, the extent of existing knowledge on the subject area to be researched, the amount of time and resources available, and the philosophical underpinnings of the researcher. There are many strategies the researcher can select, based on the criteria stated above. The research strategy applied in this study is the quantitative case study. The quantitative case study was chosen because in situations where multiple variables influence behaviour, children only see a partial picture of the entire process, making survey designs less appropriate (Johnston et al 1999). Stake 2005, as cited in Thomas (2011:512), defines a case study as, "Case study is not a methodological choice but a choice of what is to be studied. . . . by whatever methods we choose to study the case. We could study it analytically or holistically, entirely by repeated measures or hermeneutically, organically or culturally, and by mixed methods — but we concentrate, at least for the time being, on the case." A case study research methodology relies on multiple sources of evidence to add breadth and depth to data collection, to assist in bringing a richness of data together in an apex of understanding through triangulation, and to contribute to the validity of the research (Tellis 1997; Yin 2003; Yin 2009).

Yin (2009) discusses a number of rationales for case selection. A case may be a critical case to test a theory, an extreme or unique case that is so exceptional that it is

worth studying, a typical case that captures characteristics of everyday situations, a revelatory case unfolding phenomena that were previously inaccessible to researchers, and a longitudinal case following a single case in more points in time. Yin (2009) further states that the type of research questions asked determines the strategy to be used. The 'how' and 'why' questions are more explanatory and will most likely lead to the use of case studies. Looking back at the research questions in this study, "how" and "why" questions can be noticed (***see*** Chapter 1: Table 1.1). The case study was also applied as it allows for examining contemporary events without control over the behaviour through direct observations and interviews of participants (Yin 2009).

Berg (2009:326) describes a critical or instrumental case study as, "The researcher focusing on a single issue or concern and identifies a single case to illustrate this item of concern." The critical or instrumental case study design is applied in this study, TAM being the theory that will be applied to determine the acceptance of digital school libraries by children. Greig, Taylor and MacKay (2007: 18) state the reason why theory is needed when researching children, "It has a massive impact leading to a range of possible futures for a given child, and seeking to improve the ways in which different professional groups can understand the theories and practices of each other and work together in the interests of children." Like all other research methods, it is the degree to which theory and related hypotheses have been developed prior to data collection that allows for the testing of the theory. The study of a single case may be used to support the theory, extend it or refute it (Johnston et al 1999, Thomas 2004 as cited in De Vos, Strydom, Fouche & Delport 2011). Berg (2009:326) further states that, "The case serves only as a supportive role, a

background against which the actual research interest will play out." Instrumental case studies are often investigated in depth, and all aspects and activities are detailed, but not simply to elaborate on the case per se. Instead, the intention is to help the researcher better understand some external theoretical question, issue or problem (Johnston et al 1999).

Yin (2003a), as cited in Berg (2009: 319 – 320), emphasises that theory development prior to the collection of case study data is important because:

- it can assist in the selection of the cases to be studied and whether to use a single-case or multiple-case design
- it helps the researcher to specify what is being explored when undertaking an exploratory case study
- it aids in defining a complete and appropriate description when undertaking a descriptive case study
- it can stimulate rival theories when undertaking an explanatory case study
- it can support generalisations the researcher may seek to make to other cases

It is because of the reasons stated above that TAM is used to determine the factors that influence acceptance and rejection of school digital libraries. TAM will be a stage at which observations and experiments can be conducted and will serve as the practical function of guiding the study.

### *3.3.3 Time horizon*

The final layer of the research onion, before reaching the core, highlights the time horizon over which the researcher undertakes the research. The cross-sectional time horizon was applied in this study. In this study, data is gathered just once, over a period of days, in order to answer the research questions. The cross-sectional time horizon was applied because it allows for multiple variables to be studied without interfering (Hall 2008). The advantage of such studies is that subjects are deliberately exposed, treated or not treated, and, hence, there are seldom ethical difficulties (Mann 2003). The cross-sectional design is an efficient strategy for describing age-related trends and because participants were only measured once, the researcher did not need to be concerned about such difficulties as selective attrition, practice effects or changes in the field that might make the findings obsolete by the time the study is complete (Berk 2006).

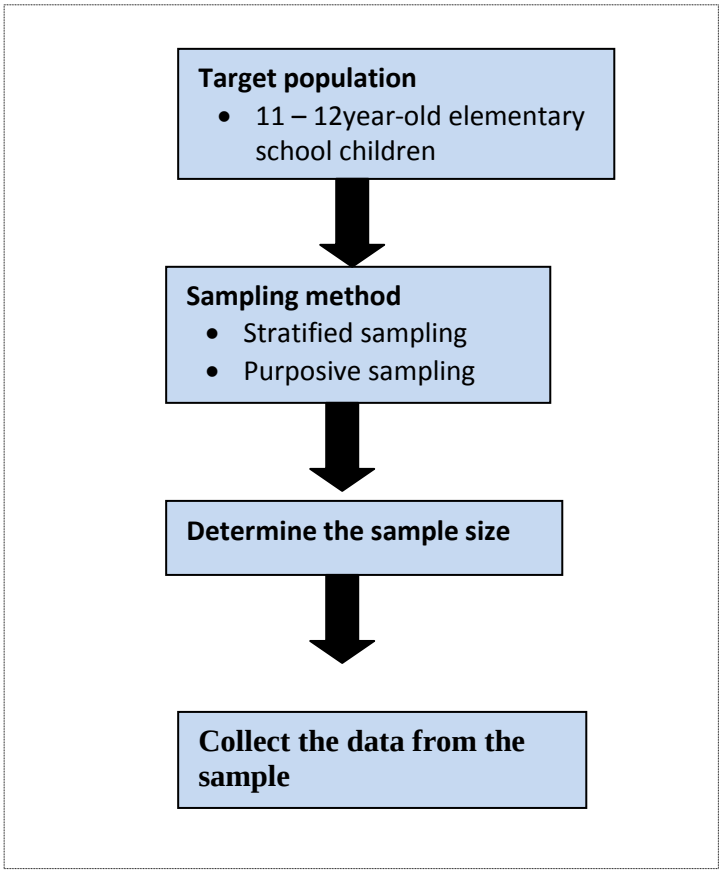
## 3.4 Research population

The population or the unit of analysis in the study is children aged 11 – 12 years at Crawford Preparatory Pretoria School. There are 100 grade 6 children with 25 children per class at Crawford Preparatory Pretoria School, and the sample was selected from them.

### *3.4.1 Sampling*

Payne and Payne (2004: 200) define sampling as, "the process of selecting a sub-set, of people or social phenomena to be studied, from the larger 'universe' to which they belong." Sampling strategies or methods are designed to allow for the selection of samples from the unit of analysis.

**Fig 3.4**: Summary of the sampling procedure in this study




#### 3.4.1.1 Sampling methods

There are two sampling methods, namely the non-probability and probability sampling. Non-probability sampling is used when the main focus is on the specific

and its meaning, while probability sampling is when the main focus is on generalisation to the population (Payne and Payne 2004). Denzin and Lincoln (1998:102) explain how sampling within case studies is done: "The sample is chosen assuring variety but not necessarily representativeness, without strong argument for typicality, again weighted by considerations of access and even by hospitality."

Probability sampling ensures that all individuals in the target population have a known chance of being interviewed. Stratified random sampling is applied in this study. Powell and Connaway (2004:100) describe how stratified sampling is undertaken: "One must first divide the population elements into groups or categories and then draw independent random samples from each group or stratum." The children at Crawford Preparatory Pretoria School were grouped per grade and then randomly selected. Greig, Taylor and MacKay (2007:72) define purposive sampling as: "This is where the researcher selects participants, employing judgment to ensure that that the sample is selected on the basis of the information required." Purposive sampling is used to select the children that will be included in the focus group and those that will fill in the questionnaire.

**Table 3.2**: Summary of study population

| | | **Percentage of grade to the total number of learners in grade 6** |
|---|---|---|
| **Total number of boys** | 42 | 46% |
| **Total number of girls** | 49 | 54% |
| **TOTAL** | **91** | **100%** |

#### 3.4.1.2 Sampling and children

Hill (2006:77) states that,

> The words ‘fair’ and ‘unfair’ are often used by children to express their judgments of approval and disapproval. They tend to dislike situations where some (appear to) have more access to opportunities than others or receive more favourable treatment. With respect to research and consultation, this is linked to criteria for inclusion and differential attention. Children’s views of fairness are different from the accepted scientifically representative sample.

This creates a challenge on the inclusion and exclusion of the children to participate in the research. In quantitative methodology, sampling is an essential step as it will impact on how the results can be generalised to the general population. To ensure fairness, all the grade 6 children were included in this study. However, only the children whose parents gave consent for participation in the study were included.

Gatekeepers often see themselves as the protectors of children and young people and as such believe it is their responsibility and duty to make decisions on behalf of children. They would therefore judge the merit of particular research projects and opt not to refer children who they believe might not benefit from the research or might be adversely affected through their participation. These both require them to make a value judgement, often without considering the particular wishes or needs of individual children and, in some cases, the capacity of the researchers and the project to ensure their safety (Moore, Saunder and McArthur 2011). While such gatekeepers may be acting as protectors, there is the potential that they may deny children the opportunities for participation or conversely coerce them into participating. This therefore limits the accessible population from which the sample will be drawn.

There were children that consented to participate in the study but their parents decided otherwise. The consent of the parents took precedence over that of the child, hence, they could not participate in the study. This therefore limits the accessible population from which the sample will be drawn.

### 3.5 Data collection methods

Data collection entails the gathering of data related to the research questions. It involves obtaining discrete units of information from the study population (Powell and Connaway 2004). Data collection is the process of gathering and measuring information on variables of interest, in an established systematic way that enables one to answer stated research questions, test hypotheses and evaluate outcomes.

Consequences as listed from Data collection (n.d) of improperly collected data include:

- inability to answer research questions accurately
- inability to repeat and validate the study
- distorted findings resulting in wasted resources
- misleading other researchers to pursue fruitless avenues of investigation
- compromising decisions for public policy
- causing harm to human participants and animal subjects

Data collection plays an essential role in the study, hence it is located in the core of the research onion by Saunders. Collecting good quality data supplies objective information for the problem under study, therefore solutions can be obtained. The data collection methods applied in this study include observation, questionnaires,

focus groups and a task-based approach. It has been noted that some children do not participate in a group, but open up in an individual interview, while others are nervous on a one-on-one basis and more confident in a group (Punch, 2002 as cited in Hill 2006). Multiple data collection methods were applied to allow for the comprehensive understanding of why children accept or reject use of the digital school libraries and for the different data collection preferences of the children.

### *3.5.1 Observation*

Greig, Taylor and MacKay (2007:118) define observation of children as research participants, as "watching children individually, in relationships, in contexts and asking: what do they see, what do they feel, what do they think, and what do they do?" Observational evidence is often useful in providing additional information about the topic being studied. If a case study is about a new technology, observation of the technology at work is an invaluable aid for understanding the actual use of the technology or potential problems being encountered (Yin 2009). The structured observation is applied in this study. Structured observation focuses on designated aspects of behaviour.

Powell and Connaway (2004:159) describe the steps involved in structured observation as, "The most basic step involves developing the observational categories to be employed. These are set up in advance but may be adjusted later if necessary." They further state that developing such categories involves defining appropriate, measurable acts, establishing time units or the time length of the observation and anticipating patterns of phenomena likely to occur. This type of

observation follows the principles and assumptions of quantitative research: the focus of the observation is fragmented into predetermined, smaller, more manageable pieces of information (behaviours, events, etc.) that can be aggregated into variables (De Vos et al 2011).

Powell and Connaway (2004: 160 -161) list the steps to be taken to increase the reliability of observations:

a) Developing adequate definitions of the kinds of behaviour to be recorded and being certain that they correspond to the specific concepts to be studied.
b) Carefully training the observers to ensure that they are adequately prepared and that they have confidence in their ability or judgment to check the appropriate categories.
c) Avoid observer bias. Generally, the observer should take behaviour at its face value and not attempt to interpret their 'real' meaning, at least not at the time the observations are made.

In structured observation the aim is to minimise the effects of observer subjectivity by ensuring that all observers observe behaviour in the same way and follow the same coding rules. This ensures the reliability and validity of the study. Maintaining reliability addresses the need for increased control for observer bias, contextual variances, and data quality Stangor, 2011 as cited in Ostrov and Hart (n.d: 293) state that, "For observational methods, the most important measure of consistency is inter-observer reliability, or the degree to which two sets of observations from two independent observers agree."

#### 3.5.1.1 Observation and children

There is a variety of observational techniques to consider, which varies according to the age of the children, their conceptual abilities, their relationship with the observer and the purpose of the research. Observational techniques are particularly helpful in research with children who may be unable to communicate any other way.

Greig, Taylor and MacKay (2007: 119) state the possible sampling methods that can be used in observations:

a) Predominant activity sampling – only the behaviour that best describes what has happened in the interval is sampled
b) Unit sampling (or one-zero sampling) – the behaviour is recorded only once if it occurs in a given time interval
c) Instantaneous sampling – recording takes place at a predetermined moment at regular intervals
d) Natural sampling – all relevant occurrences and their length are recorded for a given time interval

The natural sampling will be employed in this study as it seeks to understand the reasons why elementary school children use or reject digital school libraries.

Shaw, Brady and Davey (2011: 26 -27) outline the importance when doing an observation study of children and young people, to agree on procedures for the following situations:

a) How to observe without disrupting ongoing activities and routines

b) How to refrain from participating when conducting a non-participant observation (including strategies on how to politely decline children and young people's requests to talk or play with them during an observation)

c) When it would be appropriate to suspend the observation and intervene (for example to prevent serious physical danger to a child)

#### 3.5.1.2 Task-based approach

The task-based approach involves giving tasks to the participants to gather data. In this study, the learners were given tasks to look for books in the ICDL and the rate at which they retrieve the books was taken into consideration. The tasks were also used to measure the interactions the children have with the digital library. The tasks given to the children were grouped into two categories: fully assigned tasks and self-generated tasks (***see*** Appendix F). The fully assigned tasks were used to gather factual data on the use of the ICDL and the self-generated tasks were used to gather personal interactions with the ICDL. The following tasks, adapted from Bilal and Sarangthem (n.d.), were given during the ICDL sessions:

(1) How many books do the ICDL have from South Africa?

(2) Find a book in the Afrikaans language titled, '*Nelson Mandela, a fighter for humanity*' and open the first page of the book.

(3) Find a book about animals and write the name of the book on your sheet.

(4) How did you find the book in (3)?

(5) Find a five-star, happy short story and write the title of the book on your sheet.

The use of this method is underpinned by beliefs that, although children are similar to adults they have different expertise and competencies. Kirk (2007) lists the rationale of using the novel technique that includes the task-based approach:

**Table 3.3**: Rationale and assumptions in the use of novel techniques in research with children (Kirk 2007:1257).

| **Rationale** | **Underlying assumption** |
|---|---|
| To sustain interest and avoid boredom | • Children prefer 'fun' methods.<br>• Children are more competent at these methods.<br>• Children (especially younger children) may have a shorter attention span.<br>• Children are more used to visual and written techniques. |
| To encourage expression | • They encourage children to express their views freely to an adult researcher.<br>• They foster rapport and enable children to feel more at ease.<br>• They enable children to express feelings or needs that they are reluctant to express verbally. |
| As a means to lessening the imbalance in power between adult researchers and child participants | • They may lessen the power relationship imbalance as the interaction is between the child and the paper, rather than with an adult researcher. |

It is due to the reasons stated above that the task-based approach was applied in this study.

### *3.5.2 Focus groups*

Jakobsen (2012:113) defines focus groups as, “Discussions among five to 10 people on a given topic.” Wayne (2013: 265) further adds that, “Focus groups can be used to reveal what a particular group of people think about particular complex subjects.” The focus group in this study was used to gather the information why children accept or reject digital school libraries. Wayne (2013:265) summarises the characteristics of focus groups as follows:

- The purpose of the group meeting is to get information about how the participants feel and think about a specific item of interest.
- Multiple group discussions, each with different participants are held to ensure reliability.
- Each group meets once for a limited time, usually for about 90 – 120 minutes.
- Each group consists of a limited number of participants selected according to the criteria that relate to the research question. A number of six to 12 participants are usually recommended.
- Each group follows the same structured agenda.
- Agendas consist of questions that, if answered by participants, will yield data that answer the research question.

Morgan, Scannell and Krueger (1998) state the two basic considerations that go into determining the composition of a set of focus groups:

1. The participants’ comfort in talking to each other about the topic
2. Your goals for creating productive discussions about the topic

Planning the focus group is essential to attain the required information. This therefore calls for planning in terms of the participants to be involved, the size of the focus group and the number of focus groups.

#### 3.5.2.1 Focus groups and children

Archer (1993) outlines the differences when conducting focus groups with children:

1. Questions should be appropriate to the age level, but still unstructured.
2. Youth who know each other can participate.
3. Total time for the group interview should be 40-60 minutes.
4. Each group should have five or six participants.
5. Determine whether the topic being discussed might produce different responses from boys versus girls. When in doubt, have groups of all girls or all boys.
6. All participants of each group should be the same age.
7. When possible, incorporate things to touch, do, or respond to.
8. Avoid dichotomous questions.
9. The moderator should have experience in working with youth. Moderators for focus groups with children must exude trust, respect, tolerance, humour and a willingness to listen.

The modifications stated above are made taking into consideration the development stage, their cognitive, linguistic, social, and psychological abilities and tendencies (Gibson 2012 and Morgan et al 2002). Children are attracted to methods that give immediate pleasure. Therefore, it is commonly reported that group discussions are

fun, especially when there are activities and exercises (Punch, 2002 as cited in Hill 2006). Purposive sampling was used to select the participants per class to be involved in the focus group. Each class had one group, making the total number of groups in this study four. Each group met for a maximum of 30 minutes to discuss their views about the digital school libraries. The questions were designed according to each age group's general development abilities and tendencies (***see*** Appendix G). Different activities like drawing and stretching games were introduced at different intervals per group to allow for increase of attention span and also to get the shy children to have a say (Gibson 2012 and Morgan, M., Gibbs, Maxwell & Britten 2002).

