USER EXPERIENCE AND INTERFACE DESIGN FOR A CHILDREN'S DIGITAL LIBRARY FOR FOLKTALES

BY

OWIADOLOR OSAWESE PAUL
PSC1707579

DEPARTMENT OF COMPUTER SCIENCE
FACULTY OF PHYSICAL SCIENCE
UNIVERSITY OF BENIN
BENIN CITY.

MARCH, 2023

USER EXPERIENCE AND INTERFACE DESIGN FOR A CHILDREN'S DIGITAL LIBRARY FOR FOLKTALES

BY

OWIADOLOR OSAWESE PAUL

PSC1707579

A PROJECT SUBMITTED TO THE DEPARTMENT OF COMPUTER SCIENCE FACULTY OF PHYSICAL SCIENCE, UNIVERSITY OF BENIN, BENIN CITY. IN PARTIAL FULFILMENT FOR THE AWARD OF BACHELOR OF SCIENCE (B.SC.) HONOURS DEGREE IN COMPUTER SCIENCE.

MARCH, 2023

DECLARATION

I declare that:

I. This project is based on a study undertaken by me in Department of **Computer Science** University of Benin, under supervision of Prof. (Mrs) F.A. Egbokhare

II. This work has not been previously submitted for the award of any degree elsewhere.

III. All ideas and views are products of my personal research and where the views of others have been expressed; they have been duly referenced and acknowledged.

IV. Any liability arising from this work is be wholly borne by me alone.

_____

OWIADOLOR OSAWESE PAUL

PSC1707579

_____

Date

CERTIFICATION

We certify that this work was carried out by **Owiadolor Osawese Paul** with matriculation number **PSC1707579** in the Department of Computer Science University of Benin, Benin City and do approve that it is adequate in scope and

quality in partial fulfilment of the award of Bachelor of Science (B.Sc) degree in Computer Science, University of Benin. Benin City

.

_____ _____

Prof. (Mrs) F.A. Egbokhare
Date
(Project Supervisor)

_____ _____

Prof. Mrs A.O Egwali
Date
(Head of Department)

DEDICATION

This project is dedicated to God almighty for His Abundant grace in my life, and for seeing me through my academic pursuit and aspirations.

ACKNOWLEDGEMENTS

This final year Project would not have been possible without the support and encouragement of many individuals. First and foremost, I would like to express my sincerest gratitude to my supervisor, Prof. (Mrs) F.A. Egbokhare, for their unwavering guidance, patience, and expertise throughout this Journey.

I would also like to extend my appreciation to the Department of Computer science for providing me with the resources and facilities necessary to complete this project.

I would like to express my gratitude to my Parents, Mr and Mrs Owiadolor and also my family and friends, for their support, encouragement, and understanding during the development of this project.

Finally, I would like to acknowledge the invaluable contributions of all those who participated in the research and provided valuable insights.

Thank you all for your support and for making this project a success.

TABLE OF CONTENT

ABSTRACT

This thesis focuses on the importance of good design in creating kid-friendly and entertaining applications. The research examines various design factors such as color, layout, and interaction, and their impact on user experience. The study also explores the contribution of features like audio support and progress monitoring to the overall satisfaction of young users. The objective of the study was to develop an app that provides an enjoyable reading experience while fostering learning and development in children. The authors conclude that the successful integration of design elements and consideration of young users' needs result in a successful and entertaining app.

CHAPTER ONE

1.8. Introduction

Roughly 30 years ago, when high-speed internet, tablets, and iPhones were nonexistent, only adults had access to advanced technology usage. Most children had little access to laptops and spent very little if any time using smart phones or most other forms of information technology, therefore most technologies were created and designed with only adults in mind.

Today, times have changed, with more than 50% of Nigerian children over the age of nine having access to or owning cellphones, computers, televisions, and other gadgets. In some cases, these youngsters are even more tech adept than adults. This may be ascribed to a variety of factors, but mostly to technical developments, price reductions, and widespread acceptance of information technology. In many respects, information technology is now a part of both adults' and children's daily life.While the fact that many kids having access to smartphones on a daily basis may seem concerning, it should be noted that cellphones have a variety of uses, including as calculators, sources of entertainment and education, and they may have a good impact on kids' developing minds.

It is crucial that more goods and services be created with kids as the primary consumers since technology will only grow more prevalent among kids as time goes on, this in theory might seem like a simple task, Designing for children can

be more difficult than designing for adults because children have less developed motor skills and cognitive abilities. They are also less accustomed to technology, so this lack of exposure must be taken into account when creating an intuitive digital experience that kids can use.

In this thesis, I explore the challenges of creating a digital library that children can use intuitively and offer solutions based on personal research and existing literature in the area of user experience for children. I also examine the user experience needs of children, such as safety, rewards, feedback, and other fundamental needs of children. I will assess the current children's digital library *Getepic* in order to validate our results and design. All research findings were taken into consideration and included into our design prototype for our children's *folktale library*, and the final design was afterwards proposed.

1.9. Background of Study

Concerning designing for kids, a lot of research, study, and writing has been done. The majority of academic research, however, is either outdated or feature or technology focused. Regarding design trends, a significant amount has changed like visual design standards for online interfaces, while others have remained relevant, such as tablet usability concerns for kids. Large organizations that cater to children, like Lego and Sesame Street, frequently create their own

design frameworks. These design frameworks, however, frequently apply solely to that brand's specific items

Children's surfing patterns and usability difficulties on prominent websites have been the subject of two Nielsen Norman Group investigations, one in 2001 and the other in 2010. 90 kids participated in the evaluation and testing of 53 websites (41 girls and 49 boys). The results of their two investigations, which were conducted nine years apart, are all compiled in the book Children (Ages 3-12) on the Web, which also includes 130 specific usability recommendations.

Debra Levin Gelman's book Designing for Children: Digital Products for Playing and Learning has some more current writing on the topic of children and technology. In her writing, Gelman explores how children who are two years apart in age act and feel at various points in adolescence.

1.3 Statement of problem

A designer may put oneself in the user's shoes when faced with the issue of producing a product for an adult target market. It's possible for designers to wind up buying the products they contributed to making. This is not the case when creating for children since designers are adults and, as a result, think and act very differently from children. They are neither present nor potential customers for the good.

1.4 Aim and Objectives

The goal of this project is to provide a kid-friendly digital library with a reading environment that children may explore without adult supervision.

1.5 Significance of Study

This study is important for a few reasons:

1. This research outlines the numerous factors to take into account when designing for kids in order to give them a secure and enjoyable digital experience and shows how to put these factors into practice when building kid-friendly UI.

2. I also highlight common concerns that parents have when deciding which applications are secure for their kids to use, as well as suggestions for how to address these concerns.

1.6 Scope of Study

A digital library, also known as an internet library, is an online database that contains digital objects in many formats that can be accessed online, including text, video, audio, photos, and other media. It may be used as a platform for digital content organization, searching, storage, and retrieval.

There are many different kinds of digital libraries, including institutional repositories, national library collections, digital archives, and others. However, for the sake of this thesis, I'll be designing a collection with kids as the main target audience, and as such, I'll only include digital resources that are child friendly.

1.7 Constraints and Limitation

Although the aim of this thesis is to offer a design that is as child friendly as possible, several limits have been made owing to time constraints:

Ages; Although the framework briefly addresses all kid ages, only those aged 3 to 12 will be further explained.

Background; the children's specific background, including their race, gender, demography, socioeconomic status, etc., will not be taken into account.

Technology; Only touch-based mobile phones are designed for in this thesis

CHAPTER TWO

LITERATURE REVIEW

2.1 Definition

As part of this thesis, a variety of materials in the field of UX design for kids were evaluated. A range of sources, including books, articles, old interviews, films, magazine postings, and blog entries, were used to get a thorough understanding of the subject. Using search phrases like "user experience for children," "designing for kids," "children and media," etc., the online library at Umea University provided the bulk of the resources used in the reviewed research. The results of the literature study included most areas of design for children, including visual design, interaction design, experience design, etc.

2.2 Theoretical Framework

The information is drawn from a wide range of sources, including books, articles, interviews, films, reviews, presentations, magazines, and blog posts, all of which were authored by experts in the field of user experience (UX) design for kids.