### *3.5.3 Questionnaires*

Oates (2006), as cited in Adams (2010:66), states that, "Questionnaires make it easier to collect large amounts of pre-defined data in a pre-determined order over a shorter period of time." The questionnaire was adopted in this study as it allows for the gathering of data from a large population. De Vos et al (2011) state the basic objective of a questionnaire as, "To obtain facts and opinions about a phenomenon from people who are informed on the particular issue." The questionnaire was given to the children who had experience in using the ICDL. Gorrell, Ford, Madden Holdridge & Eaglestone (2011:507) state that, "Often, data concerning behavior are sought using questionnaires in which respondents are asked to report their perceptions, preferences, attitudes or behavior." The study sought to determine the factors that influence acceptance of digital school libraries by children.

#### 3.5.3.1 Development of the questionnaire

Neuman (2012:175) outlines the issues to consider when constructing questionnaires, "Keep it clear, simple and keep the respondents' perspectives in mind." The way in which the questionnaire is developed has an impact on the data that it will gather. It is therefore important to take serious measures when constructing them. Neuman (2012) further lists 12 things to avoid when constructing a questionnaire:

1. Avoid jargon, slang and abbreviations
2. Avoid ambiguity, confusion and vagueness
3. Avoid emotional language
4. Avoid prestige bias
5. Avoid double-barrelled questions
6. Do not confuse beliefs with reality
7. Avoid leading questions
8. Avoid asking questions that are beyond the respondent's capabilities
9. Avoid false premises
10. Avoid asking about intentions in the distant future
11. Avoid double negatives
12. Avoid overlapping or unbalanced response categories

When the above are avoided, the questionnaire will gather the data that it is required to gather. The length of the questionnaire, the sequence of questions, the format and layout are critical when developing questionnaires (Nueman 2012, Powell and Connaway 2004). The questionnaire applied in this study was more structured,

limiting the responses of the participants to stated alternatives. Having fixed responses helps to ensure that the answers are given in a frame of reference that is relevant to the purpose of enquiry. Structured questionnaires are appropriate for securing factual information and eliciting expressions of opinions about issues on which people hold clear opinions (Powell and Connaway 2004).

To ensure that the questions are not redundant, the **Variable Question Matrix** was used. Powell and Connaway (2004:135) explain that,

> This matrix is simply a table with the questions numbered across an adjourning edge. Corresponding cells are then checked when there is a question about a variable. If many cells are checked for any variable, it may suggest that more questions are being asked about the topic than is necessary. Too few or no checks for a variable would raise the opposite concern.

Each variable in the study has representation in the questionnaire. Below is the variable question matrix applied in this study:

**Table 3.4**: Variable Question Matrix (adapted from Powell and Connaway 2004) (***see*** Appendix H)

| | Variables | | |
|---|---|---|---|
| **Questions** | **Organisational context** | **System characteristics** | **Individual difference** |
| **A1 – A4** | | | * |
| **A5** | | | * |
| **A6** | | | * |
| **A7** | | | * |
| **A8** | | * | |
| **A9** | * | | |
| **A10** | | * | |
| **A11** | | * | |
| **A12** | * | | |
| **A13** | * | | |
| **A14 -15** | * | | |
| **A16 – A17** | | * | |
| **B1 – B3** | | | * |

#### 3.5.3.2 Questionnaires and children

Greig, Taylor and MacKay (2007:125) state that, "Questionnaires can be a good way of finding out about children's attitudes, and they can be designed to cover exactly the areas you are interested in." The changes in the development of cognitive and functioning have profound implications for the question-answer process, namely question comprehension, recall of relevant information from memory, judgement formation and reporting (de Leeuw 2012). It is for this reason that the questionnaire was designed to cater for developmental stages of children from 7 – 13 years old.

Borland et al (2001), as cited in Hill (2006:80), state that, "Young people report that written questionnaires are boring." The children were guided in answering each question. This ensured a high response rate of the questionnaire. The questionnaire

was pretested to ensure that there are no problems relating to methodology, the statistical procedures are used appropriately, and to indicate if the questionnaire will gather the information it is meant to gather (Powell and Connaway 2004).

### 3.6. Data analysis

De Vos et al (2011:401) refer to data analysis as, "It involves reducing the volume of raw data, sifting significant from trivia, identifying significant patterns and constructing a framework for communicating the essence of what the data reveals." It is a process of bringing order and meaning to the data collected. Statistical data analysis for quantitative data will be employed in this study. Statistics will ensure the reliability of the conclusions. The basic purpose of statistical analysis is to summarise observations or data in such a manner that it provides answers to the hypothesis or research questions (Powell and Connaway 2004). The preparation stage of the analysis involves devising a good form in which to reproduce the data so that they provide a fair summary of what has been studied and can be analysed readily to answer the researcher's questions ( Sapsford and Jupp 1996). The steps involved in statistical analysis include establishment of categories, coding and analysing the data.

Establishment of categories entails the classification of variables involved in the study (Nueman 2011; Neuman 2006; Powell and Connaway 2004). The categories applied in this study include individual differences, system characteristics and social influence. These categories assisted in the coding process. The data was assigned to the categories. The new data from questionnaires, focus groups, observation and

task-based approach was then assigned numerical codes, which were then analysed. Descriptive statistics were used to determine the frequency values which were presented in tables and graphs. Descriptive statistics portrayed the variety of characteristics of the elementary children at Crawford Preparatory Pretoria School with respect to acceptance and rejection of digital school libraries.

### 3.7 Data triangulation

The study made use of both qualitative and quantitative data collection tools to research the same issue with the same unit of analysis. Guion, Diehl and McDonald (2011:np) define data triangulation as, "using different sources of information in order to increase the validity of a study." The benefits of triangulation include increasing confidence in research data, creating innovative ways of understanding a phenomenon, revealing unique findings, challenging or integrating theories, and providing a clearer understanding of the problem (Thurmond 2001, as cited in Guion, Diehl and McDonald 2011). Using multiple data collection methods assists in the gathering of information from different perspectives, especially considering that children have different developmental and cognitive stages and thus their preferences of different data collection methods (Hill 2006). This study applied the questionnaires, observations, task-based approach and the focus group. By using the different data collection methods the study gathered comprehensive data on the extent to which children accept digital school libraries.

### 3.8 Reliability and validity

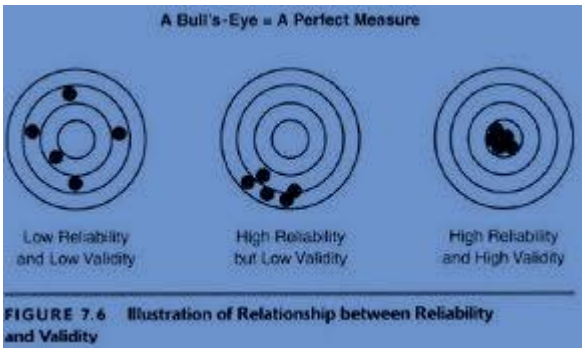
Neuman (2011: 208) defines reliability as, "The numerical results an indicator produces do not vary because of characteristics of the measurement process or measurement instrument itself." Reliability suggests that if the same method is repeated under similar conditions it yields the same results. There are three types of reliability, namely, stability reliability, representative reliability and equivalence reliability. Stability reliability measures reliability across time, representative measures across groups and measurement is the dependability of the variable. Neuman (2011:208) defines validity as, "how well the conceptual and operational definitions mesh with one another." Validity suggests the truthfulness, how well an idea matches with the actual reality. There are four types of validity, namely, face validity, content validity, criterion validity and construct validity. Validity and reliability ensure the quality of the data and thus the overall quality of the study.

To improve reliability Neuman (2011:209) lists the following:

1. Clearly conceptualise all constructs. Each measure will represent one concept.
2. Increase the level of measurement
3. Use multiple indicators of a variable
4. Use of pilot studies and replication

If people receive very different scores on a test every time they take it, the test is not likely to predict anything. However, if a test is reliable, that does not mean it is valid. The validity and reliability relationship is summarised below:

**Fig 3.5**: Illustration of relationships between reliability and validity (Neuman 2011: 217)




The data collection tools were pre-tested to ensure that they gathered the data on the variables that influence acceptance of digital school libraries by children. This therefore ensured validity and reliability of the instruments. When the observations, questionnaires are more reliable the closer the study arrived at the true variables that influence acceptance by children. To ensure validity the data collection was free from bias based on gender, race and disability in both the way they are administered and in the content.

### 3.9 Ethical considerations

These are ethical considerations involved in all research studies that involve human beings. In order to carry out this study, the researcher sought permission to conduct research at Crawford Preparatory Pretoria School. The researcher balanced the interests of the individual child with the best interests of the children as a group (Unisa Research Involving Children Policy- 2009). The assent of the children on their inclusion in the study was sought by using an assent form adjusted to their developmental stages. Lewis and Lindsay (2000:39) assert that children are competent and can decide whether or not to participate in a research study, provided

they have sufficient understanding of what participation entails and how it may affect them. The earliest age at which assent and consent are asked, is arbitrarily set at 7 years (Unisa Research Involving Children – 2009). This research proposal fulfils the Unisa Policy on Research Ethics (2007).

All works consulted and quoted were acknowledged. Adherence to the policy ensured professionalism. The children's privacy was respected and this was reflected in the way the researcher interacted with them, in the tasks they did and in the information that was gathered. In this context, the researcher subjected a project proposal, an ethical clearance form and the consent document to the Unisa Ethics Review Committee (ERC) for approval for the intended research. The consent of the principal and the school's governing body to undertake research during school hours was also sought.

### 3.10 Summary

Chapter 3 focused on the research methodology applied in this study. The research onion adopted from Saunders et al (2003) (***see*** Fig 3.2). The quantitative research methodology using deductive research was applied. The sampling and data collection methods were adapted to the elementary children's cognitive, developmental and language abilities. Ethical consideration with regard to researching young children was adhered to as outlined in the Unisa Research Involving Children: standard operating procedures 2009 and Unisa Policy on Research Ethics 2007.

Chapter 4 will present the data and Chapter 5 will be a discussion of the results, Chapter 6 summary of findings, conclusions and recommendations.

# CHAPTER FOUR

# DATA PRESENTATION

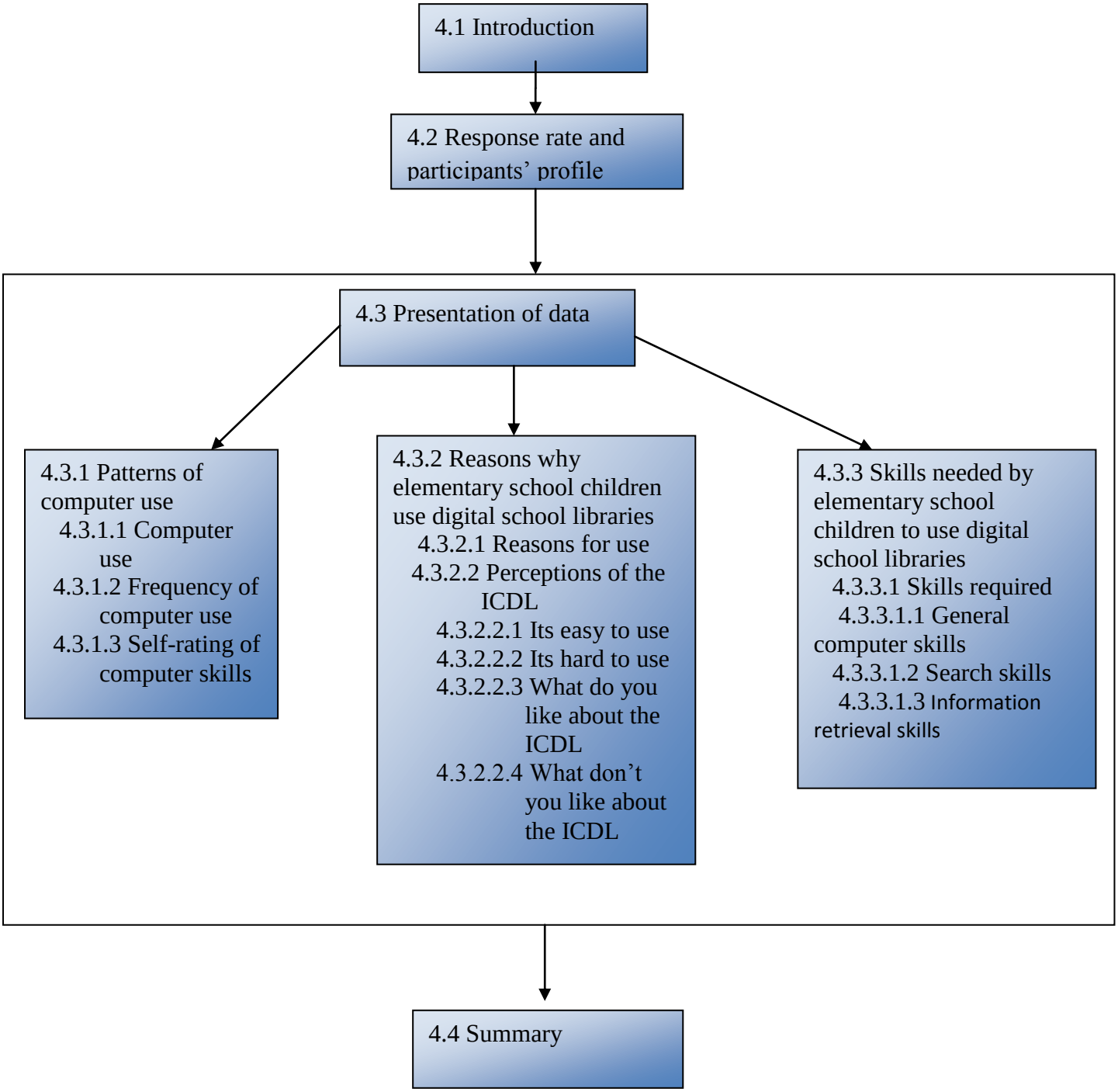



**Fig 4.1**: Data presentation map

## 4.1 Introduction

The previous chapter dealt with the research methodology applied in this study. This chapter will focus on the presentation and analysis of the data gathered from the questionnaire, focus group and the task-based approach. Johnson (2012:n.p) defines data analysis as, "a process used to transform, remodel and revise certain information (data) with a view to reach a certain conclusion for a given situation or problem." DeVos, Strydom, Fouche and Delport (2011) further add that it involves reducing the volume of raw data, sifting significant from trivia, identifying significant patterns and constructing a framework for communicating the essence of what the data reveals. The researcher used triangulated data collection tools and the study thus involves both quantitative and qualitative data analysis. Quantitative data analysis is a process of deductive reasoning while qualitative data analysis is a process of inductive reasoning to make inferences from empirical data of social life. Data was analysed according to the objectives of the study.

## 4.2 Response rate and participants' profile

Sahlqvist, Song, Bull, Adams, Preston, Ogilvie and the iConnect consortium (2011:4) define response rate as, "the number of usable returned questionnaires expressed as a percentage of the issued sample." In this study, the response rate was 100% as the questionnaire and task-based activities were administered in person. Ninety-one questionnaires and task-based activity sheets were distributed and the children were guided in completing them and then the questionnaires and the task sheets were collected after completion. All the questionnaires returned were usable;

however, there were 10 task-based activity sheets that were not usable as they were not filled in.

The researcher felt it was necessary to know the demographics of the participants, as this is part of what would define the individual characteristics, a construct that was used in the study. The questionnaire therefore had a section (Section B (***see also*** Appendix G)) that requested the participants to state their age and gender. In the tables 'Missing Data' means that the participants did not complete the section. Of the 91 participants, 46% (42) were boys and 47% (43) were girls. Seven per cent (6) of the participants did not respond to the question. Grade 6 learners were used and the age range of the participants that responded to the question is shown in *Table 4.1* below:

| **Year of birth** | **2001** | **2002** | **2003** | **Missing Data** | **TOTAL** |
|---|---|---|---|---|---|
| **Number of participants** | 10 | 71 | 2 | 8 | **91** |
| **Gender Female (F)**<br>**Male (M)** | 3<br>7 | 38<br>33 | 2<br>0 | 0<br>2 | **47% (43)**<br>**46% (42)** |
| **Age Percentage (%)** | 11 | 78 | 2 | 9 | **100** |

**Table 4.1**: Age group distribution of participants

### 4.3 Presentation of data

In this study, the data is presented through written descriptions and descriptive statistics. The results are presented as per the objectives of the study. The broad objective of the study was to determine the factors that shape elementary children's acceptance and use of digital school libraries. The first objective to explore the

current state of research on the acceptance of digital school libraries was dealt with in the literature review in Chapter 2. The specific objectives were the following:

(i) To identify the patterns of computer use within the age group represented in the study.

(ii) To determine the reasons why elementary children use digital school libraries.

(iii) To identify the skills needed by the children to use digital school libraries effectively.

### *4.3.1 Patterns of computer use*

The purpose of this objective was to determine how often the participants use computers. This is important as it is argued in the literature that computer experience has a moderating impact on the acceptance of digital school libraries. Individuals' perceptions of computers will change as soon as the individual has hands-on experience with computers (Venkatesh 2000; Venkatesh and Bala 2008; Thong, Hong and Tam 2002). Findings are presented in the following sub-themes to establish the patterns of computer use:

- Computer use
- Frequency of computer use
- Self-rating of computer skills

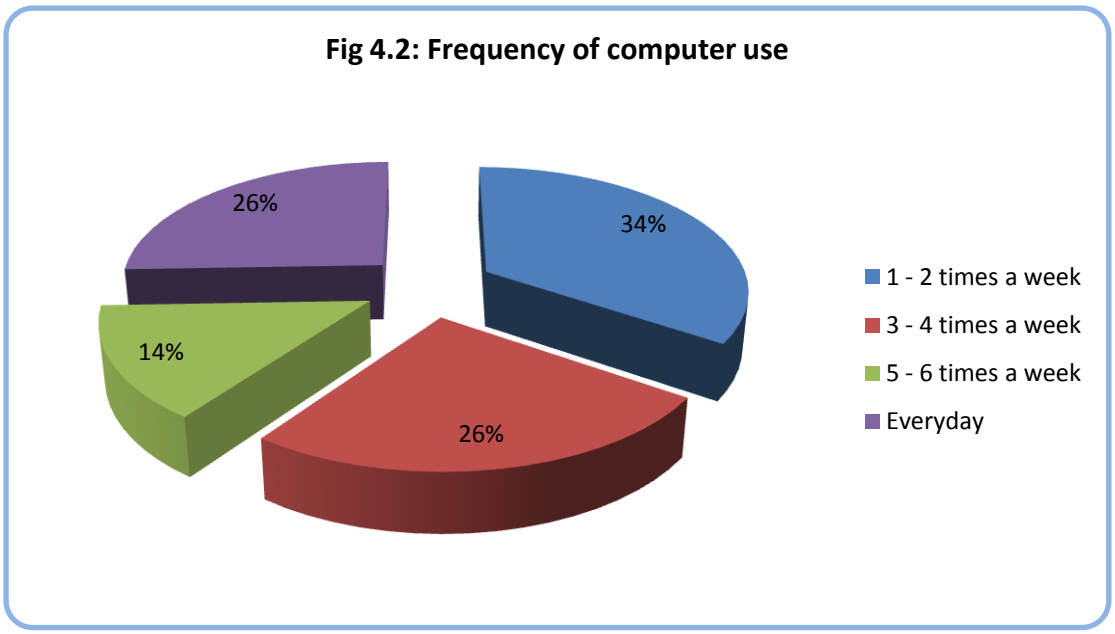
#### 4.3.1.1 Computer use

The participants were asked if they had ever used a computer. All 91 participants (100%) reported that they had used a computer. During the focus group discussions, the participants mentioned that they also use other ICT devices like smartphones, iPads and tablets. For the task-based activities the participants used iPads to access the ICDL. When asked why or for what reasons they used these ICT gadgets, the participants mentioned the following reasons:

- "To type homework"
- "To play games"
- "To read digi-books"
- "Social networking"
- "To search the web"
- "Emailing questions on our homework to our teachers and friends"

#### 4.3.1.2 Frequency of computer use

As reflected in Figure 4.1, out of 91 participants, 34% (31) reported that they used computers 1 – 2 times a week, 26% (23) responded that they used computers 3 - 4 times a week, 14% (13) reported that they used computers 5 – 6 times a week and 26% (23) responded that they used a computer every day. The participants reported that they used computers and/or iPads more at school for their school activities and lessons. However, the participants also mentioned that they use their smartphone more at home than they do computers.