2.2.1 Age Group

Each child grows in a unique way; some children learn to walk before they can talk, some children master the bicycle before they can read, some children are interested in physics, and other children are interested in sports. Each of them is unique. As a result, grouping children together is both a problem and a necessity. There are other solutions for the specified age range (3 to 12 years), but I would argue that by age is the most appropriate. In particular, every three years (preteens span four), in line with recommendations provided by experts in the area.Jakob Nielsen. (*Jakob Nielsen. Children (Ages 3-12) on the Web, 3rd Edition. Nielsen Norman Group, 2010.Helene Blowers and Robin Bryan. Weaving a library Web: A guide to developing children's websites. American Library Association, 2004.Linus Nilsson at North Kingdom. Personal interview, 2016*.)

In this thesis I will cover only the ages 3 - 12. Preschoolers, schoolchildren, and preteens are the three age groups that are used to accomplish this. A person under the age of 18 is often defined legally as a kid or minor in most nations. Therefore, I shall define the various spans, ranging from 0 to 17, and explain their daily lives:

Ages 0-2: Infants and Toddlers newborns who have just been born to toddlers who have just learned to walk and are able to create rudimentary verbal phrases or sentences. These babies and toddlers frequently spend the first half of their time at home with their parents before moving on to kindergarten or another type of daycare.

Ages 3-5: Preschoolers From infants who can run, climb, and play to kids who can create complex verbal phrases and grasp the idea of letters. The kids in this group engage with other kids their own age and are often all in kindergarten.

Ages 6-8: School kids From young infants just starting to read and write to children comprehending the four fundamental mathematical processes. The majority of the youngsters in this group are in their first to third year of primary school and frequently hang out with friends who are considerably older than they are.

Ages 9-12: Preteens from young kids taking up sports to preteens reading to study and comprehend the basic premises of society. Youngsters in this age range are often in the fourth to sixth grade of elementary school and are frequently with both younger and older children.

Ages 13-17: Teenagers The entire time of adolescence, from young adolescents through young adults. These young people are halfway between upper secondary school and the last few years of Primary school.

Physically and intellectually, age disparities between children are far more significant than they are for adults. A 2 year old and a 5 year old are very different from a 42 year old and a 45 year old. Age becomes less important as kids become older and go closer to adulthood.

2.2.2 Current Technology

The most common media/entertainment/technology platforms that children use nowadays are smartphones, tablets, computers, and TV gaming consoles, as detailed in the Swedish Media Council's survey on media consumption among children in Sweden in 2014.*(Swedish Media Council. Facts about kids's usage and experiences of media (fakta om sma barns anvandning och upplevelser av medier). Kids & Media(Smaungar and Medier) 2015, 2015. Swedish Media Council. Facts about children's usage and experiences of media (fakta om barns och ungas anvandning och upplevelser av medier). Children & Media (Ungar & Medier) 2015, 2015.)*

Smartphones

Smartphones come in many different sizes and shapes, but they all have a few things in common, including touchscreens (often 3.5 to 5 inches), connectivity (cellular, WiFi, and Bluetooth), feature-rich operating systems (most frequently Apple iOS or Google Android), sensors (such as accelerometer, gyrometer, magnetometer, GPS, microphone, cameras, etc.), a small number of physical buttons (typically around five), portability, and low power consumption (both computational and electrical).

Despite the fact that the great majority of children have access to smartphones in 2014, just 13% of those between the ages of 5 and 8 actually had one*(Swedish Media Council. Facts about kids's usage and experiences of media (fakta om sma*

barns anvandning och upplevelser av medier). Kids & Media(Smaungar and Medier) 2015). This suggests that the children in this category are most likely playing on phones that aren't their own, such their parents', and that they are most likely at home. On the other hand, 78% of children between the ages of 9 and 12 have their own smartphone and are probably often utilizing it outside of their households as their primary mobile platform *(Swedish Media Council 2015)*.

2.2.3 Purpose and Goal

Play is education, producing something amusing and informative for children should always be the primary goal when developing an experience, whether real or digital (*Neil Bennett 2016, Debra Levin Gelman 2004, Karina Ibarra 2016)*. Unlike adults, most youngsters utilize products, services, and software for entertainment rather than for work *(Sabina Idler 2014)*. Adding educational components to games will help both the child and the parent by providing an incentive for the youngster to continue playing (*Debra Levin Gelman 2004)*.

According to long-held parental attitudes, children should limit their time spent playing video games and watching television *(Swedish Media Council 2015)*. As a result, the application should prioritize enhancing users' existing screen time rather than expanding it. While less time in front of a screen is required *(Karina Ibarra 2014)*, establishing omni-channel experiences that go beyond it may enrich the digital and overall experience. Cubetto and Lego Club are two fantastic examples

of these activities, which transfer the real Lego experience into a digital one (teaching children digital programming using physical objects).

Kids, teachers, caregivers, parents, and grandparents may all benefit from kid-friendly products. However, because stakeholders are vital to the development of applications, adopting the correct income model (usually free or paid) is critica l*(Sabina Idler 2014, Helene Blowers and Robin Bryan 2004, Debra Levin Gelman 2014)*. It is rarely suggested that a child-oriented software feature any in-app transactions due to the potential of unintentional purchases. If this is the chosen business model, passwords must be required *(Rian van det Merwe 2012, Justin smith 2016, Daniel Wieselberg 2016)*, and in-app payments must prioritize content (such as more levels, character enhancements, virtual money, or preferable a one-time payment). Furthermore, if you don't want the parents to disable the app, you should avoid pressuring the youngster to make these transactions *(Justin Smith 2016, Georgia Gallavin 2015)*.

2.2.4 Feedback and Reward

To create an app that kids will want to use again and again, the overall experience must be enjoyable. Children should constantly be complimented and given positive feedback on their development. Try to balance the difficulty level such that it is neither too easy nor too challenging for them to feel deserving of the reward *(Debra Levin Gelman 2014, Karina Ibarra, Andrew Smyk 2016.)*.

Gamification is a well-researched concept that describes the incorporation of these types of game features into non-gaming services *(Raph Koster 2013, John Ferrara 2012, Eric Zimmerman Katie Salen 2004, Gabe Zichermann 2011, Debra Levin Gelman 2014.)*.

2.2.5 Parents and Safety

When playing online games or utilizing social media, children of all ages may encounter "stranger danger" (a sense of risk connected with people whom they generally do not know). In fact, two-thirds of parents are concerned that their child would be bullied or harassed online *(Swedish Media Council, 2015.)*. To soothe these parents, it is best to limit user interaction (bad language is prohibited) or utilize premade responses (users can only choose between pre-determined messages). Children can engage with one another in a safe manner *(Debra Levin Gelman 2014.)*

Even if the software or service is meant for the youngest audience, it's best to assume that parents will also use it. These youngsters may require assistance in understanding the program's aim, operation, and controls. Consider implementing a feature that displays additional descriptive English in addition to the illustrative symbols to help parents comprehend and explain the program. Advanced settings and service information (such as user agreements) should be kept out of reach of

minors while being easily accessible to parents. Suggestions for solutions may be found in webpage footers or system settings for native apps.

2.2.6 Privacy

Privacy concerns are either disregarded or purposefully overlooked during the early phases of design, particularly for adult-oriented devices. However, due to stronger restrictions such as the *Children's Online Privacy Protection Act* (COPPA) *(Iubenda 2016)*, this might result in legal action for things marketed for children. COPPA is a form of legislation designed to safeguard children's online privacy and is applicable to services aimed at children under the age of 13. (not services that just might have young users). It does this by addressing the release of personal information on children, such as metadata, photos, and location data *(Debra Levin Gelman 2014, Justin Smith 2016)*. It is critical to completely comprehend and follow the product's domestic and international rules.