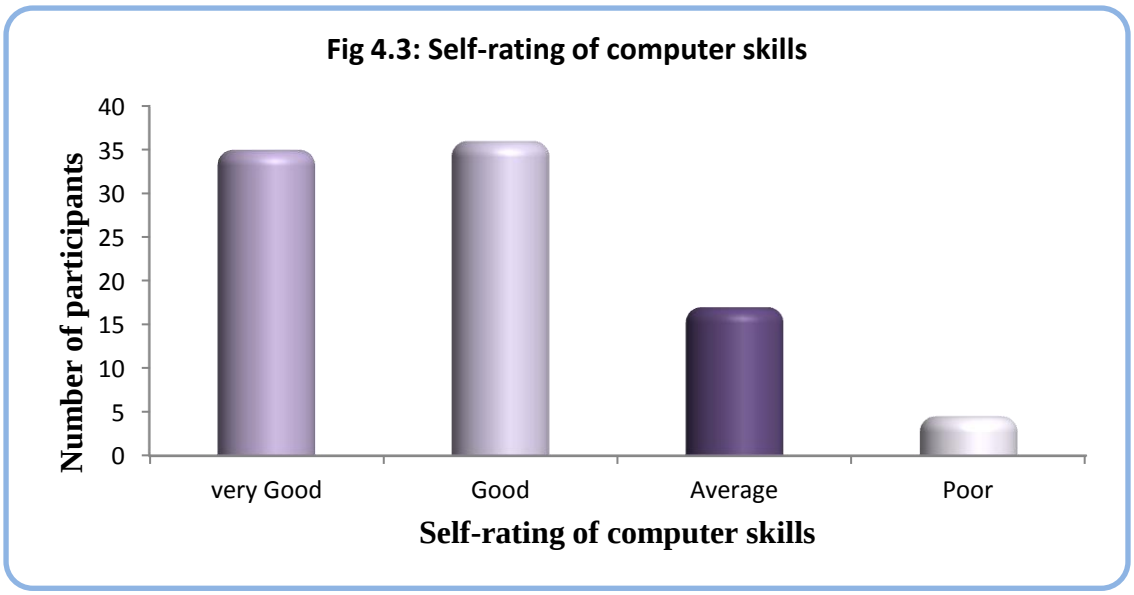



#### 4.3.1.3 Self-rating of computer skills

With regard to skills proficiency, 39% (35) reported that they were very good, 40% (36) reported that they were good, 19% (17) reported that they were average and 1% (1) participant reported that he/she was poor in using computers. When asked why they would rate their skills as they had the participants mentioned the following reasons:

- They could use the mouse correctly
- They could type on the keyboard without any trouble
- Using the iPads was easier as they were more familiar with swiping and selecting using their hands than a mouse
- They could use the internet and search for what they want

It was also observed during the task-based activities that the participants were able to use the ICDL with little assistance from the teacher and the researcher.



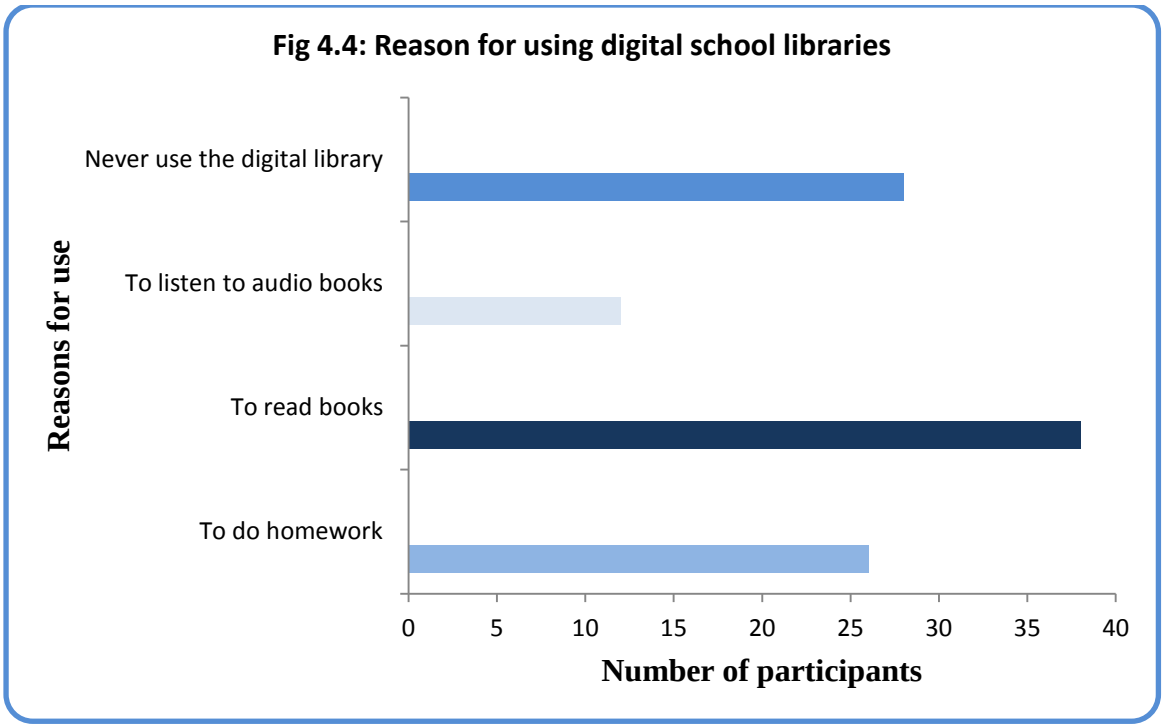

### *4.3.2 Reasons why elementary school children use digital school libraries.*

The purpose of this question was to determine the reasons why children use digital school libraries. The participants were asked about the reasons they used digital school libraries. Findings are presented in the following sub-themes:

- Reasons for use
- Perceptions of the ICDL
    - Is it easy to use?
    - Is it hard to use?
    - What do you like about the ICDL?
    - What don't you like about the ICDL?

#### 4.3.2.1 Reasons for use

Of the 91 participants, 30% (26) reported that they use it to do their homework, 44% (38) to read books, 14% (12) to listen to audio books and 33% (28) reported that they never use digital school libraries.




#### 4.3.2.2 Perceptions of the ICDL

The participants were asked what they thought about the ICDL. Seventeen per cent (13) reported that the ICDL was easy to use. Thirty-three per cent (26) reported that it was hard to use, 30% (24) reported that it was sometimes hard to use and 20% (16) reported that they were not sure.

#### *4.3.2.2.1 It is easy to use?*

The participants were asked to state the reasons why the ICDL is easy to use. Twenty-eight per cent (9) reported that they knew where to get the books, 16% (5) reported that they could select the books from the screen, 22% (7) reported that they could find a way around the ICDL and 34% (11) stated other reasons for why it is easy to use. **Table 4.2** presents the summary of responses.

**Table 4.2: Other reasons why the ICDL is easy to use**

| **Reason why the ICDL is easy as stated by the participants** |
|---|
| "I can search the book's name by clicking some pictures" |
| "It is organised in an easy way" |
| "This program is very simple and easy to find what kinds of books are there like if l want to find the animal books it's right there in front of me" |
| "I can search by using any words by using keyword search" |
| "I can search by using any language" |
| "I can search use age category" |
| "I can search using different sections" |

#### *4.3.2.2.2 It is hard to use?*

The participants were asked why they thought the ICDL was hard to use. Thirteen per cent (9) reported that they did not know where to find the books, 5% (1) reported

that he/she did not know how to search the ICDL, 19% (13) reported that they could not find their way around the ICDL and 66% (44) reported that there were other reasons why they found the ICDL hard to use. Table 4.3 below highlights the reasons stated most.

**Table 4.3: Other reasons why it is hard to use**

| **Reasons why the ICDL is hard as stated by the participants** |
|---|
| "Not easy to select categories" |
| "It is very confusing because the tabs are really not understandable" |
| "Too much scattered and small writing if you click on a topic it does not bring everything together" |
| "There are hidden buttons and descriptions that took me a while to find" |
| "Well, instead of the search key to be at the bottom it should be at the top and it should be much bigger" |
| "When you tap on a book, it takes a long time to load and when you read the book it's hard, long and tiring to turn the page" |
| "This website is extremely confusing for me because l cannot search for books like l normally do" |
| "When you get to the book it is hard to see the read book button on the screen" |
| "You have no proper reference to the books, and by the looks of it you'll need training to use it" |
| "It is very complicated" |
| "I am not sure how to find the intricate things on the ICDL" |
| "It is hard to search for books using the ICDL because it does not show the book you are looking for" |

#### *4.3.2.2.3 What do you like about the ICDL?*

The participants were asked why they liked the ICDL. The participants mentioned the reasons below why they liked the ICDL:

- "There's many types of books"
- "It is really cool to read books online and it is very cheap"
- "Everything was easy like the sections"
- "I like about that l can read in English and my language"
- "The fact that it is free"
- "I like the simplicity to use it"
- "You can read and reading is my favourite thing to do"
- "I like the fact that you are helping children that cannot afford books but just a little improvement will be nice"
- "I like the books especially the feel it's real books"
- "When l want to read a book, l don't have to purchase it or fill in my details"
- "Has age categories"
- "It's available to everyone"

#### *4.3.2.2.4 What don't you like about the ICDL?*

The participants were asked to state the things they did not like about the ICDL. The participants stated the reasons below:

- "There's not enough books that is very famous or new"

- “There’s no books that l want”
- “Changing pages is tiring”
- “Doesn’t even have Dr Seuss”
- “Why would someone look for a colour for a cover of a book”
- “It isn’t appealing to the eye”
- “Keyword search doesn’t work”
- “It isn’t easy to find the books”
- “The font is too small”
- “It’s hard to navigate”
- “You can’t find likeable books there”
- “The name isn’t easy to remember (too long)”
- “The way the pictures are taken makes it hard to read”
- “Blurs when zoom-in”
- “It takes long to load and to turn a page you have to press a button instead of swipe”
- “This app mustn’t use internet”
- “The books are for small children”
- “Hard to search”
- “You have no proper reference to the books and by the look of it you’ll need training to use”
- “The FAQ is too long for young children”
- “The website should look more fun”
- “When you click the home button it goes no where”
- “I don’t like the too much information maybe the books should be in alphabetical order”

- “I don’t like the layout and l also found it very hard to find certain things”
- “I don’t like that it’s hard to find books the search icon is not visible. Some things take forever to get to for example you have to go from one place to another”
- “I’m worried that one day we will have these digital libraries all the time instead of books which is bad for our eyes if we read for long and then you start getting dizzy but with normal books you don’t”
- “I did not like the theme. The fact that not all the books were in English. This is a very complicated website. I didn’t know to access books. A very small portion was in English. Nothing made sense. The books were not the type of books most people my age would read.”
- “Doesn’t have all age categories”
- “Everything is scattered, l like stuff to be in one place. I also do not like the fact that you have to press buttons to find what you want l’d rather have written it in”
- “Because there are hidden buttons and descriptions that took me a while to find”
- “I get confused with all the icons”
- “It is hard because finding the type of books you want is hard. I think instead of the colours they should put it in Sci-fiction, adventure, romance, etc.”

### *4.3.3 Skills needed by children to use the digital school libraries effectively*

The purpose of the question was to establish the skills needed to be able to use digital school libraries. The participants were asked which skills they think they should have to use the digital school libraries effectively.

#### 4.3.3.1 Skills required

The participants were asked during focus group discussions what they thought the essential skills were that were needed to use school digital libraries. The skills that were mentioned are listed below:

- General computer skills
- Searching skills
- Information retrieval skills

##### *4.3.3.1.1 General computer skills*

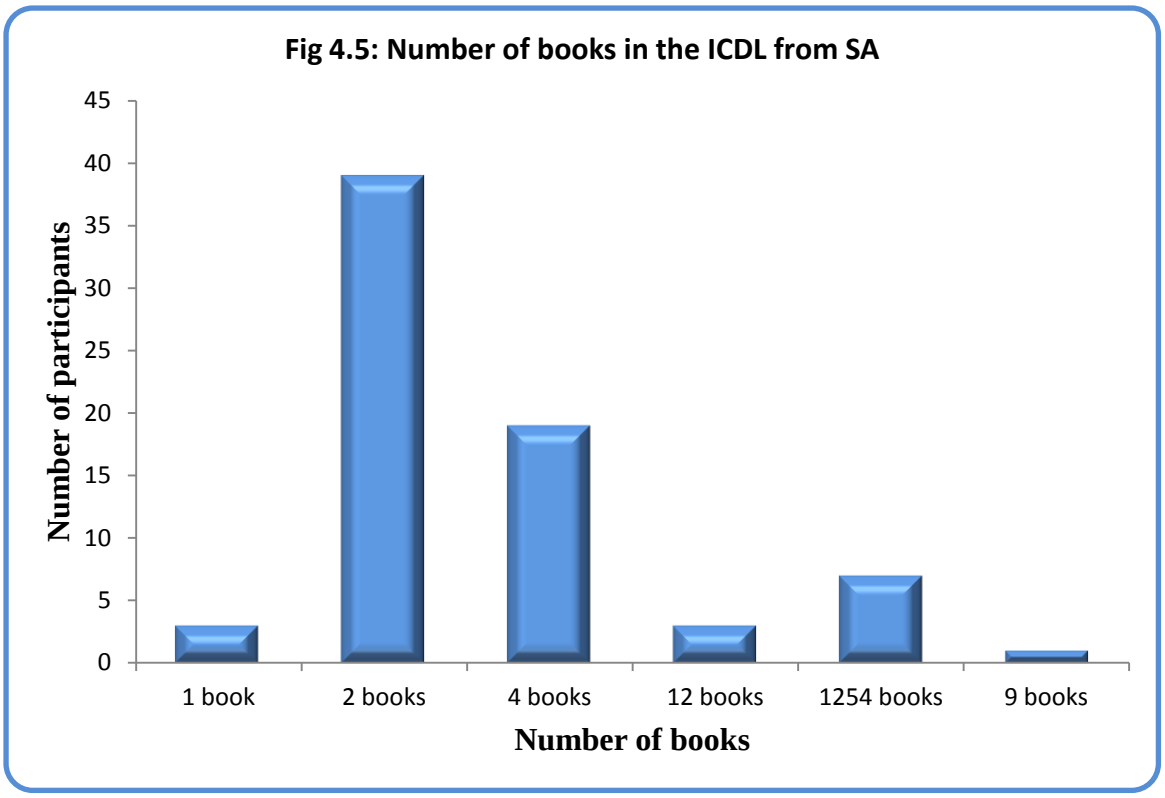
The participants felt that there was a need to be able to use the computer for one to be able to use digital school libraries. The general computer skills mentioned included using the mouse and typing. In one of the focus groups, a learner reported that it would be hard to select the books from the simple search of the ICDL because one needs to be able to use the mouse. However, they stated that when using IPads and touch screen laptops it would not be an issue as they can just touch the icon they want to select.

#### *4.3.3.1.2 Search skills*

The participants mentioned that one of the skills needed for efficient use of digital school libraries is searching skills. They stated that this included knowing how to search and which search tool to use, for example, a keyword search or simple search. Four tasks were given to the participants to determine their search skills. Of the 91 participants, 89% (81) returned completed forms while 11% (10) returned the forms without completing the tasks. The tasks included guided searches and self-guided searches. The guided searches were used to find out if the participants could locate different search interfaces and the self-guided searches were used to find out which search interfaces the participants preferred. Below are the results of the task-based approach:

a) **The participants were asked how many books the ICDL has from South Africa?**

One of the searching interfaces is searching by country. The question intended to find out if that interface is easy to access for the children or not. Using different search interfaces resulted in different answers, 4% (3) participants reported that there was one book, 48% (39) reported 2 books, 23% (19) reported 4 books, 4% (3) reported 12, 9% (7) reported 1254 books, 1% (1) reported 9, 2% (2) participants reported that there were 1 to 2 books and 9% (7) participants did not respond to the task.




b) **The participants were asked to find a book in the Afrikaans language titled *Nelson Mandela, a fighter for humanity* and open the first page of the book. They were the asked to write the first sentence.**

For this question, the intention was also to test their search skills using the language search interface. The participants were able to write down the first sentence from different parts of the book. While 12% (10) wrote down the first sentence from the dedication page, 68% (55) wrote the sentence from the preface page, 2% (2) of the participants went further and wrote the first sentence from chapter one, 4% (3) participants just picked random sentences from the book and 14% (11) did not respond. Table 4.4 summarises the results:

**Table 4.4: First sentence from a selected book**

| Page from book | Number of participants |
|---|---|
| Dedication | 12% (10) |
| Preface | 68% (55) |
| Chapter one | 2% (2) |
| Any sentence | 4% (3) |
| None | 14% (11) |
| **TOTAL** | **100% (81)** |

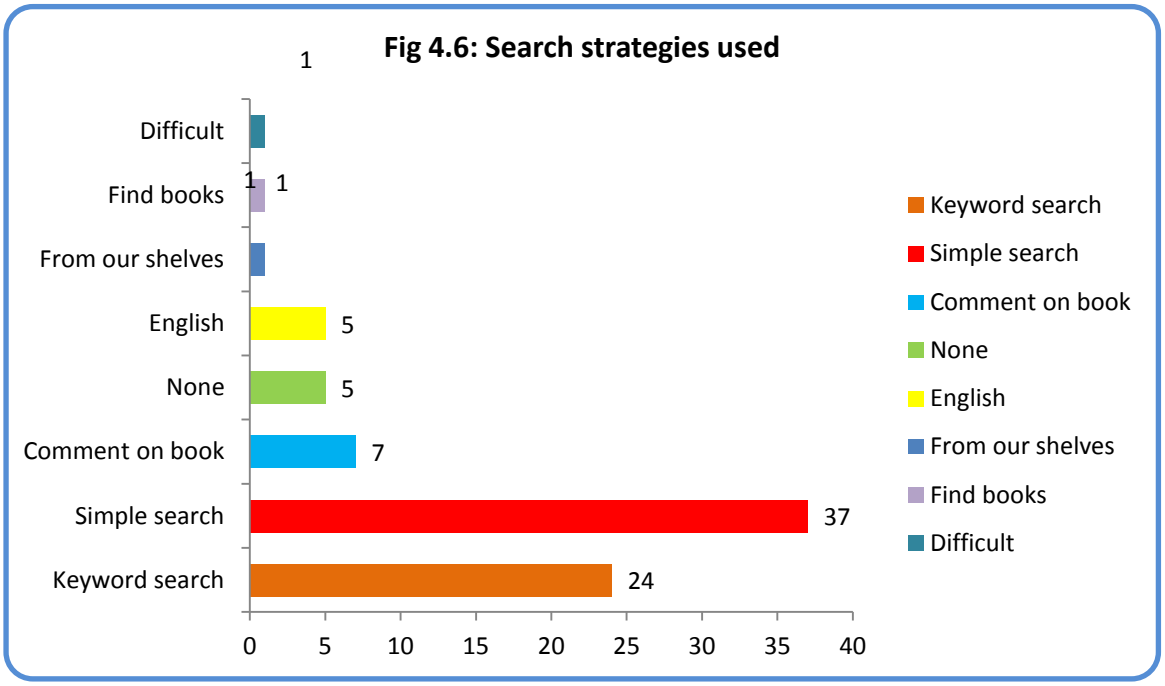
c) **The participants were asked to find a book about animals and write the name of the book on their sheets**

This task was a self-guided search task to determine the search interface that the participants preferred using. Out of the 81 participants, 77 (95%) managed to identify books about animals, 3 (4%) did not respond and 1 (1%) mentioned a book that could not be found in the ICDL.

d) **The participants were asked how they found the book in (c)?**

The task intended to find out the search interfaces that the participants used to get a book about animals. Thirty per cent (24) of the participants reported that they used the keyword search, 37 (46%) of the participants used simple search, 7 (9%) commented on the book they chose in question 3, 5 (6%)did

not respond to the task, 5 (6%)used the English tab in the simple search, 1 (1%) used 'From our shelves', 1 (1%) used 'Find books' and 1 (1%) reported that it was difficult.




e) **The participants were asked to find a five-star, happy short story in English. They were then asked to write down the title of the book.**

The task was intended to find out if the participants could combine the search interfaces to find a particular book. The participants mentioned 24 books. Below is the table showing how many participants mentioned a title:

**Table 4.5: Books identified by combining search strategies**

| Book title | Search strategies used by participants | Number of participants |
|---|---|---|
| Sweet, sweet mango tree | f) Keyword search<br>g) Simple search (5star +happy + short story + English) | 16% (13) |
| Blue sky | • Simple search (Award winning + short books)<br>• Keyword search 'happy books' | 19% (15) |
| Axle the freeway cat | • Simple search ( 5 star + happy)<br>• Keyword search 'happy books' or '5 star books' | 7% (6) |
| Apple pie English | • Keyword search 'happy books' or '5 star books' | 5% (4) |
| The flying train | • Simple search (Award winning + short books) | 4% (3) |
| Alexander the great | • Keyword search 'five star, short story book' | 7% (6) |
| Buhuki | • Simple search (Award winning + short books) | 5% (4) |
| Daniel's ride | • Simple search (Award winning + short books) | 4% (3) |
| Little red riding hood | • Keyword search 'happy books' or 'short story books' | 2% (2) |
| The guilt makers gift | • Keyword search 'happy books' or '5 star books' | 1% (1) |
| Cry baby moon | • Simple search (Award winning + short books) | 1% (1) |
| An angel is born | • Simple search (Award winning + any language) | 1% (1) |
| Jungle party | • Simple search (Award winning + short books) | 1% (1) |
| The hunter and the crocodile | • Simple search (Award winning + short books)<br>• Keyword search 'happy books' | 1% (1) |
| The adventures of Ulysses | • Keyword search 'five star, short story book'<br>• Keyword search '5 star books' | 1% (1) |
| Visiting Singapore | • Keyword search '5 star books' or 'happy books' or 'short story books' | 1% (1) |
| The bird who flew beyond time | | 1(1%) |
| Moon and star | • Keyword search '5 star books' | 1% (1) |
| Denslow's humpty dumpty | • Keyword search '5 star books' or 'happy books' or 'short story books' | 1% (1) |
| Five little friends | • Keyword search '5 star books' | 1% (1) |
| King winter | • Keyword search '5 star books' | 1% (1) |
| Miss Tiny | | 1% (1) |
| Several list of books | • The participant did individual search, i.e. 5 star books, happy books, short story books, etc. | 1% (1) |
| None | | 14% (11) |

#### *4.3.3.1.3 Information retrieval skills*

The participants mentioned that information retrieval was one of the skills needed to use digital school libraries effectively. They mentioned that this entailed being able to select the appropriate book from the vast results that the system brings. One of the participants in the focus groups mentioned that, “I don’t like the too much information maybe the books should be in alphabetical order”.

## 4.4 Summary

In this chapter, the data collected through the questionnaire, focus group and task-based activities was analysed. The acceptance of digital school libraries by elementary school children was discussed. The key issues raised are listed below:

- The current state of research on the acceptance of digital school libraries
- The patterns of computer use within the age group represented in the study
- The reasons why elementary school children use digital school libraries
- The skills needed by the children to use digital school libraries effectively

The next chapter interprets and discusses the results.

# CHAPTER FIVE

# INTERPRETATION AND DISCUSSION OF RESULTS

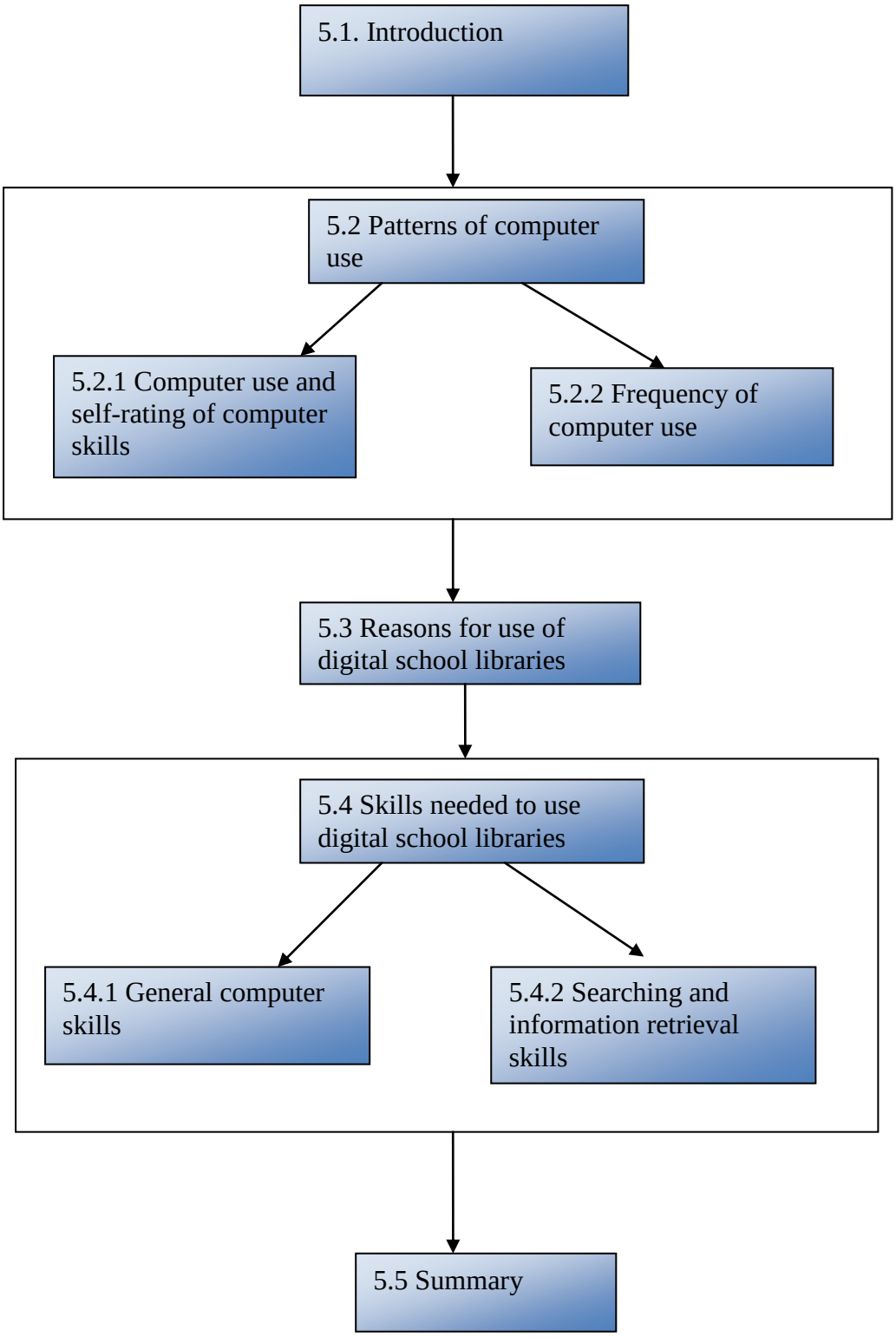



**Fig 5.1**: Interpretation and discussion of results map

## 5.1 Introduction

The previous chapter analysed and presented data collected from questionnaire, focus group and task-based activities. This chapter provides the interpretation and discussion of results based on the objectives of the study. The MBA tutor website states that,

> Interpretation has two major aspects namely establishing continuity in the research through linking the results of a given study with those of another and the establishment of some relationship with the collected data. Interpretation can be defined as the device through which the factors, which seem to explain what has been observed by the researcher in the course of the study, can be better understood.

The main aim of the study was to determine the factors that influence the acceptance of digital school libraries by elementary school children. The discussion will be presented according to the following objectives:

- To identify the patterns of computer use within the age group represented in the study.
- To determine the reasons why elementary school children use digital school libraries.
- To identify the skills needed by the children to use digital school libraries effectively.

## 5.2 Patterns of computer use by 11- to 13-year olds

Computer use is a moderating factor for determining the user acceptance of digital libraries (Venkatesh 2000; Venkatesh and Bala 2008; Thong, Hong and Tam 2002). Computer use relates to the individual difference external variable as determined by Thong, Hong and Tam (2004). They state that computer experience is one of the individual characteristics that influence whether or not an individual will accept a digital library. Children go through different developmental stages; they might be of the same age but their cognitive and motor skills differ and thus individual characteristics are critical in determining the factors that affect perceived ease of use (Bilal 2005; Bilal & Bachir 2007; Gelderblom 2008; Martens 2012 and Waldman 2007). In this research, the objectives were addressed by data from questionnaire, focus groups and task-based activities. In explaining the patterns of computer use the study looked at the following aspects:

- Computer use and self-rating of computer skills
- Frequency of computer use

### 5.2.1 Computer use and self-rating of computer skills

All 91 participants (100%) reported that they have used computers. The participants were therefore able to use the ICDL as was observed during the task-based activities.

The participants were able to use the mouse and they could type through the keyword search. As in Joeng's (2011) study, the participants are mandated to use computers during the Integrated Media subject period and thus the idea that computers are essential for them is instilled as they enter school. This forms the social influence as perceptions on computers are made based on what the teachers instil in the children on the importance of computers**.** Joeng (2011: 56) states that, "Because the mentality of treating computers as necessary tools has matured, user efficiency should not be treated as an issue in the e-library environment." The study is at odds with other studies that report that computer self-efficacy has a direct impact on perceived ease of use.

However when the participants were asked if they could use the ICDL, 13% stated that they did not know where to find books, although 40% reported that they were good at using computers. A possible explanation could be that there are other reasons apart from the general computer skills that made the ICDL difficult to use. This is evidenced in some of the reasons stated for the ICDL being difficult:

- ✓ "This website is extremely confusing for me because l cannot search for books like l normally do"
- ✓ "I am not sure how to find the intricate things on the ICDL"
- ✓ "It is hard to search for books using the ICDL because it does not show the book you are looking for"

The participants had trouble with the design of the ICDL itself and not with the general computer skills.

### 5.2.2 Frequency of computer use

Frequency of computer use is referred to as the computer experience in literature. This is still an individual difference characteristic. Computer experience is defined as how long a person has used computers. The participants were asked how often they use computers, 34% used computers at least 1 – 2 times a week. The participants use digi-books at school as part of their curriculum. Venkatesh (2000) theorised that the effects of adjustments on perceived ease of use were stronger with more hands-on experience with the system. The frequent exposure to computers will instil the belief that the system is easy to use and therefore the study concurs with previous studies that the more experience the users have, the easier they would find the digital school libraries to use (Venkatesh 2000; Venkatesh and Davis 2008).

## 5.3 Reasons why elementary school children use digital school libraries

The organisational context's external variable includes relevance, system accessibility and system visibility (Thong, Hong and Tam 2002). The purpose of this objective was to determine if the participants perceived the digital school libraries to be relevant to them. They were therefore asked for the reasons why they use the ICDL. Forty-four per cent (44%) reported that they read books while 33% reported

that they never use digital school libraries. This implies that the digital school libraries are relevant to the elementary school children as they mentioned that they use them to do their homework, read books and listen to audio books. This is consistent with previous studies that mention that relevance has an impact on perceived usefulness (Hong et al 2002, Thong et al 2004, Joeng 2011). The findings of the study support the need for more relevance of the digital school libraries to make them acceptable to elementary school children.

However, this does not dismiss the fact that if the ICDL becomes relevant or if another digital school library does, they are likely to use it. It is also important to note that most children read to pass their school subjects and therefore they might regard a digital library that does not have material in their curriculum as irrelevant. The ICDL is a digital library with storybooks from all over the world. As stated earlier, it is essential that digital school libraries cater for the needs of its user – schoolwork being the highest need for elementary school children. The findings of the study support the need for more relevance of the digital school libraries to make them acceptable to elementary school children.

However, 33% reported that they never use the digital school libraries. A possible explanation is reflected on the comments that the participants mentioned as the reason why they do not like the ICDL:

- ✓ “There’s not enough books that is very famous or new”
- ✓ “There’s no books that l want”

- ✓ “You can’t find likeable books there”
- ✓ “The books are for small children”
- ✓ “Doesn’t have all age categories”

Twenty-eight participants felt that the ICDL was not relevant to them and thus did not use them. Another possible explanation will be that the 28 participants in the study felt that is was hard to access some of the functions of the ICDL:

- ✓ “The name isn’t easy to remember (too long)”
- ✓ “I don’t like the layout and l also found it very hard to find certain things”
- ✓ “I don’t like that it’s hard to find books the search icon is not visible. Some things take forever to get to for example you have to go from one place to another”

The findings of the study concur with those of Thong et al (2004) that states that system accessibility can also influence ease of use factors. If it is difficult to access a digital library due to a lack of computers or necessary software, potential users will perceive it as difficult to use. Conversely, if a digital library is easily accessible, potential users are more likely to perceive it as easy to use. During the task-based activities, there was trouble with internet connectivity and thus the participants perceived the ICDL as hard to use, compared to downloaded PDF books they usually read. Connectivity is an issue in most communities in South Africa and thus a digital library that uses the internet is likely to be perceived as hard to use due to slow internet connections. It is also true when the hardware is outdated, as stated by the participants that they preferred swiping the pages of books than pressing the next

page button. Conversely, if a digital library is easily accessible, potential users are more likely to perceive it as easy to use.

## 5.4 The skills needed by elementary school children to use digital school libraries

The skills needed by elementary school children to use digital school libraries are essential, as they will determine the design of the system. This aspect of the objectives uses the interface characteristics external variable. These variables include terminology, navigation and screen design. The interface characteristics entail the interactions between the system and the user. Joeng (2011:48) states that, "Interface characteristics are important to the enhancement of the user-interface, which reduces the effort of using a particular technological tool." Interface characteristics are therefore essential for the PEOU. Interface characteristics only help to increase the ease of use of the digital school libraries. However, although interface characteristics only indirectly impact on the perceived usefulness (via a PEOU), they are nonetheless important for the enhancement of user-friendliness, which is itself important to reduce the efforts that are involved in the use of digital library systems (Joeng 2011). This objective was addressed under the following sub-headings:

- General computer skills
- Searching and information retrieval skills

### 5.4.1. General computer skills

The results of the study are in agreement with other studies that confirm that general computer skills are essential when interacting with digital school libraries (Venkatesh 2000; Venkatesh and Bala 2008; Thong, Hong and Tam 2002). Navigation offers the users of a site easy access to information of interest, the ability to move around within the system, or the ability to access other sites (Ramayah, 2006 as cited in Jeong 2011). The participants were able to find their way around the ICDL, which confirms that the navigation of the ICDL was clear. In their study, Thong et al (2004) concluded that navigation clarity has a relatively smaller but significant effect on PEOU of digital libraries. The design of a digital library's interface should enable easy navigation among different modules. Proper cues, such as navigation aids, can be provided for users to prevent disorientation by indicating where they come from and where they are going to in a sequence of query screens. Descriptive labels can also help users make more efficient navigational decisions when searching for information. Successful navigation of an information system and accurate searching of the resources depend on the clarity of the terminology used.