Ages 3-5: Preschoolers

Preschoolers are young children who are enrolled in kindergarten or another type of childcare program. They spend the majority of the day chatting and playing with friends and peers *(Debra Levin Gelman 2014.)*. They can run and walk, but they struggle with fine motor abilities. Despite their vivid imaginations, most difficult activities are beyond these children's patience *(Debra Levin Gelman 2014, Sofia Persson 2016.)*. At this age, children are beginning to comprehend what

gender identities are, thus it is critical to maintain characters and chores gender neutral or balanced in order to appeal to both sexes*(Debra Levin Gelman 2014.).*

2.2.7 Challenge level and limitation

Children of this age want to learn and may be pushed, but they lack patience and the capacity for prolonged attention. The key to a successful application for young children is to give basic tasks that are easy to complete *(Debra Levin Gelman 2014, Nor Azah Abdul Aziz 2003, Karina Ibarra 2016.).*

. If a task takes too long to understand and accomplish, the child will abandon the program.*(Debra Levin Gelman 2014, Andrew Smyk 2016.).*

As a result of this lack of patience, it is advisable to limit the quantity of distractions, such as advertisements and interactive elements *(Debra Levin Gelman 2014, Karina Ibarra 2016, Justin Smith 2014, Luke Worblewski)*. Avoid extended non-interactive loading displays; if longer loading is required, the loading screen should distract the child's focus away from the waiting. This can be achieved by include some type of interactive mechanisms or a simple but entertaining animation *(Karina Ibarra 2016, Justin Smith 2014, Luke Worblewski)*.

It's best to steer clear of delivering these kids precise directions or other lengthy pieces of information because they also have very short recall. This material is less likely to seem overwhelming since it has been divided into more digestible portions (*Justin Smith 2014, Debra Levin Gelman 2004)*. Norman introduces the

memory notion of information in the Head and in the World in his book *Design of Everyday Things (Donald A Norman)*. This concept uses retrievable visual and acoustic information to represent the environment, while the head represents short- and long-term memory.

> *"Help kids and information that may be hard to keep in their head,*
>
> *and help them keep it in the world" (Justin Smith 2014).*

2.2.8 Repetition

Children at this age like repeating actions, no matter how minor; repetition is an important aspect of both learning and enjoyment. Because repetition is essential for learning, it should not only be planned for but also encouraged by offering a simple method for youngsters to repeat behaviors *(Andrew Smyk, Karina Ibarra 2016, Justin Smith 2016, Sesame Street 2013)*. It is possible to rewind a video clip, repeat minor jobs, or repeatedly hit the sound-playing button. An example is Blue's Clues which broadcast the same program every day for a week to match Sesame Street's ratings before releasing fresh episodes the following week. *(Lawrie Mifflin 2016)*

2.2.9 Technology

Although technical platforms have been briefly mentioned in this part, it is crucial to note that young children have limited experience with technology. According to research, the best way to identify how well a youngster understands technology is to look at their early technological exposure *(Jakob Nielsen 2010)*. The usage of the touchscreen, a more kid-friendly interface alternative, has decreased the barriers for children interacting with technology, particularly with the introduction of tablets *(Wendy Boswell 2016)*. Compared to more conventional interfaces, such as the keyboard and mouse, touchscreens provide great natural user interfaces (NUI) *(Steve Mann 1998)* that allow users, particularly youngsters, to quickly develop from novice to expert.

2.2.14 Audio feedback

As previously said, young children cannot read; at most, some of them may recognize specific letters and create short phrases. An application interface should never rely just on text to engage with users; instead, it should employ various channels, such as auditory feedback*(Debra Levin Gelman 2014, Linus Nilsson 2016, Andrew Smyk 2016, Gerry Ganey and James Hunter 2016)*. There are three types: interactive noises (for hitting buttons or engaging with the environment), voice-overs (for instructions, assessments, and guiding), and music (used as background noise and a reward when tasks are accomplished (*Debra Levin Gelman 2014*). Combining all three should be done with caution since the noises from repeated taps or clicks may overlap (*Andrew Smyk 2016, LukeWroblewski*

2016). To minimize confusion, it is important to stop one interactive sound before beginning another. *(Karina Ibarra 2016, Debra Levin Gelman 2014)*

2.2.15 Beauty

Small children rely extensively on images, according to studies, especially since the majority of touchscreens lack tactile input and young children their age are unable to read. Young children like big, bold user interfaces with large images and bright colors; they should avoid minimalism and aesthetically pleasing user interfaces. While this is true, apps should avoid using a large variety of colors because it can be distracting and add to the visual complexity of the interface (*Justin Smith (2016),Svetlana Ognjanovic (2010)*).

Iconography is a tricky area that constantly requires altering and simplifying. Children see symbols more literally at this age due to their lack of exposure to most icons prior to this age. Icons should be literal in their portrayal since using a floppy disk icon to represent the operation "save" is not obvious to toddlers *(Sofia Persson (2016), Justin Smith (2016), Lawrence Kao (2015)).*

2.2.16 Gestures and interactions

Young toddlers frequently require some gestures and interactional patterns to be erased due to their undeveloped motor abilities. More complex touchscreen movements, such as dragging, double tapping, scrolling, and other multi-touch variations, should be avoided since they are all examples of learnt interactions.

Because children are accustomed to simple interactions, tapping and short, simple swipes are advised while building for touchscreens. It is advisable to avoid more complicated interactions, such as navigation, that rely exclusively on accelerometer, especially on tablets, because they may result in undesirable activities *(Debra Levin Gelman (2014),Nor Azah Abdul Aziz (2013))*.

Multi-touch should be avoided, but it should also be anticipated. Even at this young age, children are highly inquisitive, and whether or not larger displays were built for collaborative usage (more fingers on screen), this behavior is common. When the smartphone is handled incorrectly, unwanted multi-touch functions may be enabled by unintended finger contact with the screen. If these and other failures, such as miss-clicks, are not anticipated and forgiven, the youngster will be pushed to remove the program. *(Sabina Idler (2014)Donald A Norman (2013))*

Multi-touch should be avoided, but it should also be anticipated. Even at this young age, children are highly inquisitive, and whether or not larger displays were built for collaborative usage (more fingers on screen), this behavior is common. When the smartphone is handled incorrectly, unwanted multi-touch functions may be enabled by unintended finger contact with the screen. If these and other failures, such as miss-clicks, are not anticipated and forgiven, the youngster will be pushed to remove the program.

(Daniel Wieselberg (2016)Sabina Idler (2014))

2.2.17 Conclusion

Designing digital content for children can be a complex task that requires careful consideration of their needs and preferences. One important aspect to consider is the user interface, which should be engaging and easy to use for the target age group. Children tend to prefer more interactive and expressive interfaces, while adults may prefer a more minimalistic design that focuses on efficiency. It is also important to understand the motivations and cognitive processes of the user, as well as their prior technology experience, as these can all influence how they interact with the content.

Another key factor to consider when designing for children is the content itself. While educational content can be beneficial for children's development, it is not always the primary focus for young users. Many children simply enjoy using digital toys and apps for their entertainment value. It is important to strike a balance between educational and entertaining content to keep children engaged and interested.

When developing an application or digital toy for children, it is important to consider the age and developmental stage of the target audience. Different age groups may have different needs and preferences, and it is important to design products that can be used by a broad range of children. This requires taking into

account the criteria for each age group and previous stages of development to create a well-balanced and enjoyable experience for all users.

The following are considerations to address when designing for children in different levels of their development

Repetition to Exploration Children enjoy repetition while they are Because repetition is dull, as users age, they seek for new content, especially experimental and dynamic content.

Fun to Productivity Most young individuals use digital applications primarily for entertainment purposes. Although many teenagers utilize similar items, they typically employ a variety of items for utility and productivity.

Limitation to Challenge While the earliest toddlers are physically and psychologically constrained, teenagers have minimal cognitive restrictions and, frequently, have stronger motor abilities than adults. In general, as kids become older, they can and wish to manage more challenges.

2.3 Application Review

2.3.1. OSMO Suite

The OSMO Application Suite is an iOS game platform for children ages 5 to 13. Each app tries to expand the range of interactions with the iPad beyond the digital objects on the screen to incorporate real-world physical objects. The experience is

built around an iPad table mount and a mirror that holds the iPad upright and tilts down the front-facing camera. The following five applications are unique from one another:

Numbers You may use math to release fish by placing tiles with numbers and mathematical operations in front of the device and by popping bubbles on the iPad

Tangram use wooden puzzle pieces to solve traditional Tangram puzzles shaped like animals.

Words Children solve a hangman puzzle by placing the appropriate plastic letter tiles in front, similar to those used in the board game Scrabble.

Newton Kids direct tiny balls on a screen toward their intended destinations by drawing lines on a sheet of paper.

Masterpiece By providing on-screen guidelines of objects that are traced on paper by the kids, teaching kids how to draw.

Even though the OSMO programs vary, they all have a similar goal: to make learning pleasant and interesting. They achieve this by providing a user-friendly interface (UI), well-translated words, audible and visual feedback that is clear, entertaining and kid-friendly material, and support for and acceptance of numerous users.

2.3.2. Toca Boca Tea Party

One of Toca Boca's first and most popular applications is Toca Boca Tea Party. In 2014, a survey of young Swedish children revealed that 12% of them preferred playing Toca Boca games over other games. Additionally, among girls aged 5 to 8, their games rank third in terms of usage (8%). Toca Boca's success doesn't end there, though; between all 32 applications, they have over 9 million active users each month.

Toca Boca claims that Tea Party is neither a game nor a lesson. For children ages 3 to 6, the application (or toy, as Toca Boca refers to it) concentrates on play. The application's function is unclear, however it is made to seem like a tea party where kids may play with teapots, cups, biscuits, donuts, silverware, etc. One of the factors in the popularity of Toca Boca toys is the general concept of open-ended, exploratory gaming that allows kids to do as they choose.

2.3.3. Minecraft

Open-ended, adventure, and survival video game Minecraft was created by the tiny, independent gaming firm Mojang in 2011 for the PC. Players are dropped into an automatically created voxel environment where they must create tools, hide from creepers (adversaries that resemble zombies), and construct dwellings while while constantly scouting the area for new resources.

Since its release, more than 20 million copies of the game have been sold worldwide. It is now accessible on all major platforms, including Lego. Initially, Minecraft was not intended for kids, in contrast to Toca Boca Tea Party and the OSMOs apps. However, this hasn't been an issue as the majority of Swedish kids between the ages of 5 and 8 played Minecraft in 2014, which was the most popular game overall. More than a third of kids between the ages of 9 and 12 fall into this category.

The ability to express oneself is only one of many aspects contributing to Minecraft's enormous success. Children may customize their gameplay and do almost whatever they want within the game's few predefined bounds thanks to the open-ended principles. Any location you see may be visited, every object you see can be picked up, and so on. The game is very much a "What You See Is What You Get" sort of scenario.

The simplicity of its operation and understanding do not make Minecraft a well known game but It's because it offers gameplay and content that are appealing to all age groups.

2.3.4. Lego Star Wars: Force Builder

North Kingdom has been engaged in a variety of initiatives since being named Lego's official creative collaborator and innovation partner in the summer of 2015. Lego and Disney decided to work together to create a variety of games and

applications to coincide with the release of a new series of Star Wars films (late 2015). Children are the intended audience for one of these programs, a mobile exploration game called Force Builders.

With the help of digital Lego pieces, this game invites kids to construct while also learning about the Star Wars world.

North Kingdom began working on the product in the summer of 2015, and it was released in the first half of 2016 as version 1.0 (used throughout this thesis). With the release of new Star Wars films, the application will be updated with pertinent material to keep users occupied. The application will act as a case study for the theoretical framework created throughout this thesis because of its target age group.

2.3.5. EPIC!

American children's reading and educational platform Epic! is available by subscription. For youngsters under the age of 12, it provides access to books and movies. Mobile and desktop devices may both use the service.

Suren Markosian and Kevin Donahue established Epic! in 2013, and the game was released the following year. In July 2021, Indian educational technology company Byju's bought Epic! for $500 million in cash and equity.

EPIC! Offers In read-to-me and audio book forms, both fiction and nonfiction books. Themes and topics covered include STEM, language arts, social science, history, music, art, science fiction, and DIY. Among the books and television shows are BIG NATE, Garfield, Warriors, and The Chronicles of Narnia. Books are accessible in English, Spanish, Chinese, and French, among other languages. The Epic! app offers customized suggestions based on a child's reading proficiency and interests. Users may search for books, videos, and quizzes on Epic! based on their age, keywords, and reading level.

CHAPTER THREE

RESEARCH METHODOLOGY

User interface and experience (UI/UX) design are critical components of any product, as they determine how users interact with and perceive a product. Research methodologies play a crucial role in the UI/UX design process, as they allow designers to gain insights into user needs, behaviors, and preferences.

One common research methodology used in UI/UX design is user interviews, in which designers conduct in-depth interviews with a small number of users to learn about their experiences and preferences. These interviews can be open-ended, allowing users to share their thoughts and experiences in their own words, or structured, using predetermined questions to guide the conversation. User interviews can provide valuable insights into how users think and feel about a product, and can help designers identify areas for improvement.

Another common research methodology used in UI/UX design is usability testing, in which designers ask users to complete specific tasks using a product, and then observe and record their behavior. Usability testing allows designers to identify areas where users struggle to complete tasks, and can help designers make design decisions that improve the user experience.

A third research methodology often used in UI/UX design is focus groups, in which designers bring a small group of users together to discuss and provide feedback on a product. Focus groups provide designers with a rich source of

feedback from a diverse group of users, and can help designers understand how different users perceive and interact with a product.

Overall, research methodologies are essential for ensuring that UI/UX design is user-centered, and that the resulting product is intuitive, easy to use, and enjoyable for users.

The two primary sections of this thesis are Definition and Evaluation.

Definition: A theoretical framework was developed in the first phase utilizing information acquired through literature reviews, interviews, and assessments of best practices.

3.3. Literature Review

Evaluation of a broad variety of children's UX design books was part of the project's first phase. The sources studied included books, articles, old interviews, films, magazine posts, and blog entries to gain a thorough picture of the area. Using search phrases like "user experience for children," "designing for kids," "children and media," etc., the online library at Umea University provided the bulk of the resources used in the reviewed research. The findings of the literature research served as the theoretical framework's foundation and covered the majority of child-friendly design elements, such as visual design, interaction design, experience design, etc.

3.4. Best Practice Evaluation

Popular children's apps and games were examined and reviewed as part of building the theoretical framework. This was done in order to learn more about which games and apps are most liked by kids and why. Three different programs Minecraft, Toca Boca Tea Party, and the OSMO Application Suite that have all received awards were selected and assessed based on how well-liked they are among kids and parents.

Questions like "Why are they popular with kids?," "Who is their target market?" and "How significant is the user interface relative to the content?" were all posed and answered.

3.5. Observations

During the observation, ten children aged six to twelve were encouraged to use the app for 30 minutes each. During the observation, the children were told to execute a variety of tasks inside the app, such as navigating to different sections, completing activities and games, and obtaining information. This was done in a school environment.

One of the significant findings was that children usually reacted well to the user interface, with the majority of them quickly getting used to the navigation and

comfortable with the application. The youngsters seemed to comprehend the navigation menu, which was located at the top of the screen and featured short and clear labeling for each section. The program's main screen had a variety of symbols and graphics representing different areas of the software, and the youngsters seemed to have difficulty determining what each sign represented but did not hesitate to explore.

The interactive aspects, such as games, videos, and activities, proved to be highly engaging to the youngsters, and they often spent a significant amount of time exploring and playing in those areas. The games and activities were well-designed and engaging, with clear goals that seemed to be straightforward for the children to understand. The films were also well-liked, and most children viewed many of them while participating in the program.

It became clear that youngsters liked interfaces with greater color and aesthetic appeal, and they felt more motivated and engaged when the app presented evident goals or challenges to them. Youngsters who were obliged to solve a problem or collect virtual items, for example, seemed to be more motivated and focused than children who were just permitted to browse through information. The children looked to be more motivated and interested since they seemed to like obtaining prizes or successes for completing tasks inside the app

It was also discovered that some youngsters were annoyed or confused when they encountered bugs, technical difficulties or received no feedback from the user interface when they tried to perform an action, and if those difficulties persisted, they were more likely to give up on the software. The younger children were more likely to encounter these issues, suggesting that they were less tech-savvy and more prone to making mistakes.

Overall, the findings show that the user interface was largely effective in appealing and motivating the youngsters, though any reliability and stability issues should be addressed to provide a positive user experience. It may be beneficial to consider adding more interactive and goal-oriented components to improve the children's engagement and motivation. Furthermore, further research might be conducted to investigate how the user interface influences children's learning and development, as well as other factors that may influence how well-suited the app is for children, such as device type.

3.6. My Design Process

The design process for the user interface and experience (UI/UX) of folktales for kids involved several key steps, including user research, concept development, prototyping, and testing.

First, I conducted user research to gain insights into the needs, behaviors, and preferences of our target audience - young children. I conducted user interviews and usability testing with a diverse group of children to learn about their experiences with reading apps, and to identify areas for improvement in our own app.