On the ICDL, books are easy to navigate with buttons that appear on the top right of the main navigation bar at the top of the screen. Users can make the book full screen, zoom out, zoom in, view one page or two adjacent pages, turn one page back and turn one page ahead. Forward page turns can also be achieved by clicking on the book itself. Users can easily navigate back to the "About This Book" item record or go back to their original search by clicking on the appropriate link in the breadcrumb

trail. However, \some participants felt that it was hard to navigate around the ICDL because “everything was scattered around” and “keyword search did not work”.

Screen design plays an important role as it is the interface that the users see when they interact with the system. Ramayah (2006), as cited in Joeng (2011: 56), states that screen design strongly relates to the arrangement of content in terms of layout, colour schemes, paragraph formatting, icons, buttons, font sizes, and line spacing. The participants stated some of screen design features as the reasons why they disliked using the ICDL:

- ✓ “It isn’t appealing to the eye”
- ✓ “The font is too small”
- ✓ “It’s hard to navigate”
- ✓ “The website should look more fun”
- ✓ “I don’t like that it’s hard to find books the search icon is not visible. Some things take forever to get to for example you have to go from one place to another”

The findings of the study are similar to those of other studies that state the importance of the screen design in influencing perceived ease of use (Thong et al 2002, Hong et al 2002, Joeng 2011). This finding indicates that elementary school students tend to rate digital school library systems as less useful if they find them difficult to use. The ICDL has a variety of search interfaces – simple search, advanced search, keyword search, location search, which enable the children to

select the search interface they are comfortable using, thus making it easy to use. In children's eyes, the visual design of a successful portal is one with a fun name, colourful background and foreground, large fonts, graphics and animation, recognisable characters, suitable vocabulary, well laid out screens and no advertisements (Bilal 2005). However, while the graphics on the digital library are very colourful and fun to use, the fact of response time should not be overlooked as it is also a variable that influences acceptance. When the children perceive the digital school library to be easy to use, they will indirectly see it as useful and use it.

### 5.4.2 Searching skills and information retrieval skills

Bilal and Bachir (2007: 47) states that:

> Prior research has shown that while children enjoy using various technologies (e.g. multimedia encyclopaedias', online catalogues, and the Web), they experience difficulty formulating adequate search strategies, commit spelling errors, use Boolean operators incorrectly, and employ search syntax that is not supported in the systems used.

Elementary school children struggle with search interfaces, therefore the objective sought to find out the search skills that the children needed to use digital school libraries. This was done by using the task-based activities. The activities were divided into two sections; one was to determine search skills with the participants being guided through how to search whilst the other they did a search without any guidance. This is important because voluntary and mandatory situations impact differently on the BI to use digital school libraries.

To do the tasks the participants accessed the ICDL by using iPads. This proves the point that there are now many new platforms with which to access digital materials, therefore increasing the accessibility of the digital school libraries. This is an advantage that South African schools can use to provide school library services to their students as many of them own smartphones that enable them to access the internet and thus digital materials. If the digital school libraries are built to be accessed in the many different platforms like the ICDL, accessibility is increased and thus impact on the PEOU. The tasks are discussed below:

This task was part of the guided search tasks. One of the simple search interfaces on the ICDL is to search by country. Searching by use of the country or location interface will give a result of two books from South Africa, 48% of the participants managed to retrieve the correct answer. The participants that retrieved one book (4%) used the Keyword Search to find books from South Africa. The participants that retrieved four books (23%) used the Keyword Search 'books in South Africa'. The findings of the study are similar to the findings of Bilal and Bachir (2007). Elementary school children struggle with the correct words to use in a keyword search, hence the variety in answers obtained. Terminology of the system plays an important role in how the system and the users interact. Hong et al (2002:106) state that:

> On one hand, users need to submit their queries to the system through structured phrases where knowledge of the terminology used by the system is indispensable. On the other hand, it is also important that users understand the descriptions, instructions, and search results of the digital library clearly and correctly.

The results of this study confirm that the terminology of the digital school library has to be understood by the users in order for them to benefit from using them. Unclear terminology can result in retrieval of undesired information, as there will be a mismatch of the words of the user and those of the digital library. It is crucial to make the terminology used in the digital school library close to children's vocabulary. Eliminating jargon on a search form can be one solution (Kim 2006). The searching and browsing interfaces are important if the children are to achieve their goal of using libraries. Clear terminology increases the ease of use of a digital school library by providing effective communication of system instructions and responses to elementary students (Joeng 2011). When the participants were frustrated from not retrieving the information they needed they did not attempt the task. This may be a possible explanation of participants leaving their task sheets not completed for some tasks.

**a) The participants were asked to find a book in the Afrikaans language titled *Nelson Mandela, a fighter for humanity* and open the first page of the book. They were then asked to write the first sentence.**

This task was also a guided search task. The task intended to find out if the participants could use the language search interface and get the experience of reading the book from the ICDL. Eighty-six per cent (86%) of the participants managed to retrieve the book. They mentioned first sentences from different pages of the book –

the dedication page, the preface page, chapter one and some from within the book. A possible explanation will be that the participants that went further from the dedication page were excited to read the book from the ICDL. However, there were 11 (14%) participants who did not respond to the task. A possible explanation would be that by the time of data collection the Afrikaans version of the book was no longer available on the ICDL. The participants that retrieved the book used the English language version of the book.

Also, to be noted is the fact that all the participants were able to access one book and read it without having to be put on holding lists – which is usually the case in print based libraries. This is an advantage that can be realised and used in the provision of school libraries in South Africa where shortages are rampant. The participants enjoyed reading the same book simultaneously. This can also be used as an advantage to provide curriculum-related materials for the school children, in which they are able to access anytime and without having to wait for the other students to finish reading it first.

**b) The participants were asked to find a book about animals and write the name of the book on their sheets**

This task was a self-guided task, that is, the participants were free to use any search strategy. Ninety-five per cent (95%) of the participants managed to retrieve a book about animals. In order to select a book about animals, the participants had to search for animal books, employ filtering skills and then select the book of their choice. The

results of the study are similar to those of Bilal (2005) that indicated that children preferred the self-guided task as they had the ability to generate and modify their searches to a point where they were satisfied with the results. However, 4% did not respond to the task and 1% mentioned a book that could not be found on the ICDL. A possible explanation will be that the participants that did not respond struggled to search without being guided.

The results of this study are similar to those of the studies of Venkatesh (2002) and Venkatesh and Bala (2008) in that the effect of the SN on BI became weaker with increasing experience, particularly in a voluntary context, that is, the degree to which an individual perceives that most people who are important to him think he should or should not use the system decreases as the user becomes accustomed to the system and uses it voluntarily. The effect of SN on BI is stronger in a mandatory context.

**c) The participants were asked how they found the book in (c)**

This task was intended to find out how the participants retrieved the book about animals. Eighty-four per cent (84%) of the participants managed to state the different search interfaces they used. These results are similar to those mentioned in literature on TAM , that indicate that knowledge of the search domain influences the acceptance of the digital libraries (Hong, Thong and Tam 2004; Venkatesh 2000). The participants were able to produce suitable search queries, interpret the output of the search query and adjust their search queries accordingly.

However, nine per cent did not comment on how they found the book, but on the book itself. A possible explanation to this is that, being young children, the participants did not understand what the task required of them. As Miller and Khera (2010) state, there is a positive relationship between English literacy and perceived ease of use. Six per cent, as compared to the 4% in task (c), did not respond to the task and 1% reported that using the system was hard. This could imply that there were some participants who managed to find a book on animals, but were not able to state how they found it.

**d) The participants were asked to find a five-star, happy short story in English. They were then asked to write down the title of the book**

This task was a guided task that involved combining different search interfaces to come up with a book on the ICDL. Combination of search interfaces is similar to the Boolean search in adult information retrieval. Sixteen per cent (16%) of the participants managed to combine the search strategies and retrieve the book '*Sweet sweet mango tree'*. Forty-six per cent (46%) of the participants managed to combine at least two or three of the search strategies to retrieve different books. This again confirms that knowledge of the search domain is important for the digital school libraries to be accepted.

Hong et al (2002:116) state that, "When users are more familiar with the subject domain they are searching, the search activities become easier for them". The participants who were able to combine the search interfaces had knowledge of the search domain and were therefore able to retrieve '*Sweet, sweet mango tree*'. One participant (1%) had a list of several books. The participant searched using each search strategy singularly and thus had a book for five-star books, one for happy books, another for short stories and several for English books. Two per cent of the participants mentioned two books '*The bird who flew beyond time*' and '*Miss Tiny*'. The researcher was not able to establish how they retrieved the books. It was beyond the scope of the study to trace the participants as they worked on the ICDL. Fourteen per cent of the participants did not respond to the task. A possible explanation is that the participants struggled with combining the search interfaces.

## 5.5 Summary

This chapter interpreted and discussed the empirical research findings presented in Chapter 4. The following is the summary of the suggestions of the findings:

- The impact of computer self-efficacy on PEOU is reduced when computer use is mandatory.
- The more experience the users have, the more they would find the digital school libraries easy to use.
- Screen design plays an important role, as it is the interface that the users see when they interact with the system.
- Relevance has a direct impact on perceived usefulness.

- Clear terminology increases the ease of use of a digital school library by providing effective communication of system instructions and responses to elementary students.
- Knowledge of the search domain influences the acceptance of the digital libraries.

It is clear from the results that perceived ease of use and perceived usefulness lead to acceptance of digital school libraries. The results of the study are similar to those of earlier research on the acceptance of technology. The next chapter presents the conclusions, summaries and recommendations of how digital libraries can be designed to ensure that they are accepted and used by elementary children.

# CHAPTER SIX

# SUMMARY, CONCLUSIONS AND RECOMMENATIONS OF THE STUDY

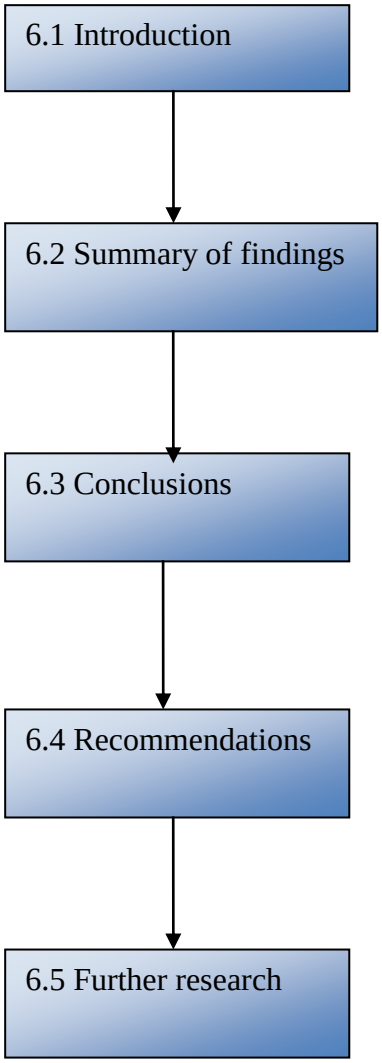



**Fig 6.1**: Summary, conclusions and recommendations of the study map

## 6.1 Introduction

The previous chapter dealt with the discussion and interpretation of the data gathered from questionnaires, focus groups and task-based activities. This chapter will present the summary of findings, conclusions and recommendations of the study. Libguide (n.d.) states that, "A conclusion is not merely a summary of the main topics covered or a re-statement of the research problem, but a synthesis of key points and if applicable, where recommendations of new areas for future research are made." The purpose of this chapter is to present the last word on issues raised conveying the larger significance of the study and recommending possible new or expanded ways of thinking of the acceptance of digital school libraries. The study was set out to find the reasons why elementary school children use or reject digital school libraries. The following are the objectives of the study:

(i) To explore the current state of research on the acceptance of digital school libraries

(ii) To identify the patterns of computer use within the age group represented in the study

(iii) To determine the reasons why children use digital school libraries

(iv) To identify the skills needed by the children to use digital school libraries effectively

(v) To recommend guidelines for design processes to ensure effective use of digital school libraries

## 6.2 Summary of findings

This section outlines the summary of findings according to the objectives stated above (***see also*** Chapter 1 Section 1.5.1).

### 6.2.1. To identify the patterns of computer use within the age group represented in the study

The following constitutes the findings of the study with regard to the patterns of computer use by elementary school children:

- Overall, 91 (100%) participants reported that they have used computers to do their homework, play games, read digi-books, search the web, social networking and emailing-mailing.
- Out of the 91 participants, 23 (26%) used computers everyday, 13 (14%) used computers 5 – 6 times a week, 23 (26%) used computers 3 – 4 times a week and 31 (34%) used computers 1 – 2 times a week. It is important to note that the participants use their smartphones more at home than they do computers.
- With regard to computer skills proficiency, 71 (78%) considered themselves as good, 17 (19%) as average and 1 (1%) as poor in using computers. The participants rated themselves according to their ability to use the mouse, whether they could type without trouble and were able to search the internet without help.

Computer use plays an important role in the acceptance of digital libraries. The participants' were able to use the ICDL because they had prior knowledge of how to

use computers. The study therefore agrees with other TAM studies that computer use influences PEOU, thus acceptance of the digital school library.

### 6.2.2 To determine the reasons why children use digital school libraries

- Of the 91 participants, 76 (84%) use the ICDL to do their homework, read books and listen to audio books, and 28 (33%) had never used digital school libraries.
- Twenty-six (33%) reported that the ICDL was hard to use, 24 (30%) reported that it was sometimes hard to use. About 50 participants struggled with using the ICDL.
- The reasons stated for it being easy included being able to find their way around the ICDL, they could find the books easily and they could search for books using the different search strategies.
- The reasons stated for it being hard included that the design of the ICDL is scattered and thus makes it confusing to select books, there were no references and the books took long to load.
- The participants mentioned the reasons why they liked the ICDL, which included that it had many books, it was simple to use and it was free of charge.
- The participants that disliked the ICDL stated that it contained old books and the books were for younger children, among others.

It is clear from the study that relevance of the material that the school digital library holds is important. The ICDL is a digital library that has fiction and non-fiction storybooks. This may be a reason why other participants perceived the ICDL to be not useful to them as they prefer curriculum-related material.

### 6.2.3 To identify the skills needed by the children to use digital school libraries effectively

- The participants mentioned that general computer skills were essential for effective use of digital school libraries. These included using the mouse and typing. In one of the focus groups, a learner reported that it would be hard to select the books from the simple search of the ICDL because one needs to be able to use the mouse.

- Five tasks were given to the participants to determine their search skills. The results of the tasks were:

    - ✓ **The participants were asked how many books the ICDL has from South Africa?**

      Of the 91 participants, 39 (48%) managed to get the two books from South Africa. However, it is important to note that the participants used the keyword search and thus the search terms used retrieved many different answers, for example, 23% of the participants used "books in South Africa".

- ✓ **The participants were asked to find a book in the Afrikaans language titled *Nelson Mandela, a fighter for humanity* and open the first page of the book. They were the asked to write the first sentence?**

  About 86% of the participants were able to locate the book and write the first sentence. However, 14% were not able to find the book and thus could not attempt the task.

- ✓ **The participants were asked to find a book about animals and write the name of the book on their sheets.**

  This was a free search task. Ninety-five per cent of the participants managed to identify books about animals. Four per cent (4%) did not respond to the task and 1% mentioned a book that is not on the ICDL.

- ✓ **The participants were asked how they found the book in (c)?**

  Of the 81 participants, 61 (75%) managed to state how they found the animal book. Most of the participants were able to state the search strategy that they used while 25% either commented on the book or did not attempt the task.

- ✓ **The participants were asked to find a five-star, happy short story in English. They were then asked to write down the title of the book.**

  Sixteen per cent of the participants managed to retrieve the book *Sweet sweet mango tree* by combining the search strategies. Twenty-

three other books were retrieved by the other participants by using different search strategies. It is important to note that some of the participants searched the strategies individually thus they had a list of 4 –5 books.

- Information retrieval was another skill that was mentioned to be essential to use digital school libraries effectively. The participants mentioned that this skill was essential because they will be able to select from the list of results that they will have retrieved.

## 6.3 Conclusions

The conclusions are drawn from the objectives of the study as well as the results presented in Chapter 4.

### 6.3.1 To explore the current state of research on the acceptance of digital school libraries

This objective was addressed in Chapter 2 – theoretical framework and literature review – focusing on the acceptance of technology in general and specifically that of digital libraries by elementary school children. Numerous studies have been done that involved the acceptance of digital libraries using TAM (Hong et al 2002; Miller & Khera 2010; Nov & Ye 2008; Nov & Ye 2009; Park et al 2009; Pratminingsih &

Hendei (n.d); Thong, Hong & Tam 2002; Tibenderana, Ogao, Ikoja-Odongo & Wokadala 2010; Vaidyanathan, Sabbaghi & Bargellini 2005). Most of these studies were undertaken with university learners and the survey method was used. However, very few studies have looked at/investigated the acceptance of technology by elementary children (ages 7 – 13 years). Five studies were identified that studied the acceptance of different technologies by elementary school children. These studies were Joeng (2011); Lin (2009); Mordis, Hoffman & Marshall (2008); Shen & Chuang (2009) and Shih, Shih, Li1, Chen, Chen & Chen (2011). Mordis, Hoffman & Marshall (2008) and Joeng (2011) studied the acceptance of digital libraries specifically. Joeng (2011) established that interface characteristics (terminology, screen display and navigation) could indirectly influence PU via PEOU. This is in line with all the studies that have been undertaken using TAM to understand acceptance of technology. Joeng also observed that system quality positively influences both PU and PEOU. Joeng (2011) concluded that the total influence of PEOU could be singled out as a primary determinant of BI to the use of technology by elementary children. However, all the five studies used the survey method to collect data. This study fills the gap by using multiple data collection tools to study the acceptance of digital school libraries by elementary school children.

### 6.3.2 To identify the patterns of computer use within the age group represented in the study

The second objective was to identify computer use by elementary school children. It should be noted that computer use has an impact on how children will accept digital

school libraries. The study concludes that the more the children are exposed to computers, the more they accept digital school libraries. This is so because general computer skills are needed for the children to effectively use the digital school libraries. Therefore, computer use has a moderating factor. Crawford Preparatory Pretoria School has a subject, Integrated Media, in which children are encouraged to use computers for schoolwork. In such environments digital school libraries will be accepted more easily. Computer use is an individual difference variable as each individual's experience will vary, especially with children who have different developmental stages. The study is also in agreement with Joeng's (2011) study that states that the participants are mandated to use computers during the Integrated Media subject period and therefore the fact of computers being essential for them is instilled as they enter school. This is at odds with other studies that indicate that computer self-efficacy has a direct impact on PEOU.