Based on our user research, I developed several concepts for the app's UI/UX, sketching out different ideas and exploring various design approaches. I then created wireframes and low-fidelity prototypes to test these concepts and get feedback from users.

Next, I iterated on our design based on the feedback I received from users, refining the app's navigation, layout, and visual design to make it more intuitive and engaging for young readers. I also added gamification elements, such as a reward system and levels, to make reading more fun and rewarding.

Finally, I conducted additional usability testing with children to ensure that the app was easy to use and enjoyable for them. I made further refinements based on the feedback I received, and then launched the app for users.

Overall, the design process for the reading app's UI/UX was user-centered, involving extensive user research and testing to ensure that the final product was effective and engaging for young children.

3.7. User Persona

To grasp each age group better, personalities were built based on descriptions of children acquired from the literature research. Personas are made-up characters created to represent the numerous user groups that potentially make use of a product or service. Usually, they are written on one to two pages. The character descriptions comprise a basic history (such as name, age, gender, profession, etc.), behavioral patterns (what, how, and why they do what they do), and interests in order to build a full portrait of the user (such as hobbies, music, lm, etc). (such as hobbies, music, lm, etc.). Including a visible image of the user is another great approach of "making a fake character more human.

These personas served as early testing grounds for recommended app improvements and prototypes by helping to define and identify pain areas, values, beliefs, objectives, and actions. Using this method at all phases of the design process has various advantages, including the chance to examine multiple solutions, debate unique user assumptions among team members, and present a "human face." "about the demographics

3.8. Prototypes

To put the theoretical framework to the test, low-fidelity (Lo-Fi) and high-fidelity (Hi-Fi) prototypes were created. A prototype is often an early version of the completed product that is used to test either novel ideas or common user behaviors.

These prototypes may frequently help determine if an idea is solid before investing excessive resources in its development.

The design prototype of folktales kids went through various iterations as I sought to improve the user experience and make the app more engaging and effective for young readers.

Initially, the app featured a simple design with a navigation bar at the top and a grid of book covers on the home screen oriented in portrait mode. Users could tap on a book cover to open the book and start reading,

However, after conducting user interviews and usability testing with young children, I realized that the navigation bar was difficult for them to use and the grid of book covers was overwhelming. I decided to simplify the home screen by removing the navigation bar and replacing the grid of book covers with a single row of bold book covers that the user could swipe left or right to access different books or tap on the left or right navigation.

Next, I added gamification elements to the app to make reading more fun and engaging for kids. I added a reward system that allowed users to earn points for completing books and unlock new avatars as they progressed. I also added a level indicator that allowed users to see their reading levels this acted as a progress tracker that allowed users to see their reading progress over time and set goals for themselves.

I also added an assistant to interact with the kids, to act as entertainment and also as a guide to help the kids make decisions, congratulate them on their progress and encourage the kids to spend more time reading

Finally, I added a customization feature that allowed users to personalize their reading experience by choosing their own theme and background color for the app.

Overall, the design of the app went through multiple iterations, each of which was informed by user research and feedback, in order to create a fun, engaging, and effective reading app for kids.

3.9. Lo-fi Prototypes

To design the low fidelity prototype, the first step I took was looking as other apps and website which offered similar services then brain storming ideas using the classic crazy 8, use which lead me to coming up with 8 different ideas on how what the user interface could look like, after this I eliminated the ideas that didn't seem user friendly or feasible leaving me with a few designs that required further iterations

I created a low fidelity prototype to test the core functionality of folktale

First, I identified the problem that the prototype would solve. I conducted extensive research and user interviews to gather as much information as possible about our target kids and their needs.

Once I had a clear understanding of the problem and the users, I brainstormed potential solutions. I created rough sketches and wireframes of the interface, focusing on the core functionality of the product, User requirements like navigation and an assistant were designed the books grid went through various iterations also did the top navigation, changing, removing and playing with various ideas

Next, I used paper to cheaply create a physical prototype. I tested the prototype with kids and gathered their feedback. Based on their feedback, I made adjustments to the design and continued to iterate until I were confident in the core functionality of the product.

Throughout the design process, our focus was on testing the core functionality and gathering user feedback. I kept the design simple and avoided adding unnecessary features, which allowed us to create a low fidelity prototype that effectively solved the problem at hand.

3.10. Hi-fi Prototypes

I began by building upon the work done in the low fidelity prototype. I took the rough sketches and wireframes from the low fidelity prototype and added more detail and polish to them.

Once I had a clear idea of the app's interface and functionality, I used Figma to create a digital prototype. I focused on creating a realistic representation of the final product, with engaging visuals and intuitive interactions.

Once the digital prototype was complete, I tested it with a group of kids to gather feedback. Based on their feedback, I made adjustments to the design and continued to iterate until the prototype was ready for development.

Throughout the design process, my focus was on creating a high fidelity prototype that accurately represented the final product. This allowed for more detailed and accurate user testing.

3.11. User testing

User testing on both kids and parents was done as part of the assessment process. These tests were carried out to assess the current Folktale user interface design and confirm or deny the problems identified during the design review. All experiments were carried out in a comfortable setting using a Redmi Note 9s running the most

recent version of the Design. Each exam lasted 15 to 30 minutes, and all of the children names are purposefully omitted to maintain their privacy.

All of the children were familiar with both Star Wars and Lego, but none of them had ever heard of or used a reading app. Following each test, the children were questioned about their impressions of the application, including what they found challenging, simple, and enjoyable.

3.12. Testing with Children

The total number of children who participated in the user testing was one boy and four girls, and all but two of them were within the application's intended age range. These two individuals were used as references to better understand the needs of users outside of the intended audience. Everyone who was related to the author in any manner felt free to share their thoughts and views on the application. All of the tests had a hazy structure, and the students were not informed what the main objectives were. Rather of being told what to do, the users were first advised to freely explore the application on their own. After around 20 minutes of fun, the youngsters were asked to complete any incomplete work. The following objectives were set:

- Complete the tutorial/On boarding
- Open at least one book

- Find 3 books or choice
- play book in Audio format
- Add one book to favourite

Each children received access to the program after completing the exam, but without a supervisor present. This was carried out in order to understand how they would perform in reality when alone.

Considerations for Testing

In many ways, user testing with children is similar to testing with adults. However, it is vital to recognize that kid user testing varies from adult user testing in that children need a more engaging and entertaining experience.

When doing user testing with children, the following changes were considered

Questions: it was important to keep in mind that they may not have the same level of understanding or experience as adults, and may not be able to articulate their thoughts and feelings as clearly, it was critical to ask the proper questions, it was equally critical to tailor the language to their level and to ask open-ended questions. "Is this cool?" "What do you think about...?" and "What are you thinking right now?" are some nice examples of questions I asked the children

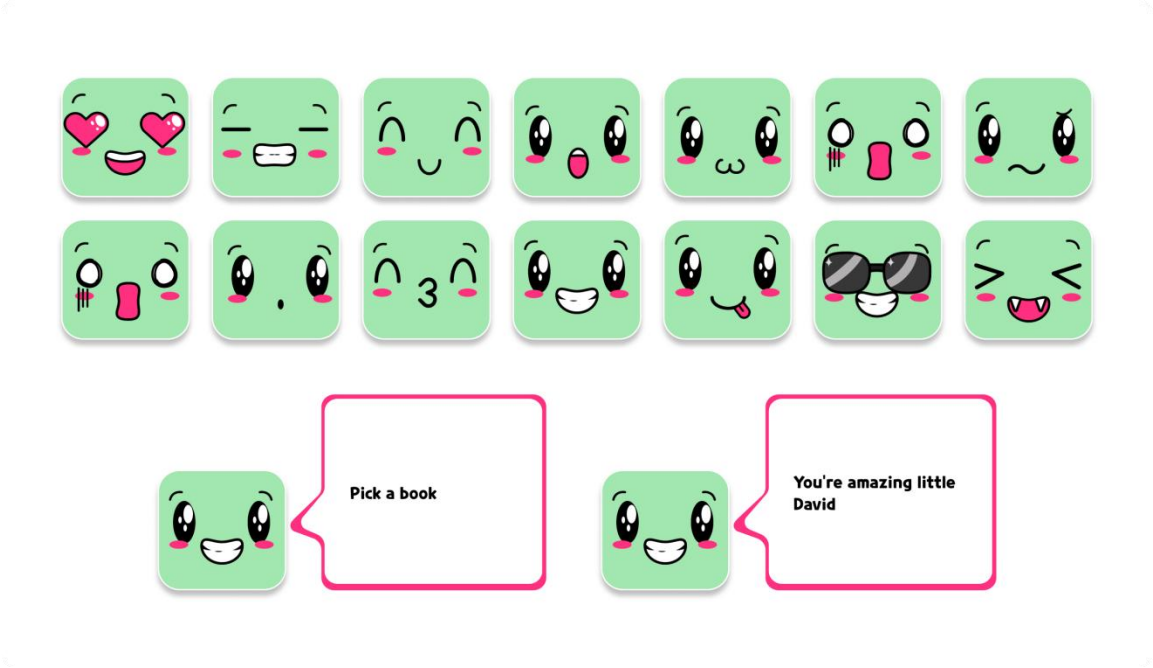
Environment: In order to get insightful comments and insights, it was critical to establish a relaxing and entertaining setting. The testing setting was adjusted based on the age and developmental stage of the children being examined. I used a play space to encourage the children to be more comfortable.

CHAPTER FOUR

RESULTS

4.5. Our Helper

Before I talk about the final designs I want to talk about our helper which will be acting as a guild for kids, helping them complete various task, celebrating the kids achievements, and encouraging them to keep reading and coming back to Folktales



Expressiveness: Making the assistant expressive was because Human have an intuitive understanding of Expression and body language, kids are especially more reliant on expressions and body language for communication with people around them

4.6. Splash Screen

For my splash screen, I made a special screen that appears when you first open my app. This screen shows the name of my app

The purpose of my splash screen is to give people a good first impression of my app and to let them know what it does. My splash screen is meant to be helpful and attractive to children will be using my application

I chose a playful font giving the children a play feeling the moment the app launches and the helper which the children will be seeing every time they open Folktales represents the app, this will get the children even more excited as they use the app more often.

4.7. Grown up or Kid Selection Screen

This is the screen for first-time users. The purpose is to reduce the complexity of the user interface for children, making it safer for them to use the app. To protect kids, I've disabled features such as in-app purchases and in-app settings for the kids section. This ensures that kids can't accidentally make purchases using their parents' payment information. I've also used the term "grown up" to be inclusive of children who may not have parents. I hope this screen helps make the app more accessible and enjoyable for kids

4.8. Home screen

The home screen is the main page, its were the main purpose of the app lies, it has the major functionalities

Factors considered while designing the home page include:

1. Layout

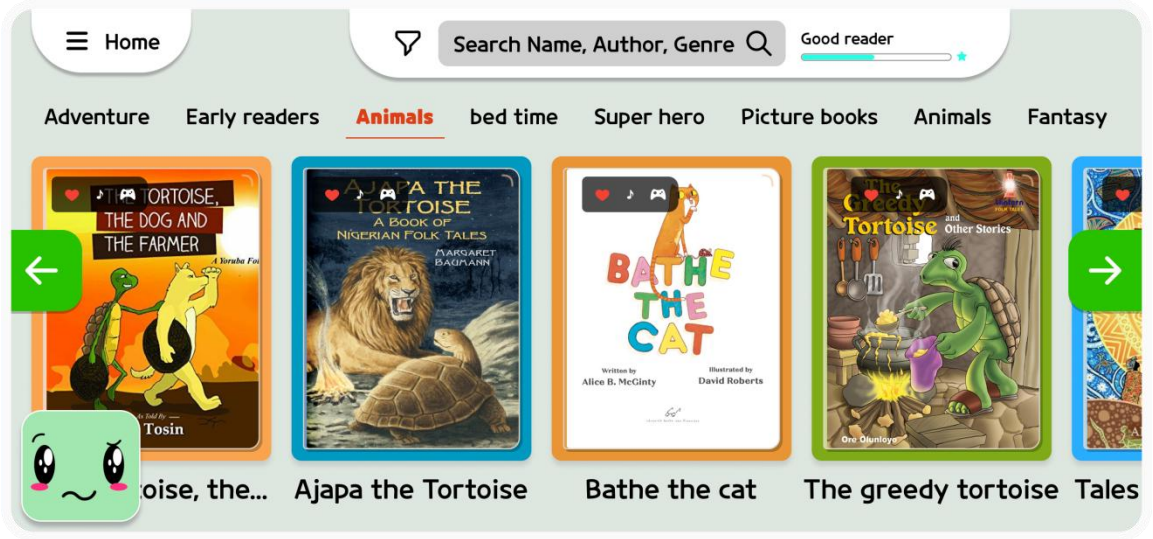
2. Position

3. White spacing

4. Colour and coordination

5. Layering

6. Navigation



Layout: In designing the layout for the page, I opted for a simple layout that utilizes ample spacing between different sections. This is based on the principle of the law of proximity, which states that items with similar spacing are perceived as being related. By using similar spacing, I aimed to create a layout that is easy for users to navigate. The ample spacing between sections helps to clearly define the different areas of the page and makes it easier for users to locate and access the information they need.

I made the decision to only display a total of four books on the screen at a time in order to prevent children from feeling overwhelmed by the number of options available. When children are presented with too many choices, they may experience decision paralysis, which can make it difficult for them to pick a book. By limiting the number of books displayed on the screen to four, I aimed to make it easier for children to select a book.

Overall, my goal was to create a layout that is intuitive and user-friendly, helping users to easily find and interact with the content on the page.

Positioning: Designing the layout of the page was a careful process. In adult apps, it is common to place the navigation menu at the bottom of the page. However, I wanted to make the app easier for kids to use, so I decided to place the menu at the top of the screen. This decision was based on the fact that kids may have poor fine motor skills, and placing the menu at the top reduces the chances of them making mistakes while trying to navigate the app.

Color and Coordination

Vibrant colors were a key element of our design, as they help engage and interest children. I carefully considered how to use color effectively without compromising the app's functionality. In addition, I applied the principle of common region by using color to clearly separate different elements on the home page, creating a clean and organized layout that is easy for kids to understand and navigate.

Layering

To make the app more intuitive and user-friendly, I added shadows behind different elements of the app. This helped to clearly distinguish which elements were interactive, making it easier for users to identify and interact with them. I used this technique because in the real world, objects that are separated from a surface have shadows, which helps us understand the spatial relationships between objects. By mimicking this natural visual cue, I hoped to create an app that feels more familiar and intuitive to users.

Overall, the addition of shadows was an important part of the design process, as it helped to increase the app's usability and make it more engaging for users. By considering how people naturally perceive and interact with the world around them, I aimed to create an app that feels natural and easy to use.

Navigation

The navigation consist of various parts with different functions

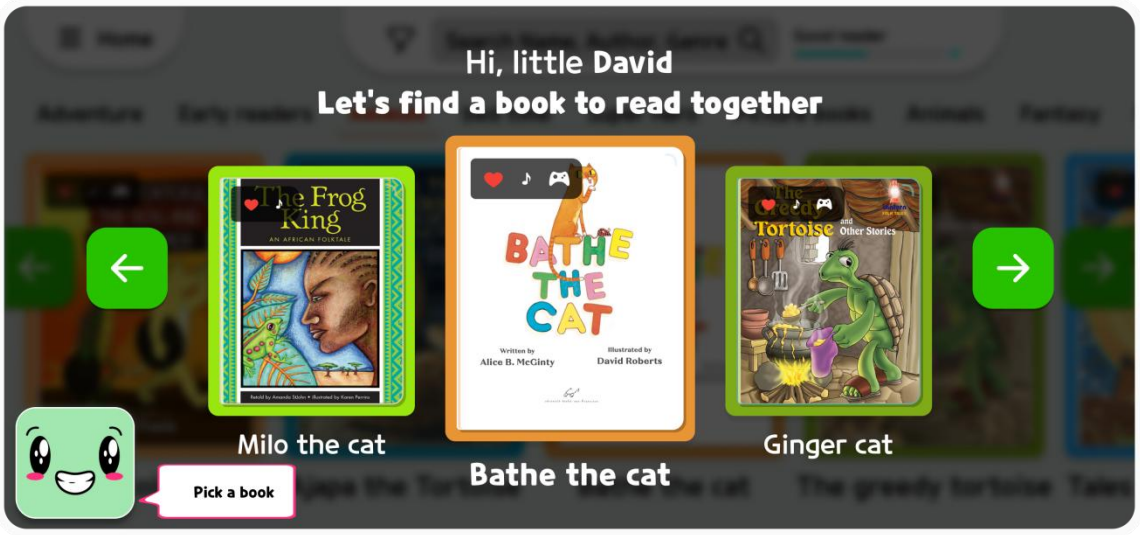
a. **Swiping/Arrows:** The interface supports swiping through the books available but there is also persistent arrow buttons that serve to help kids navigate cause of there poor motor skills

b. **Top menu:** The top menu serves as the primary navigation it holds the search function, filter, level, hand burger menu and also shows the page the

user is on so they never get lost, this might be seen as obvious to adults but to kids who aren't tech savvy it'll help them always be able to identify where in the app they are at any point in time

c. **Secondary navigation:** I navigation system is designed to be dynamic and responsive to the user's interests. As children use the app, the navigation will become more personalized and tailored to their reading preferences. It also clearly displays the types of books that are currently being shown in the selection by making use of color, making the word bolder and underling, helping kids make informed choices about what to read. Overall, the navigation system is meant to make the app more engaging and user-friendly for children, and to help them find and enjoy the kinds of books they love.