### 6.3.3 To determine the reasons why children use digital school libraries

The relevance of the digital school libraries has an impact on the perceived usefulness. The more relevant the digital school libraries are to the children's needs the more they will perceive them to be useful. Accessibility is also an organisational factor that has an impact on the PEOU and PU. If it is difficult to access a digital library due to a lack of computers, slow internet connectivity or the necessary software, potential users will perceive it as difficult to use. Conversely, if a digital library is easily accessible, potential users are more likely to perceive it as easy to use. Therefore, PEOU indirectly impacts on PU and thus on the acceptance of digital

school libraries. Crawford Preparatory Pretoria School can use the advantage of their internet connectivity and iPads to offer a variety of information resources to its pupils and thus meet their information needs.

### 6.3.4. To identify the skills needed by the children to use digital school libraries effectively

It is important that the children have certain skills to be able to use the digital school libraries. General computer skills enable the children to type, use the mouse and navigate around the digital school library. Screen design therefore plays an important role, as it is the interface that the users see when they interact with the system. As stated earlier, computer experience has a moderating role on PEOU, that is, the more experienced the children are in using computers, the more they will perceive the digital school libraries as easy to use and thus it will be easily accepted.

Information and search skills are also essential in the use of digital school libraries. Hong et al (2002:116) state that, "When users are more familiar with the subject domain they are searching, the search activities become easier for them." Elementary children struggle with the correct words to use in a keyword search, hence, the variety in answers obtained in the tasks given. Terminology of the system plays an important role in how the system and the users interact. Clear terminology increases the ease of use of a digital school library by providing effective communication of system instructions and responses to elementary students (Joeng 2011). The effect of

SN on BI became weaker with increasing experience, particularly in a voluntary context. The effect of SN on BI is stronger in a mandatory context.

### 6.4 Recommendations

The following recommendations are made based on the study's results, its scope and limitations:

- For the digital school libraries to be used effectively, the terminology should be understood by the children, the screen design should be well organised and structured to meet the needs of elementary children. As motor skills of children differ, the navigation should also be made easier for children to be able to perform information searches without any trouble.
- The digital school library should meet the information needs of elementary school children. This is essential, as it would ensure that they are relevant to their users. The study recommends that the digital school libraries include up-to-date materials and/or books in their collection.
- Librarians and teachers are to provide training for computer use as the experience with it will ensure ease of use of the digital school library. The study recommends that an online help function on the digital school library be included to allow the children to ask for help from the system whenever they get stuck.
- The study recommends the design of flexible interfaces that cater for the different domain knowledge levels of elementary children as they have different developmental stages.

- The study recommends that Crawford Preparatory Pretoria School introduce the use of digital school libraries in order to meet the user's needs and increase literacy and critical thinking skills through their use. Digital libraries like the ICDL can be used to encourage reading for pleasure as it includes books from all over the world.

## 6.5 Further research

- This study used a case study. It would be more informative to have multiple case studies to have in-depth information on the acceptance of digital school libraries. Use of mixed method research is recommended, especially where the qualitative method is applied more.
- The study used participants with ages of 11 – 12 years. A further study of all elementary school children from seven-year olds to 13-year olds is recommended to gather in-depth information on the acceptance of digital school libraries by elementary school children.

## References


Adams, R. 2010. Exploring the acceptance of enterprise resource planning systems by small manufacturing enterprises. A Master of Science in Information Systems. University of South Africa.

Amaratunga, D., Baldry, D., Sarshar, M. & Newton, R. 2002. Quantitative & qualitative research in the built environment: application of 'mixed' research approach. *Work Study* 51(1): 17–31.

Anandarajan, M., Igbaria, M. & Anakwe, U.P. 2002. Information technology acceptance in a less-developed country: a motivational factor perspective. *International Journal of Information Management* 22:47–65.

Antolini, T. 2009. Digital school libraries leave book stacks behind. Available at http://www.librarystuff.net/2009/11/09/digital-school-library-leaves-book-stacks-behind/ (Accessed on 18 January 2013).

Archer, T.M. 1993. Focus groups for kids. *Journal of Extension*, Vol 31 (1): np.

Arms, W. 2000. Digital libraries and electronic publishing today. Available at http://www.cs.cornell.edu/wga/DigLib/MS1999?Chapter14.html (Accessed on 17 February 2013).

Asselin, M. & Doiron, R. 2008. Towards a Transformative Pedagogy for School Libraries 2.0. *School Libraries Worldwide*, 14(2): 1-18. Available at http://www.anlp.org/previous-rapport-issues. (Accessed 29 March 2014)

Averweg, U.R. 2008. Applicability of the Technology Acceptance Model in three developing countries: Saudi Arabia, Malaysia and South Africa. *Alternation* 12(1a): 331–343.

Averweg, U.R. 2008. Information technology acceptance in South Africa: an investigation of perceived usefulness, perceived ease of use and actual system use construct. *The African Journal of Information Systems* 1(1):44–66.

Bahari, S.F. 2010. Qualitative versus quantitative research strategies: contrasting epistemological & ontological assumptions. *Jurnal Teknologi*, 52: 17–28.

Baohua, W., Xiaoyan, M. & Fei, G. (n.d.). On characteristics of the digital library and the influence of the work of reader service. Available at http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.201.6439 (Accessed on 25 January 2013).

Bar-IIan, P. & Wolman Y. 2003. A survey on the use of electronic databases and electronic journals accessed through the web by academic staff of Israel University. *Journal of Academic Librarianship* 29(2):115-119.

Baruchson-Arbib, S. & Shor, F. 2002. The use of electronic information sources by Israel college learners. *Journal of Academic Librarianship* 28(6):346 –361.

Baskerville, R. & Pries-Heje, J. 2001. A multiple theory analysis of a diffusion of information technology case. *Information Systems Journal* 11(3):181–212.

Bederson, B.B., Quinn, A. & Druin, A. 2009. Designing the reading experience for scanned multi-lingual picture books on mobile phones. Available at http://alexquinn.org/papers/Designing%20the%20Reading%20Experience%20for%20Scanned%20Multilingual%20Picture%20Books%20on%20Mobile%20Phones.pdf (Accessed on 20 April 2013).

Berg, B.L. 2009. *Qualitative research methods: for the social sciences*. 7e. Boston: Allyn & Bacon.

Berg, S.A., Hoffmann, K. & Dawson, D. 2010. Not on the same page: undergraduate information retrieval in electronic and print books. *The Journal of Academia Librarianship* 36(6):518–525.

Berk, L.E. 2006. *Child development*, 7e. Boston: Allyn & Bacon. Available at http://www.ablongman.com/berk (Accessed on 28 February 2013).

Berman, R. 1977. Preschool knowledge of language: what 5-year olds know about language use. *Writing development: an interdisciplinary view*. Edited by C. Pontecorvo, Amsterdam: John Benjamin's Publishing: 61–76.

Bester, J. 2012. Retreat school gets a library, thanks to teamwork. *Saturday Argus*, 25 Feb:10.

Bilal, D. & Bachir, I. 2007. Children's interaction with cross-cultural and multi-lingual digital libraries: I understanding interface design representations. *Information Processing and Management* 43: 47–64.

Bilal, D. & Sarangthem, S. (n.d.). Meditating differences in children's interaction with digital libraries through modelling their tasks.

Bilal, D. 2005. Children's information seeking and the design of digital interfaces in the effective paradigm. *Library Trends* 54 (2): 197–208.

Blaine, S. (Ed). 2010. Thousands join fast in support of school libraries. *Business Day*, 30 July:4.

Boelens, H. 2012. What is a school library?: International Guidelines. A Report prepared by the Research Team, Research SIG, International Association of School Librarianship (IASL), August 2012.

Bogdan, R.C. & Bilken, S.K. 1982. *Qualitative research for education: an introduction to theory and methods*. Boston: Allyn and Bacon, Inc.

Brown, I.T.J. 2002. Individual and technological factors affecting perceived ease of use of web-based learning technologies in a developing country. *The Electronic Journal on Information Systems in Developing Countries* 9(5):3–15.

Busha, C.H. & Harter, S.P. 1980. *Research methods in librarianship: techniques and interpretation.* Orlando, FL: Academic Press Inc.

Byamugisha, H.M. 2010. Digitizing library resources for new modes of information use in Uganda. *Library Management* 31(1/2): 42–56.

Cape Times Staff Writer 2013. Library donation to change pupils' lives, says principal. *Cape Times*, 12 March:6.

Carusi, A. & Mont'Alvao, C. (n.d.) *Navigation in children's educational software: the influence of multimedia elements.* Available at http://www.iea.cc/ECEE/pdfs/art0221.pdf (Accessed: 13 May 2013).

Chauke, P. 2014. Illiteracy: no library in 80% of schools. *The Citizen*, 05 March:10.

Chrismar, W.G. & Wiley-Patton, S. 2003. Does the extended Technology Acceptance Model apply to Physicians. Proceedings of the 36th Hawaii International Conference on System Science.

Cohen, L., Manion, L. & Morrison, K. 2000. *Research methods in education (5th ed.).* London: RoutledgeFalmer

Comin, D. & Hobjin, B. 2004. Cross-country technology adoption: making the theories face the facts. *Journal of Monetary Economics* 51(1):39.

Cooper, L. 2002. Methodology for a project examining cognitive categories for library information in young children. *Journal of the American Society for Information Science and Technology* 53(14):1223–1231.

Crawford Preparatory Schools' Code of Conduct, The Electronic Media Policy. 2011. *see* Crawford College.

Creswell, J.W. 1994. *Research design: qualitative & quantitative approaches*. California: Sage Publications.

Creswell, J.W. 2008. The selection of a research design. Available at http://www.sagepub.com/upm-data/22780_Chapter_1.pdf (Accessed on 02 January 2014).

Creswell, J.W. 2014. *Research design: qualitative, quantitative & mixed method approaches*. Los Angelos: Sage Publications, Inc.

Data collection (n.d.). Available at http://ori.hhs.gov/education/products/n_illinois_u/datamanagement/dctopic.html (Accessed on 08 March 2014)

Davis, F.D. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly* 13 (3): 318–340.

De Leeuw, E.D. 2011. Improving data quality when surveying children & adolescents: cognitive & social development & its role in questionnaire

construction & pretesting. Report prepared for the Annual meeting of the Academy of Finl&. Research programmes Public health challenges & health & welfare of children & young people. May 10-12, Naantali, Finl&. Available at http://www.aka.fi/Tiedostot/Tiedostot/LAPSET/Presentations%20of%20the%20annual%20seminar%2010-12%20May%202011/Surveying%20Children%20&%20adolescents_de%20Leeuw.pdf (Accessed on 10 March 2014).

De Vos, A.S, Strydom, H., Fouche, C.B. & Delport C.S.L. 2011. *Research at grassroots: for social sciences & human service professions. 4e*. Pretoria: Van Schaik.

.

Dhakal, M.P. 2012. Digital libraries in college education: needs and opportunities. *Cross Cultural Discourse* 1(1):107–118.

Digital Libraries Federation 2003.http://www.clir.org/dlf.html (Accessed: 17 January 2011).

Dillon, A. & Morris, M. 1996. User acceptance of new information technology: theories and models. *Annual Review of Information Science and Technology*, Edited by M. Williams, Medford, NJ: Information Today 31:3–32.

Dillon, A. 2001.User acceptance of information technology. *Encyclopaedia of Human Factors and Ergonomics*. Edited by W. Kurwowski. London: Taylor & Francis.

Diso, L.I. 2011. Policies for digital libraries and archives in Africa: developing strategies for access to knowledge for development. *International Journal of Information Science and Management* 9(2): 55–68.

Dlamini, B. & Brown, A. 2010. The provision of school library resources in a changing environment: a case study from Gauteng Province, South Africa. Available at http://www.eric.ed.gov/PDFS/ED518499.pdf (Accessed on 20 February 2013)

Druin, A. (n.d.). *The role of children in the design of new technology*. http://www.cs.umd.edu/hcil (Accessed: 17 January 2011).

Druin, A. 2005. What children can teach us: developing digital libraries for children with children. *Library Quarterly* 75(1): 20–41.

Druin, A., Bederson, B.B., Weeks, A., Farber, A., Grosjean, J., Guha, M.L., Hourcade, J.P., Lee, J., Liao, S., Reuter, K., Rose, A., Takayama, Y. & Zhang, L. 2003. The International Children's Digital Library: description and analysis of first use. Available at http://www.cs.umd.edu/hcil (Accessed: 17 January 2011).

Druin, A., Weeks, A., Massey, S. & Bederson, B.B. 2010. Children's interests and concerns when using International Children's Digital Library: a four country

case study. Available at http://hcil2.cs.umd.edu/trs/2007-02/2007-02.pdf (Accessed on 18 March 2013).

Ellis, K. & Blashki, K. 2004. Toddler techies: a study of young children's interaction with computers. *Information Technology in Childhood Education Annual*: 77–96.

Entlich, R., Garson,L., Lesk, M., Normore, L., Olsen, J. & Weibel, S. 1996. Testing a digital library: user response to the CORE Project. *Library Hi Tech* 14(4):99–118.

Equal Education 2010. We can't afford not to: costing the provision of functional school libraries in South African public schools. Available at http://www.equaleducation.org.za/sites/default/files/Equal%20Education%20Costing%20Booklet.pdf (Accessed on: 25 March 2013).

Evaluating schools: the big picture (n.d.). Available at http://www.aneducatedchoice.com/research-and-resources/evaluating-schools-the-big-picture (Accessed on: 24April 2012).

Family Health International (n.d.).*Qualitative research methods: a data collector's field guide: participant observation*. Module 2.

Farmer, L.S.J. 2005. *Digital inclusion, teens, and your library: exploring the issues and acting on them*. Westport, Connecticut: Libraries Unlimited.

Fleener, C., Morrison, S., Linek, W. & Rasinski, T. 1997. Recreational reading choices: how do children select books? *Exploring literacy: the 19th annual yearbook of the College Reading Association*. Edited by W. Linek & E. Sturtevant. Plattenville: University of Wisconsin:75–84.

Ford, M. & Gonzales, E. 2010. Quantitative vs qualitative research method issues. Available at http://www.google.co.za/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=34&ved=0CD0QFjADOB4&url=http%3A%2F%2Fgeekyartistlibrarian.pbworks.com%2Ff%2F6530%2BPower%2BPoint.pptx&ei=S27OUpmePOeQ7AaOuYHoCg&usg=AFQjCNFtZiSA0HwXtWOKws9Jb3h20CsoKw (Accessed on 3 January 2014).

Fourie, J.A. 2002. School and public library studies: introductory orientation: management of information services for children and youth; only study guide for SLS101-L. Pretoria: University of South Africa

Frean, A. 2008. "Learning by rote has no place in the digital age." *The Herald* (EP Herald), 04 December: 9.

Frean, A. 2008. "Learning by rote has no place in the digital age." *The Herald* (EP Herald), 04 December: 9.

Gay, L.R. 1987. *Educational research 3e*. Columbus: Merrill Publishing Company.

Gelderblom, J.H. (n.d). Designing technology for young children: guidelines grounded in a literature investigation on child development and children's technology. Doctor of Philosophy in Computer Science, University of South Africa, Pretoria.

Gharibpanah, M. & Zamani, A. 2011. Assessing advantages and disadvantages of e-learning. *Journal of American Science*, 7 (4):519–524.

Gibson, J.E. 2012. Interviews & focus groups with children: methods that match children's developing competencies. *Journal of Family Theory & Review*, 4: 148–159.

Gorman. M. 1998. *Our singular strengths: meditations for librarians*. Chicago, IL: American Library Association

Gorrell, G. 2011. Countering method bias in questionnaire-based user studies. *Journal of Documentation* 67(3):507–524.

Greig, Taylor, J. & MacKay, T. 2007. *Doing research with children. 2e*. Los Angelos: Sage publications.

Grobbelaar, R 2011. Lack of school libraries is 'scandalous'. *The Times*, 06 June: 6.

Gu, X., Zhu, Y. & Guo, X. 2013. Meeting the 'Digital Natives': understanding the acceptance of technology in classrooms. *Educational Technology and Society*, 16 (1): 392–402.

Guion, L.A., Diehl, D.C. & McDonald, 2011. Triangulation: establishing the validity of qualitative studies. FCS6014, one of a series of the Department of Family, Youth & Community Sciences, Florida Cooperative Extension Service, Institute of Food & Agricultural Sciences, University of Florida. Available at https://edis.ifas.ufl.edu/pdffiles/FY/FY39400.pdf (Accessed on 11 March 2014).

Hagerman, M.A. 2010. "l like being intervieeeeeeeeewed!": kids' perspectives on participating in social research. *Sociological studies of children and youth* 13:61–105.

Hall, J. 2008. Cross sectional survey design. In Paul J. Lavrakas. Encyclopedia of Survey Research methods. Available at http://srmo.sagepub.com/view/encyclopedia-of-survey-research methods/n120.xml (Accessed on 7 February 14).

Hall, L.E. 2010. International Children's Digital Library: a library for the world's children. A White paper. Written as an assignment for EDUC651 at Winthrop University, Rock Hill, SC.

Hart, G. & Zinn, S. (n.d.). The conundrum of school libraries in South Africa. Available at http://www.dissanet.com/ifla/pdf/LIASA%2007%20Hart%20&%20Zinn.pdf (Accessed on 15 January 2013).

Hart, G. 2012. Searching for new library models: two South African case studies of services to youth. Libraries for Young People: Breaking through Boundaries, Pre-conference—World Library and Information Congress, IFLA Section Libraries for Children and Young Adults, Joensuu, Finland, 9-10 August 2012.

Haung, Y.M., Liang, T.H., Su, Y.N. & Chen, N.S. 2012. Empowering personalised learning with an interactive e-book learning system for elementary school learners. *Education Technology Research Development* 60: 703–722.

He, Y. (n.d.). *Relationships between factors associated with technology acceptance of an online e-business application*. Ph.D. dissertation, Capella University, United States – Minnesota. (Accessed: 11 April 2011), from Dissertation & Thesis: full text. (Publication no. AAT3444639).

Hell, M. 2005. *School libraries in a democratic South Africa: curriculum support, information literacy, policy development*. Master of Communication for Development thesis, Malmo University, Hogskola.

Hell, M. 2005. *School libraries in a democratic South Africa: curriculum support, information literacy, policy development*. Master of Communication for Development thesis, Malmo University, Hogskola.

Hill, M. 2006. Children's voices on ways of having a voice: Children's & young people's perspectives on methods used in research & consultation. *Childhood* 13(1): 69–89.