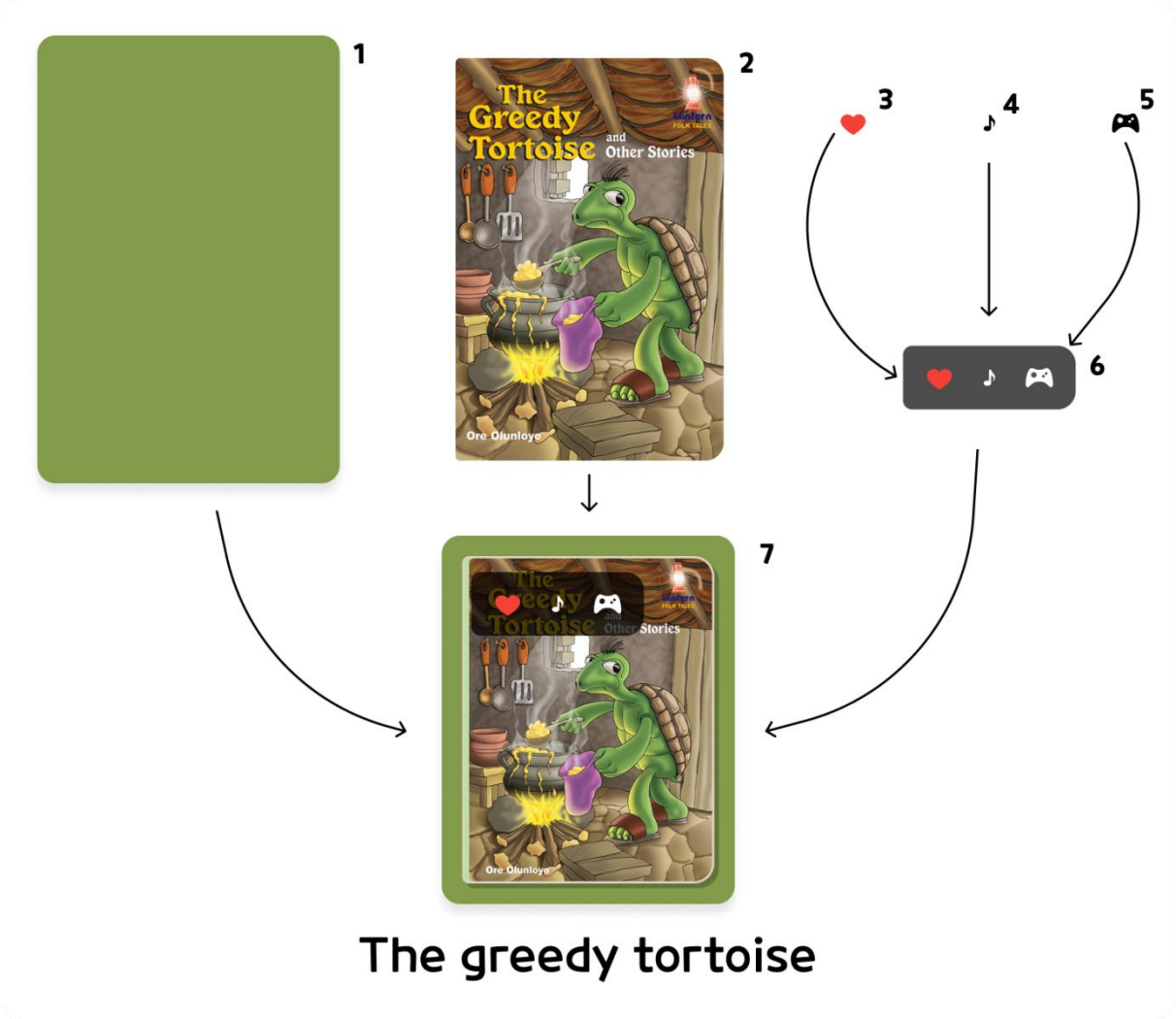
4.9. Pop-



This pop-up appears for first-time users and serves as an introduction to the app. It helps kids get comfortable and familiar with the app, and guides them through the process of selecting their first book while blurring out the background to minimize distraction. Once the child has completed their first book, they are then able to navigate the app independently, using similar arrow and card elements to navigate through the available books.

The purpose of this pop-up is to provide a gentle onboarding experience for kids, helping them feel more confident and capable as they start using the app. By introducing them to the app's features and navigation elements in a guided and structured way, I hope to make the app more accessible and enjoyable for children. Overall, the pop-up serves as an important tool for introducing kids to the app and helping them get started on their reading journey.

4.10. Book Cover Card



The book card is made up of 7 different parts that come together to improve its functionality

1. Background
2. Cover image
3. Favourite icon

4. Sound icon

5. Interaction icon

6. Feature background

7. Complete book card

8. Display name

1. **Background:** This helps to separate the card from the background, displaying clearly the boundaries and clickable area of the card, we cannot control the colour of the book cover so this an important part of the card, as it makes sure no matter the colour of the book covers it'll always have sufficient contrast from the background.

2. **Cover image:** This is the original book cover

3. **Favourite Icon:** This shows if the book has been added to favourite

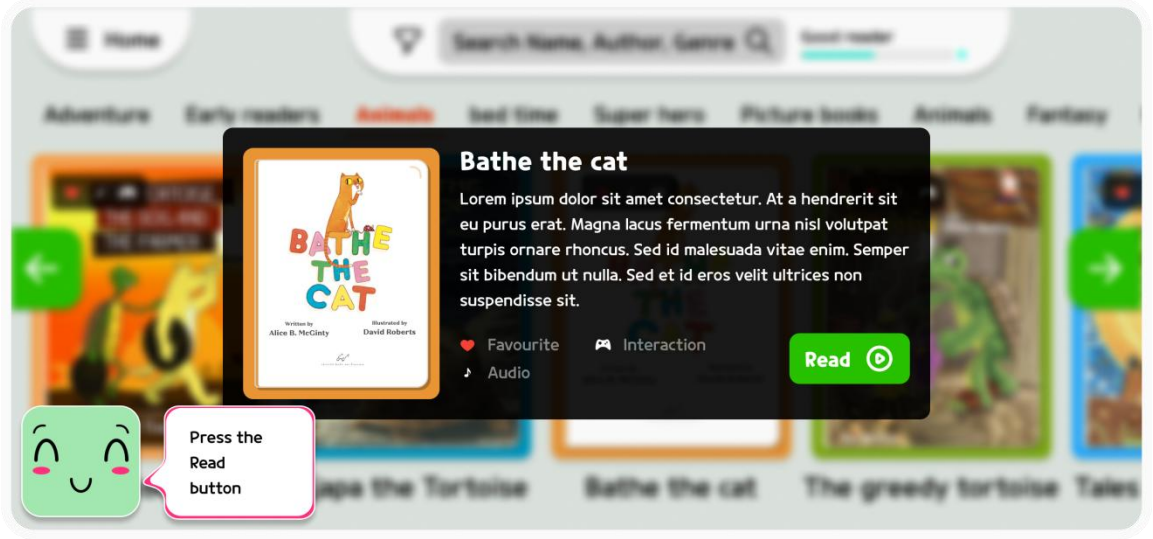
4. **Sound icon:** This shows if read to me feature is available for the book

5. **Interaction Icon:** This shows if the book has interactive elements

6. **Feature background:** This is where all the available feature are situated on the book card, it helps to improve contrast and visibility of the icons on top making it easier for the user to tell what feature a book has available

7. **Display name:** This displays the name of th

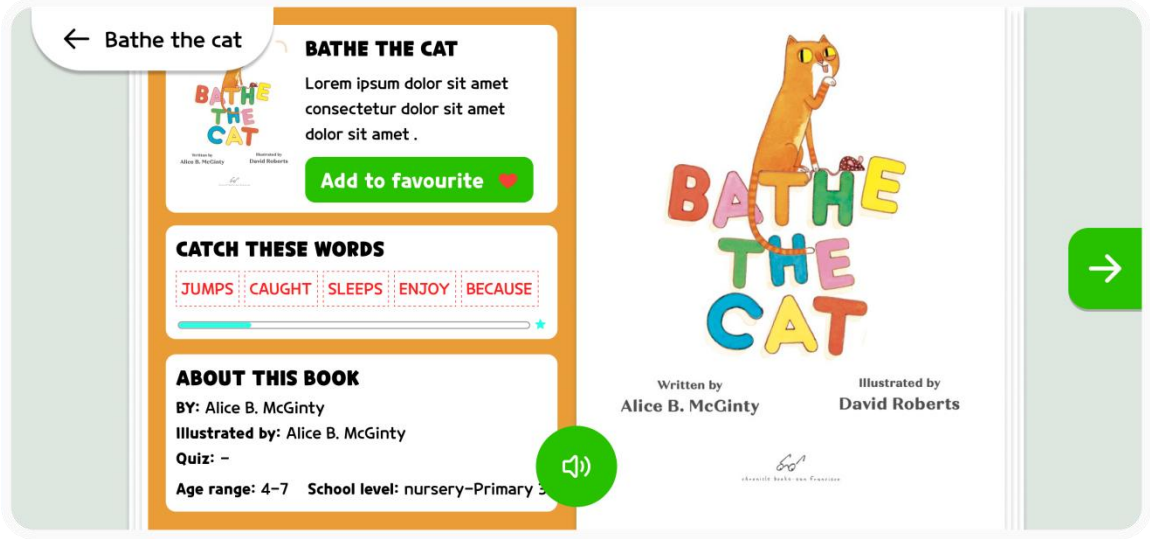
4.11. Description Card



The expanded book card is meant to give users more information about the book, helping the user make informed decisions about what to read. It also includes the "read" button, which serves as a call to action button while also making it easy for users to start reading the book they have selected. When the expanded book card is displayed, users can review the book's details and decide whether or not they want to read it. Overall, the expanded book card is an important part of the app's user interface, as it helps users discover and select books to read.

The homepage is blurred to minimize distractions and the assistant encourages the child or guilds the child on how to start reading.

4.12. Book Page

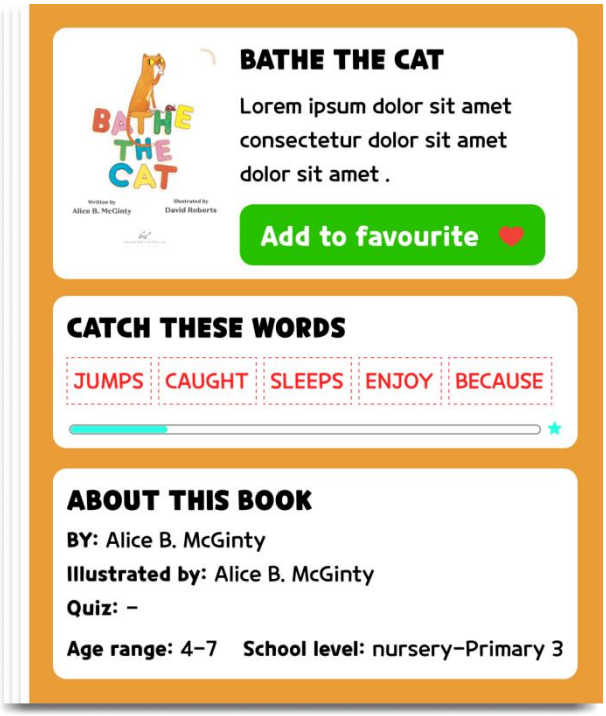


This page is designed to look and feel like a physical book, with layers and design elements that mimic the appearance of a stack of pages. This page supports swiping and arrow buttons to navigate forward and backward through the book's pages, making it accessible to kids who are still developing their reading skills as well as older individuals.

In addition to supporting accessibility, this page also includes a "sound on" button that activates audio support for books that offer audio. When the audio is on, the book is read out loud to the user, which can be helpful for children who are learning to read and may not understand certain words. To minimize distractions and help kids focus on the book, the helper is removed while the book is being read.

Overall, this page is designed to be user-friendly and engaging for children, with a variety of features that support reading and learning. By mimicking the look and feel of a physical book, I hope to create an immersive and enjoyable reading experience for kids.

First page



This page is carefully designed using various principles from the literature review, with a focus on the principle of common region. This principle helps us create a clear and organized layout by dividing the page into distinct regions or areas.

The **first** region of the page includes a description of the book and a call-to-action button that allows users to add the book to their list of favorites.

The **second** region displays words that the user should look out for while reading, and includes a progress bar to encourage the child to find and read those words.

The **third** region showcases the author and illustrator of the book, and also includes information about the book's recommended age range and school level.

4.13. Reading Page

Follow up reading pages will continue to use the same design with the first page for consistency

CHAPTER FIVE

CONCLUSION

As we've seen throughout this thesis, good design is essential for producing kid-friendly, entertaining applications. We are able to make applications that are entertaining, instructive, and secure for children by carefully evaluating their needs and talents, as well as by using numerous design and psychology concepts.

In this research, we investigated a number of design factors, such as color, layout, navigation, and interaction. Additionally, we looked at how features like audio support, personalisation, and progress monitoring contribute to a satisfying user experience. We were able to design an app that is ideal for kids who are just getting introduced to tech and reading and also satisfies their specific requirements by thoughtfully and successfully integrating these components.

Overall, we want our app to provide kids a rich and enjoyable reading experience while simultaneously fostering their learning and development. By taking into account the requirements of young users and using sound design concepts, we intend to develop an app that is beneficial and entertaining for children. Therefore,

we believe the app's design was successful and that kids will continue to enjoy it for a very long time.

REFERENCES

Swedish Media Council (2015)

Olle Findahl (2014)

Debra Levin Gelman (2014)

Sofia Persson (2016)

Don Nonnan, Jim Miller, and Austin Henderson (1995)

Don Dorman and Jakob Nielsen (2016)

Tengku Siti Meriam Tengku Wook and Siti Salwah Salim (2013)

Nor Azah Abdul Aziz (2013)

Svetlana Ognjanovic (2010)

Sesame Street (2013)

Ellen Key (1900)

Jakob Nielsen (2010)

Gerry Gaffney and James Hunter (2016)

North Kingdom (2016)

North Kingdom (2015)

"Star Wars: Episode VII - The Force Awakens" (2016)

LEGO (2016)

Chris Lindgren and Petter Karlsson (2016)

Linus Nilsson (2016)

David Sherwin (2013)

Herbert J Rubin and Irene S Rubin (2011)

Erika Hall (2016)

Georgia Gallavin (2015)

Neil Bennett (2016)

Jakob Nielsen (2016)

Lene Nielsen (2004)

Alan Cooper et al. (1999)

Miriam Walker, Leila Takayama, and James A Landay (2002)

Helene Blowers and Robin Bryan (2004)

Justin Smith (2016)

Karina Ibarra (2016)

Sabina Idler (2014)

Marissa Gluck Angeline Vuong (2016)

Rian van det Merwe (2012)

Daniel Wieselberg (2016)

Andrew Smyk (2016)

Raph Koster (2013)

John Ferrara (2012)

Eric Zimmerman and Katie Salen (2004)

Gabe Zichermann (2011)

Iubenda (2016)

LukeWroblewski (2008)

Donald A Norman (2013)

Lawrie Mincin (1997)

Wendy Boswell (2013)

Steve Jobs (2007)

Martijn van Welie (2015)

Lawrence Kao (2015)

Todd Zaki Warfel (2010)

Janna Hagan (2016)

Tamara Adlin (2013)

Tomer Sharon (2015)