Hole, V. 2013. School library a community gem: .new facility opens up magical world of books to many. *The Herald* (EP Herald), 26 April:8.

Hong, J.C., Hwang, M.Y., Hsu, H.F., Wong, W.T. & Chen, M.Y. 2011. Applying the Technology Acceptance Model in a study of the factors affecting usage of the Taiwan digital archives system. *Computers & Education* 57:2086–2094.

Hong, W., Thong, J.Y.L., Wong, W.M. & Kar-Yantam. 2002. Determinants of user acceptance of digital libraries: an empirical examination of individual difference and system characteristics. *Journal of Management Information Systems* 18 (3): 97–124.

Hopkins, W.G. 2008. Quantitative research design. *Sportscience* 4(1):1–9.

Houston, C. 2011. Digital books for digital natives: a tour of open access children's digital literature collections. *Children & Libraries*, winter 2011.

Huntington, H.E. 2011. Digital media in education: expanding the Technology Acceptance Model. Masters in Communication and Media Technology. Rochester Constitute of Technology.

Hutchinson, H., Druin, A., Bederson, B., Reuter, K., Rose, A., Weeks, A. 2005. How do I find the books about dogs? The errors and frustrations of young digital library users. http://www.cs.umd.edu/hcil (Accessed on 17 January 2011)

Hutchinson, H., Druin, A., Bederson, B., Reuter, K., Rose, A., Weeks, A. 2005. The International Children's Digital Library: a case study in designing a multilingual, multicultural, multigenerational audience. *Information Technology and Libraries* 24(1):4–9.

Hutchinson, H., Rose, A., Bederson, B., Weeks, A., Druin, A. 2004. How do l find the books about dogs? The errors and frustrations of young digital library users. http://www.cs.umd.edu/hcil (Accessed: 17 January 2011)

IFLA/UNESCO School Library Manifesto 1999. Available at http://archive.ifla.org/VII/s11/pubs/manifest.htm (Accessed on 15 March 2013).

Isaacs, S. 2007. ICT in education in South Africa. Survey of ICT and education in Africa: South Africa Country Report http://www.infodev.org (Accessed on 1 September 2011).

Jakobsen, H. 2012. Focus groups & methodological rigour outside the minority world: making the method work to its strengths in Tanzania. *Qualitative Research* 12(2);111 –130.

Joeng, H. 2011. An investigation of user perceptions and behavioural intention towards the e-library. Available at http://www.sciencedirect.com/science/article/pii/S1464905511000261 (Accessed on 2 April 2013).

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

Johnson, R.B. & Onwuegbuzie, AJ (n.d.) Mixed method research: applications and implications in the resource-based view. *Research Methodology in Strategy and Management* 4:37-73.

Johnson, S. 2012. Importance of data analysis in research. Available at http://dissertation-help-uk.blogspot.com/2011/12/importance-of-data-analysis-in-research.html (Accessed on 23 September 2014).

Johnston, W.J., Leach, M.P. & Liu, A.H .1999. Theory testing using case studies in business-to-business research. *Industrial Marketing Management* 28: 201–213.

Juma, I., Wamukoya, J. & Wekullo, C. 2014. The role of digital libraries in bridging the gap in Africa. *Mousaion: South African journal of Information Studies* 32(1): 64–83.

Kavulya, J.M. 2007. Digital libraries and development in Sub-Saharan Africa: a review of challenges and strategies. The Electronic Library 25(3):299–315.

Kemp, B. & Jones, C. 2007. Academic use of digital resources: disciplinary differences and the issue of progression revisited. *Journal of Educational Technology and Society* 10(1):52–60.

Kendall, S.L. 2011. International Children's Digital Library: a library for the world's children. *Reference Reviews* 25 (8):32–33.

Kim, S. 2008. Appropriation of wireless technology: direct impacting factors on the youth's adoption intention and usage of the wireless application protocol phone. *Information Technology Journal* 7(8):1116–1124.

Kotlolo, M. & Grobbelaar, R. 2011. Mobile libraries reach schools. Authorities come up with plans to lift literacy levels. *The Times*, 18 November:6.

Kuhlthau, C.C. 1998. Learning in digital libraries: an information search process approach – children and the digital library. *Library Trends*, Spring 1998.

Kukafka, R., Johnson, S.B., Lifante, A. & Allgrante, J.P. 2003. Grounding a new information technology implementation framework in behavioural science: a systematic analysis of the literature on IT use (Manuscript).

Kyobe, M. 2011. Investigating the key factors influencing ICT adoption in South Africa. *Journal of Systems and Information Technology* 13(3):255–267.

Larson, L.C. 2012. It's time to turn the digital page: pre-service teachers explore e-book reading. *Journal of Adolescents and Adult Literacy*, 56 (4): 280–290.

Legris, P., Ingham, J, & Collerette, P. 2003. Why do people use information technology? A critical review of the Technology Acceptance Model. *Information and Management* 40: 191–204.

Lewis, A. & Lindsay, G. (Ed.). 2000. *Researching children's perspectives*. Buckingham: Open University Press.

Liao, C., Palvia, P. & Chen, J. 2009. Information technology behavior life cycle: towards a Technology Continuance Theory (TCT). *International Journal of Information Management* 29:309–230.

Libguides (n.d.). Organizing your social sciences research paper. Available at http://libguides.usc.edu/content_mobile.php?pid=83009&sid=615873#box_615873. (Accessed on 16 December 2014).

Lin, H.T. 2009. Using Technology Acceptance Model to explore the relationship between information literacy and digital learning of elementary school learners. Master in Computer Science. Chaoyang University of Technology.

Link, K. 2011. The International Children's Digital Library: an evaluation of information retrieval systems. IST616. Final project: ICDL. Available at Available at http://krlink.mysite.syr.edu/docs/IST616.IRevaluation.pdf (Accessed: 20 March 2013).

Loertscher, D. 2007. The digital school library: a worldwide development and fascinating challenge. In Rosenfeld, E & Loertscher, DV (eds), *Towards the 21st century school library media program.* USA: Scarecrow Press, Inc.

Mackenzie, N. & Knipe, S. 2006. Research dilemmas: paradigms, methods and methodology. *Issues in Educational Research*, 16 (2): 193–205.

Mann, C.J. 2003. Observational research methods. Research design II: cohort, cross sectional, & case-control studies. *Emerg Med J* 20:54–60.

Mardis, M.A., Hoffman, E.S. & Marshall, T.E. 2008. A new framework for understanding educational digital library use: re-examining digital divides in US schools. *International Journal of Digital Librarians* 9:19-27.

Martens, M. 2012. Issues of access and usability in designing digital resources for children. *Library and Information Science Research* 34: 159–168.

Masigo, S. 2010. Easy access to books in the digital age. *The Star*, 05 August: 15.

Mason, J. & Hood, S. 2011. Exploring issues of children as actors in social research. *Children & Youth Services Review* 33 : 490–495.

Master of Business Administration tutor. Briefly explain interpretation of data. Available at http://www.mbaofficial.com/mba-courses/research-methodology/briefly-write-about-data-interpretation/ (Accessed on 24 December 2014)

Merriam, S.B. 1998. *Qualitative research and case study applications in education*. San Fransisco: Jossey-Bass Publishers.

Miller, J. & Khera, O. 2010. Digital library adoption and the Technology Acceptance Model: a cross country analysis. *The Electronic Journal on Information Systems in Developing Countries* 40(6):1-19.

Molefe, N.P.J., Lemmer, M. & Smit, J.J.A. 2005. Comparison of the learning effectiveness of computer-based and conventional experiments in science education. *South African Journal of Education* 25(1):50-55.

Molina-Azorin, J.F. 2007. Mixed methods in strategy research: applications and implications in the resource-based view. *Research Methodology in Strategy and Management* 4:37–73.

Monama, T. 2012. Heavy education spending but still not nearly enough. *Sowetan*, 23 February:8.

Monama, T. 2012. South African schools face big challenges – Minister. Bid to boost education. *Sowetan*, 11 April:7.

Moore, T., Saunders, V. & McArthur , M. 2011. Championing Choice—Lessons Learned from Children & Young People About Research & Their Involvement. *Child Ind Res* 4: 249–267.

Mordis, M.A., Hoffman, E.S. & Marshall, T.E. 2008. A new framework for understanding educational digital library use: re-examining digital divides in US schools. *International Journal of Digital Librarians* 9:19–27.

Morgan, D.L., Scannell, A. & Krueger, R.A. 1998. *Planning focus groups: the focus group kit 2*. London: Sage Publications Inc.

Morgan, M., Gibbs, S., Maxwell, K. & Britten, N. 2002. Hearing children's voices: methodological issues in conducting focus groups with children aged 7–11years. *Qualitative Research*, 2 (1):5–20.

Mtshali, N. 2012. Gauteng learners get tablets. *IOL Scitech*, 19 September. Available at http://www.iol.co.za/scitech/technology/gadgets/gauteng-learners-to-get-tablets-1.1386667 (Accessed on 29 January 2014).

Mtshali, N. 2014. Little progress at struggling school in two years: Department promised there would be a new building – but it's still in the pipeline. *The Star*, 24 July:5.

Musa, P.F. 2006. Making a case for modifying the TAM to account for limited accessibility in developing countries. *Information Technology for Development* 12(3):213–224.

Namkee, P., Roman, R., Lee, S. & Chung, J.E. 2009. User acceptance of a digital library system in developing countries: an application of the Technology Acceptance Model. *International Journal of Information Management* 29:196–209.

National Education Infrastructure Management Systems (NEIMS) Reports May 2011. Available at http://www.education.gov.za/LinkClick.aspx?fileticket=hHaBCAerGXc%3D&tabid=358&mid=180 (Accessed on 12 February 2013).

National Reading Strategy 2008. South African Department of Education.

National School Library and Information Services Guideline 2012. South Africa Department of Education.

National Uniform Norms and Standards for School Infrastructure 2008. South Africa Department of Education. Available at http://d2zmx6mlqh7g3a.cloudfront.net/cdn/farfuture/OyEjqsQBMZP62VcNN02Zup0NGAZFnfxDL6pijfNvBfU/mtime:1227692206/files/gazettes/081121schoolinfrastracture.pdf (Accessed on 25 January 2013).

Nesset,V. & Large, A. 2004. Children in the information technology design process: a review of theories and their applications. *Library and Information Science Research* 26:140–161.

Neuman, W.L. 2012. *Basics of social research: qualitative & quantitative approaches. 3e.* Boston: Pearson International.

Neuman, W.L. 2006. *Social research methods: qualitative & quantitative approaches. 6e*. Pearson Education, Inc.

Neuman, W.L. 2011. *Social research methods: qualitative & quantitative approach. 7e*. Boston: Pearson International.

Neuman, W.L. 2012. *Basics of social research: qualitative and quantitative approach*. 3ed. Boston: Pearson International.

Ngulube, P. 2010. *Quantitative research proposals in the management and social sciences*. Workshop presentation. (2010: Unisa)

Ngulube, P., Mokwatlo, K. &Ndwandwe, S. 2009. Utilisation and prevalence of mixed methods research in library and information science in South Africa 2002-2008. *South Africa Journal of Libraries and Information Science* 75(2):105–116.

Nicholson, S. 2004. A conceptual framework for the holistic measurement and cumulative evaluation of library services. *Journal of Documentation*, 60:164–182.

Nov, O. & Ye, C. 2008. Users' personality and perceived ease of use of digital libraries: the case for resistance to change. *Journal of the American Society for Information Science and Technology* 59 (5):845–851.

Ntobong, S. 2010. Pupils start drive to revive school libraries. *The Pretoria News*, 16 August:5

Ocholla, D.N. & Le Roux, J. 2011. Conceptions and misconceptions of theoretical frameworks in Library and Information Science research. Paper presented at the 6th ProLISSA conference, Pretoria, 9–11 March.

Ostrov, J.M. & Hart, J. (n.d) Observational Methods. Chapter 15. Available at http://wings.buffalo.edu/psychology/labs/SocialDevLab/Chap15%20Observational%20Methods%20_Ostrov%20&%20Hart%20(in%20press).pdf (Accessed on 28 February 2014).

Park, N., Roman, R., Lee, S. & Chung, J. E. 2009. User acceptance of a digital library system in developing countries: an application of the Technology Acceptance Model. *International Journal of Information Management* 29:196–-209.

Parker, W.C. 1984. Interviewing children: problems and promises. *The Journal of Negro Education* 53(1):18–28.

Paton-Ash, M.S 2012. Issues and challenges facing school libraries: a case study of selected primary schools in Gauteng Province, South Africa. Master of Education, Rhodes University, South Africa.

Payne, G. & Payne, J. 2004. *Key concepts in social research*. London: Sage publications.

Phakathi, B. 2013. Basic standards not met in many public schools. *Business Day*, 4 November:5.

Potter, W.J. 2005. *Media Literacy, 3e*. London: SAGE Publication.

Powell, R.R. & Connaway, L.S. 2004. *Basic research methods for librarians. 4e*. Westport: Libraries Unlimited.

Pratminingsih, S.A. & Hendri, M. (n.d). User acceptance of digital libraries in higher education. Masters in Education. Utama Universitas, Widyatama.

Punch, K.F. 2000. *Developing effective research proposals*. Thousand Oaks, CA: Sage.

Research ICT Africa 2011. South Africa http://www.researchictafrica.net/countries.ph?cid=19 (Accessed on 1 September 2011).

Responsible conduct in data management. Available at: http://ori.hhs.gov/education/products/n_illinois_u/datamanagement/dctopic.html (Accessed 24 February 2014).

Revised National Curriculum Statement 2002. Department of Education South Africa. Available at http://www.education.gpg.gov.za/Document5/Documents/RNCS%20for%20Senior%20Phase.pdf (Accessed on 26 March 2013).

Riege, A.M. 2003. Validity and reliability tests in case study research: a literature review with 'hands-on' applications for each research phase. *Qualitative Market Research* 6(2):75–86.

Robson, C. 2002. *Real world research. A resource for social scientists & practitioner-researchers, 2ed.* Malden: Blackwell.

Roes, H. 2001. Digital libraries and education: trends and opportunities. D-Lib Magazine, 7(7/8): n.p. Also available :http://www.dlib.org/dlib/july01/roes/07roes.html (Accessed on 5 January 2011).

Rowlands, I. & Bawden, D. 1999. Digital libraries: a conceptual framework. *Libri* 49: 192–202.

Rowley, J. 2002. Using case studies in research. *Management Research News* 25(10):16–27.

Ryan, A.B. 2006. Post-positivist approaches to research. Available at http://eprints.nuim.ie/874/1/post-positivist_approaches_to_research.pdf (Accessed on 29 December 2013).

Sahlqvist, S., Song, Y., Bull, F., Adams, E., Preston, J., Ogilvie, D. & iConnect Consortium. 2011. Effect of questionnaire length, personalization and reminder type on response rate to a complex postal survey: randomized controlled trial. *BMC Medical Research Methodology*. 11:62. Available at http://www.biomedcentral.com/1471-2288/11/62

Salange, G.F. 2011. Creating digital library collections: the experience of Malawi university libraries. *Innovation* 43:38–49.

Salem, L. 2013. Turning a page on access to international children's books. *Reference Review* 27(1): 4–8.

Sapsford, R. & Jupp, V. (Ed.) 1996. *Data collection & analysis*. London: Sage publications.

Saunders, M., Lewis, P. & Thornhill, A. 2003. *Research Methods for Business Learners*. Harlow: Pearson Education Limited.

Saunders, M., Lewis, P. & Thornhill, A. 2009. *Research methods for business learners, 5th ed.*, Harlow, Pearson Education.

Saunders, M.N.K. & Tosey, P. 2012. The Layers of Research Design. *Rapport* 30 58–9.

Schutt, R.K. 1996. *Investigating the social world: the process and practice of research*. Thousand Oaks, CA: Pine Forge Press.

Selwyn, N. 2009. The digital native-myth and reality. *Aslib Proceedings: New Information Perspectives* 61(4):364–379.

Shackel, B. 1991. Usability context, framework, definition, design, and evaluation. In B. Shackel and S. Richardson (Ed.). *Human factors for informatics usability*. Cambridge: Cambridge University Press.

Shaw, C., Brady, L.M. & Davey, C. 2011. *Guidelines for doing research with children & young people.* London: NCB Research Centre, Children's Bureau.

Shen, C.C. & Chaung, H.M. 2009. An investigation on user communication behavior in an interactive white board technology environment. *WSEAS Transactions on Communication* 8(1): 184–195.

Shenton, A.K. & Hay-Gibson, N.V. 2010. Modelling the information-seeking behavior of children and young people: inspirations from beyond LIS. *Aslib Proceedings* 63(1):57–75.

Shih, B.Y., Shih, C.H., Li1, C.C., Chen, T.H., Chen, Y.H. & Chen, C.Y. 2011. Elementary school learners' acceptance of Lego NXT: the Technology

Acceptance Model, a preliminary investigation. *International Journal of the Physical Science* 6(22):5054–5063.

Sidley, K. 2010. School libraries fundamental to pupils' success. *The Sunday Times*:5.

Silverman, 2006. What is quantitative research? Crawford Preparatory Pretoria. Available at http://www.uk.sagepub.com/upmdata/11254_Silverman_02.pdf (Accessed on 9 January 2014).

Sinclair, M. 2007 (ed.). A guide to understanding theoretical and conceptual frameworks. *Evidence Based Midwifery* 5(2):39.

Sun, N. & Shi, X. 2011. The analysis of Google digital library and our copyright protection, IEEEXplore. Paper presented at Management and Services Science (MASS), 11 – 14 August 2011. Available at http://ieeexplore.ieeee.org/stamp/stamp.jsp?tp=&arnumber=5998985 (Accessed on 20 January 2013).

Tellis, W. 1997. Introduction to case studies. *The Qualitative Report* 3(2): n.p.

Tellis, W. 1997. Introduction to case study. *The Qualitative Report* [On-line serial], *3*(2). Available: http://www.nova.edu/ssss/QR/QR3-2/tellis1.html (Accessed on 6 January 2014).

Teo, T. 2007. Assessing the computer attitudes of learners: an Asian perspective. *Computers in Human Behavior* 24:1634–1642.

Thomas, G. 2011. A Typology for the Case Study in Social Science Following a Review of Definition, Discourse, & Structure. *Qualitative Inquiry*, 17(6) 511–521.

Thong, J.Y.L., Hong, W. & Tam, K.Y. 2004. What leads to user acceptance of digital libraries. *Communication of the ACM* 47 (11):78–83.

Thong, J.Y.L., Hong, W. & Tam, K. 2002. Understanding user acceptance of digital libraries: what are the roles of interface characteristics, organisational context and individual difference. *International Journal of Human-Computer Studies* 57(3):215–242.

Thuthong Portal (n.d.). School libraries. Available at http://www.thuthong.doe.za/resourcedownload.aspx?id=39190 (Accessed on 27 March 2013).

Tibenderana, P., Ogao, P., Ikoja-Odongo, J. & Wokadala, J. 2010. Measuring levels of end-users' acceptance and use of hybrid library services. *IJEDICT* 6(2) 33–54.

Trochim, W.M.K. 2006. Positivism & Post-positivism. Available at http://www.socialresearchmethods.net (Accessed on 29 December 2013).

Unisa Policy on Research Ethics, 2007. *See* University of South Africa

Unisa Research Involving Children: standard operating procedures, 2009. *See* University of South Africa

Vaidyanathan, G., Sabbaghi, A. & Bargellini, M .2005. User acceptance of digital libraries: an empirical exploration of individuals and systems components. *Issues in Information Systems* 5(2):279–285.

Venkatesh, V. & Bala, H. 2008. Technology Acceptance Model 3 and a Research Agenda on Interventions. *Decision Science* 39(2):273–315.

Venkatesh, V. & Davis, F.D. 2000. A theoretical extension of Technology Acceptance Model: four longitudinal field studies. *Management Science* 46 (2):186–204.

Venkatesh, V. 2000. Determinants of perceived ease of use: integrating control, intrinsic motivation, and emotion into the Technology Acceptance Model. *Information Systems Research* 11(4): 342–365.

Venkatesh, V., Morris, M.G., Davis, G.B. & Davis, F.D. 2003. User acceptance of information technology: towards a unified view. *MIS Quarterly*, 27(3):425–478.

Waldman, J.A. 2007. Acknowledging criteria: a look at research and reality of children's digital libraries. Masters dissertation, University of North Carolina, Chapel Hill.

Walters, W.H. 2013. E-books in academic libraries: challenges for sharing and use. *Journal for Librarianship and Information Science*:1–11.

Wayne, R.H. 2013. Focus groups. In Qualitative Research in Social Work edited by Fortune, AE; Reid, WJ & Miller, R. Columbia: Columbia University Press. Available at http://books.google.co.za/books?id=Fs6rAgAAQBAJ&dq=what+are+focus+groups&lr=&source=gbs_navlinks_s (Accessed on 07 March 2014).

Weeks, A.C. 2007. *The International Children's Digital Library – using technology to expand children's access to books from around the world*. Paper presented at the 73rd IFLA General Conference, Durban, August. Also available: http://www.ifla.org/iv/ifla73/index.htm (Accessed on 15 March 2011).

Wilson, C. 2013. Gauteng to spend R400m on tablets. *TechCentral*, 14 August. Available at http://www.techcentral.co.za/gauteng-to-spend-r400m-on-tablets/42820/ (Accessed on 29 January 2014).

Woods, P. 2006. *Qualitative research*. Study guide. (2006: University of Plymouth, Faculty of Education).

Woody, W. D., Daniel, D.B. & Baker, C.A. 2010. *E-books or textbooks: learners prefer textbooks. Computers and Education* 55(3):945–948.

Yalman, M. & Kutluca, T. 2012. Future e-libraries in universities. *Procedia- Social and Behavioural Science* 47:2225–2228.

Yin, R.K. 2009. *Case study research: design & methods. 4e*. Applied social research methods v.5. California: SAGE Publications Inc.

Yin, R.K. 2011. *Applications of Case Studies Research*. Los Angelos: Sage Publications (Available at http://books.google.co.za/books?hl=en&lr=&id=FgSV0Y2FleYC&oi=fnd&pg=PR1&dq=yin+&+case+study+research&ots=40f8VqtjPn&sig=_zxFZwEdv1JH-m8OgeJtgpCtDAc#v=onepage&q=yin%20&%20case%20study%20research&f=false) (Accessed on 15 January 2014).

Zawawi, D. (n.d.) Quantitative versus qualitative methods in social sciences: bridging the gap. Available at http://www.google.co.za/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=10&ved=0CGwQFjAJ&url=http%3A%2F%2Fcore.kmi.open.ac.uk%2Fdownload%2Fpdf%2F12220233.pdf&ei=QmnOUuTkNMaL7AboxoCgCQ&usg=AFQjCNGWRTkvg-OWTyJ2FYnopE_Eib-ihQ&bvm=bv.59026428,d.ZGU (Accessed on 6 January 2014).

Zipke, M. 2012. Teacher's thoughts on e-readers in elementary school classroom. Springer Science and Business Media, LLC. Also available at http://link.springer.com/content/pdf/10.1007%2Fs10639-012-9188-x (Accessed on 16 April 2013).

**Appendix A**

**INTEGRATED MEDIA TIMETABLE – third term 2014**

INVESTOR IN PEOPLE

| | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 | Period 8 | Period 9 | Period 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Day 1 | EXCO MEETING | | | | 6W INTEGRATED MEDIA | | | | | |
| Day 2 | | | IT SUPPORT | | | | | | 7W INTEGRATED MEDIA | |
| Day 3 | 5A INTEGRATED MEDIA | | | | 7A INTEGRATED MEDIA | | | | 7R INTEGRATED MEDIA | |
| Day 4 | | | 5W INTEGRATED MEDIA | | | | | | 5R INTEGRATED MEDIA | |
| Day 5 | | | 6R INTEGRATED MEDIA | | | | 7C INTEGRATED MEDIA | | 5C INTEGRATED MEDIA | |
| Day 6 | | | 6A INTEGRATED MEDIA | | | | | | 6C INTEGRATED MEDIA | |

**Appendix B**

# Parent permission form

## Parent permission for child to participate in a research study

### Title of the study

Elementary school children's acceptance of digital school libraries: an empirical investigation into the determinants of user acceptance at Crawford Preparatory Pretoria School in Gauteng.

### Introduction

My name is Sharon Moyo (46302484). I am a student in the Department of Information Science at the University of South Africa (Unisa). I am working with my supervisor, Professor T.B. Van der Walt, on a study research on user acceptance. The researcher invites your child, with your permission, to participate in this study.

Before you and your child decide whether s/he will be part of this study, it is important for all of you to understand why we are doing the research and what will be involved. Please read this form carefully. Your child will receive his/her own assent form. The researcher encourages you to discuss the study with your child. If you or your child has any questions about the research, feel free to ask.

### Purpose

The researcher is doing this study to find out more of the reasons why children use or reject use of digital school libraries. The International Children's Digital Library (ICDL) will be used. By determining factors that shape users' acceptance, the researcher seeks to provide guidelines for design and implementation of digital school libraries in a manner that will minimise the risk of resistance or rejection by the children. The researcher is inviting your child to participate because s/he is in the age range and the school has agreed that we can conduct the research here. This study is not part of your child's schoolwork and it will not be graded.

## Procedure

If your child decides to participate and you give permission, we will ask him or her to:

- Answer a questionnaire
  Your child will be asked to complete a questionnaire on the reasons why they use or do not use the ICDL. This part will take about 10 minutes filling in and about two weeks to be returned to the researcher.

- Read using the ICDL
  Your child will select a book of their choice from ICDL and read it. They will also note the difficulties and/or easy tasks they have whilst using the system. This part will take about 30 minutes most.

- Be interviewed in a focus group discussion
  A random sample of the students who agree to be in the study will be selected. The researcher will ask these students also to participate in a focus group discussion with me. If your child is selected and wants to be interviewed, and you agree, the researcher will meet with him/her. This will take place at the school. The researcher will ask the group questions about the way they use the ICDL and take notes on our discussion. With the child's and your permission, we will also audiotape the discussion. The taping is to accurately record the information they provide. If s/he agrees to being audiotaped but feels uncomfortable at any time during the discussion, we can turn off the tape recorder, or stop the interview at his/her request at any time. The discussion will take about 30minutes.

## Benefits

There is no immediate benefit to you or your child for taking part in this study. However, the researcher hopes that the results of the research will help improve the design of digital school libraries in future and thus provide access to a wide variety of reading materials for the children.

## Confidentiality

We will keep your child's study data as confidential as possible. If the researcher publishes or presents results of this study, they will not use individual names or other personally identifiable information.

## Rights

**Participation in the research is completely voluntary**. You have the right to decline to allow your child to participate or to withdraw your child at any point in this study without penalty. Your child has the same rights to decline to participate or withdraw from the study at any time.

## Questions

You and your child can ask questions about this study at any time, now or later. You can talk to me by email or telephone. Contact me at 0713342785 or moyosharon@gmail.com

**PARENT PERMISSION**

If you decide that your child may participate in this study, ***please sign and date below***. The researcher will give you a copy of this form to keep for future references.

_____ _____

Child participant name (please print) Date

_____

Parent/Guardian's name (please print)

_____ _____

Parent/Guardian's signature Date

_____ _____

Researcher's signature Date

**Appendix C**

## Assent form

| | |
|---|---|
| **Name:** | Sharon Moyo (46302484) |
| **Supervisor:** | Prof T.B. van de Walt |
| **Description of subject population:** | 11 - 12year olds |
| **Date:** | / /2014 |
| **Institution:** | University of South Africa |

My name is Sharon Moyo (46302484). I am a researcher at the University of South Africa (Unisa) department of Information Science. I am trying to learn more about the reasons why students use or not use the International Children's Digital Library (ICDL). To do this, l am asking you and other children to take part in my research study. A research study is a way to learn more about something. You are being asked to join this research study because you are a student at Crawford Preparatory Pretoria School and are between the ages of 11 – 12 years inclusive. This form explains the study.

If you decide to be in my study, l will ask you to do the following:

- You will be given a list of questions for you to fill in. This is a set of questions on a paper that you can fill.
- You will also take part in a research interview where we will talk about how you use the ICDL. These talks will take place at school.
- You will also be given activities to do on the ICDL.

This study will last for a month. You will not have to come to Unisa, the researcher will come to the school.

Being in this study may not have a direct benefit for you. The study will assist in finding out the reasons why you use or not use ICDL so that we gather information to make digital school libraries easy to use and so that children like you benefit from using them.

Other people will not know if you are in my study. The information l write down about you and other children will be kept safely locked up. When l tell other people or write an article about my research, l will not use your name. This way, no one will know that you took part in this study.

Your parents or guardians have to say it is OK for you to be in the study. After they have decided, you get to choose if you want to do it or not. Before you decide, l will answer any questions you may have. You can also talk to your mom and dad or your teacher.

You do not have to be in this study. It is okay if you decide you do not want to be in the study or if you change your mind and wish to stop at any time. No one will be angry with you. You can say no even if your mom and dad (or guardian) say yes.

My telephone number is 071 334 2785. You can call me if you have questions about the study or if you decide you do not want to be in the study any more.

If you decide to be in this study, please sign your name below. I will give you a copy of this form to keep.


**Agreement**

I have decided to be in the study even though l know that l do not have to. Sharon Moyo has answered all my questions.

X _____

Study participant (student)

Date …….2014

X _____

Researcher (Sharon Moyo)

Date…….2014

**Appendix D**

The Principal
Crawford Preparatory Pretoria School
555 Sibelius Street,
Lukasrand, Pretoria

Dear Sir / Madam,

**Re: Permission to undertake research**

As part of my Masters research programme, I am conducting a piece of research into studying why students accept or reject using digital school libraries. The causes of resistance will be determined to locate solutions and thus encourage the successful implementation of digital school libraries. I would be grateful if you would give your permission and support for this research.

My data collection methods will include observation, questionnaires and interviews. Audio recording the children and me in conversation, photographs, diary recordings, field notes, reports will be done upon receiving permission from the children. I guarantee that I will observe good ethical conduct throughout. I will negotiate permission to work with the children. I will secure permission from parents and children to involve them in the research. I guarantee confidentiality of information and promise that no names of the colleagues or children will be made public.

I promise that I will make my research report available to you for scrutiny before it is published, if you wish, and I will make a copy of the report available for your files on its publication. Ethical approval is also being sought from the University of South Africa.

I would be grateful if you could sign and return the slip below at your earliest convenience or write a letter on your letterhead with your response.

I enclose two copies of this letter, one of which is a copy for my files and one of which is a copy for your files.

Yours sincerely

**Sharon Moyo (46302484)**

**To whom it may concern**

I, …….., Principal / Chairperson of the School Governing Board of Brooklyn Primary School, give my permission for **Sharon Moyo (46302484)** to undertake her research in the school.

Signed: _____

Principal/ Chairperson (School Governing Board)

Name : _____

Date: _____

**Appendix E**

## Task-based approach activities

My name is Sharon Moyo (46302484). I am a student at the University of South Africa (UNISA) Department of Information Science. I am trying to learn more about the reasons why students use or not use the International Children's Digital Library (ICDL). To do this, l am asking you and other children to take part in my research study. A research study is a way to learn more about something.

If you decide to be in my study, l will ask you to do the following:

- You will be given a list of questions for you to fill in.
- You will also take part in a research focus group interview where we will talk about how you use the ICDL. These talks will take place at school during extramural time.

**This is not a test and no mark will be given for attempting the questions!!!!!!!**

## Activities

(1) How many books does the ICDL have from South Africa?

Answer …….

(2) Find a book in the Afrikaans language titled, "**Nelson Mandela a fighter for humanity**" and open the first page of the book. Write the first sentence.

Answer……

.....

.....

.....

(3) Find a book about animals and write the name of the book on your sheet.

Answer……

(4) How did you find the book in (3)?

……..

……

……

(5) Find a five-star, happy short story in English. Write down the title of the book.

……

……

……

# THANK YOU !!!!!!!

**Appendix F**

**Focus groups questions**

1. Do you have access to a computer?
2. Where do you use the computers?
3. How often do you use the computers?
4. What do you like about computers?
5. What don't you like about computers?
6. What do you like about the ICDL?
7. What don't you like about the ICDL?
8. Why do you use the ICDL?
9. What are the skills that are needed to use the ICDL more effectively?
10. Is there anything you would like to add?

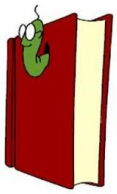
| **Question** | **Objective** |
|---|---|
| 1. Do you have access to a computer?<br>2. Where do you use the computers?<br>3. How often do you use the computers?<br>4. What do you like about computers?<br>5. What don't you like about computers | The purpose of this question is to find the general perceptions with regard to computer use. |
| 6. What do you like about the ICDL?<br>7. What don't you like about the ICDL? | To find the system characteristics of the ICDL that the children like or dislike. |
| 8. Why do you use the ICDL? | To find the factors that the children perceive to be the reasons why they use or not use digital libraries. |
| 9. What are the skills that are needed to use the ICDL more effectively | To find the skills needed to use the digital school libraries effectively. |
| 10. Is there anything you would like to add? | An open question to solicit any comments from the children with regard to the ICDL. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

**Appendix G**

# Me

# and my



# School

# Media

# Centre

My name is Sharon Moyo (46302484). I am a student at the University of South Africa (Unisa) Department of Information Science. I am trying to learn more about the reasons why students use or not use the International Children's Digital Library (ICDL). To do this, l am asking you and other children to take part in my research study. A research study is a way to learn more about something.

If you decide to be in my study, l will ask you to do the following:

- You will be given a list of questions for you to fill in. This is a set of questions on a paper that you can fill in.
- You will also take part in a research focus group discussion where we will talk about how you use the ICDL. These talks will take place at school during 'Integrated media' time.

**Please be as truthful as you can**

## Section A

Please tell us about yourself

Remember to put **ONLY ONE TICK** for each question.

A1. How often do you read a storybook?

Never ☐

Not very often ☐

Most of the time ☐

Always ☐

A2. Which book are you currently reading or the last you read?

……

……

A3. Do you like the books in the media centre?

Yes ☐

No ☐

Not sure ☐

A4. What do you do to complete your homework?

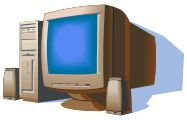
I keep it to myself ☐

I ask a friend to help ☐

I ask someone at home to help ☐

I go to the media centre ☐

A5. Have you ever used the computer?



Yes ☐

No ☐

Not sure ☐

A6. How many times a week do you use a computer?

1 – 2 times a week ☐

3 – 4 times a week ☐

5- 6 times a week ☐

Everyday ☐

A7. How would you describe your knowledge about the computer?

| Very poor | Poor | Average | Good | Very good |
|---|---|---|---|---|
| | | | | |

## AT THE COMPUTERS IN THE MEDIA CENTRE

A8. Which of these is most like you?

I always like going to the media centre ☐

Most of the time l like going to the media centre ☐

I don't like going to the media centre ☐

I never like going to the media centre

 ☐

A9. Why do you use the media centre? (**You can choose more than one answer**)

To do my homework ☐

To read books ☐

To read books from the computers ☐

I never use the media centre ☐

A10. Tell us what you think about using the ICDL?

It is easy to use ☐

It is hard to use ☐

Sometimes it is hard to use ☐

I am not sure ☐

Tell us why

…….

……

……

A11. If you answered that it is easy on question A8, tell us why it is easy to use?

I know where to get the books ☐

The books can be selected from the screen ☐

I can find my way around the ICDL ☐

Other ☐

Tell us more……

……

…….....

.....

A12. If your answer to question A8 was that it is hard, tell us why it is hard to use?

I do not know where to get the books ☐

The books can be selected from the screen ☐

I cannot find my way around the ICDL ☐

Other ☐

Tell us more……

……

……

…….....

A13. Does anyone help you with use of the ICDL?

Always helps me ☐

Often helps me ☐

Sometimes helps me ☐

Never helps me ☐

A14. Do you know where to find the ICDL from?

Yes, it's easy ☐

Yes, but l struggle ☐

No, it is hard to find it ☐

No, there are so many things you have to do before you get it ☐

A15. Do you know how to choose the book you want to read from the ICDL?

Yes ☐

No ☐

Sometimes ☐

Not sure ☐

Tell us more……..

……

……

……

A16. What things do you like about the ICDL (International Children's Digital Library)? (**Fill in and draw or paste pictures**)

……

……

……

……

……

……

……

……

……

……

……

……

……

……

A17. What things do you not like about the ICDL? (**fill in, draw and paste pictures**)

**.....**

**.....**

**.....**

**.....**

**.....**

.....

.....

.....

.....

.....

.....

**Section B**

B1. I am a boy ☐ I am a girl ☐

B2. When were you born?

Date Month
Year

☐☐ ☐ ☐☐☐☐

# Thank you very much for you help