AMPLIFYING INTERACTION PRINCIPLES THROUGH USER INTERFACE DESIGN ANIMATION

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ABSTRACT

My research paper, titled "Amplifying Interaction Principles Through User Interface Design Animation," explores the pivotal role that User Interface Animation (UIA) plays in enhancing core interaction principles within digital interfaces. My study establishes a foundation by defining and delving into the interaction principles of visibility, discoverability, affordance, feedback, and mapping, highlighting their fundamental significance in guiding user experiences.

UIA's unique contribution to these interaction principles lies in its ability to provide visual cues and feedback, making them more pronounced and intuitive for users. In terms of visibility, UIA can draw users' attention to important elements, ensuring they remain salient within the interface. For instance discoverability, animation can guide users toward hidden features or functions, unveiling them gradually to promote exploration. Affordance is augmented through animation by making elements appear more interactive and responsive, aligning with users' expectations. Feedback, a critical aspect of interaction design, benefits significantly from UIA, as it can provide immediate, visually engaging responses to user actions, reinforcing the cause-and-effect relationship between user input and system response. Moreover, the mapping of User Interface (UI) elements to user actions is made more apparent and coherent through animation, simplifying the mental model users construct when interacting with the interface.

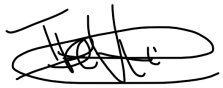
This research paper signifies the transformative potential of UIA as a potent tool for designers to create interfaces that transcend mere functionality. UI animation serves as a means to amplify interaction principles by making them more perceptible and user-centric. Its nuanced contribution to (1) visibility, (2) discoverability, (3) affordance, (4) feedback, and (5) mapping exemplifies how UIA can profoundly enhance the way users interact with technology, revolutionising user experiences in the digital age. This study significantly advances the field of UI design by providing a comprehensive exploration of UIA's multifaceted role in this context.

KEYWORDS

Interaction Principles, User Interface Animation, Interaction Design Enhancement, User-Centric, User Interface Usability.

DECLARATION OF AUTHORSHIP

With this declaration, I wish to state that the research report submitted for the degree Bachelor of Arts (Honours) in Creative Technology at The Open Window is my own work. I further declare that a comprehensive list of references in this research report contains all sources cited or quoted.



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CHAPTER ONE: INTRODUCTION

1.1 Background to the study

How can user interface animation be leveraged to amplify the interaction design principles within digital interfaces?

In the book *Interaction Design: beyond human-computer interaction*, Jenny Preece, Yvonne Roger and Helen Sharp (2019:9) define interaction design as designing interactive products to facilitate communication and interaction in people's daily and professional lives. Interaction design can also be viewed as the creation of user experiences that enhance and augment how people work, communicate, and interact (Preece *et al.* 2019:9). In essence, interaction design is about understanding the needs, behaviours, and preferences of users and creating user interfaces that meet those needs seamlessly and intuitively.

Fred Churchville (Techtarget 2023) defines the user interface (UI) as the visual and interactive components of an application or digital system that allow people to interact and communicate with digital devices. User experience (UX), which encompasses aspects such as the device's aesthetic appearance, response time, and the content presented to the user within the interface's context, is frequently discussed alongside the UI (Churchville in TechTarget 2023).

In the book, *Designing Interface Animation Meaningful Motion for User Experience*, Val Head (2016:18) states that digital user interfaces are ubiquitous in modern society, with users interacting with them daily. According to Jenifer Tidwell, Charles Brewer, and Anynne Valencia (2020:111) in *Designing Interface Patterns for Effective Interaction Design*, "[e]very well-designed websites or applications should have some form of help". This statement emphasises the importance of designing interfaces that effectively facilitate communication and interaction between users and the interface. Tidwell *et al.* (2020:111) further continue to say that, a user who approaches an interface for the first time requires a different level of assistance than

someone who uses it repeatedly. It is crucial to consider the needs and expectations of users at different levels of familiarity when designing an interface.

Ali Darejeh and Dalbri Singh (2013:1443) discuss how usability on digital interfaces can be improved by identifying common usability problems. According to Darejeh and Signh (2013:1444), digital interfaces are sometimes designed without regard for users' abilities, which causes users to become confused and makes it difficult for them to form a proper conceptual model. Therefore, the authors (Darejeh & Singh 2013:1444) suggest that identifying common usability problems can help improve the overall user experience and enhance the digital interface to be more user-friendly. The usability problems that Darejeh and Signh (2013:1444-1448) identified are the following: interfaces lack appropriate feedback, which leads to users struggling to complete tasks successfully; too many steps are involved in the digital interface that confuses the users; too much information is displayed; or when the interface is too complex, the user loses their attention and focus on what they need to do.

These usability problems highlight the importance of designing a user-friendly digital interface. To address these issues, designers need to focus on UI design, which will be explored in greater depth in Chapter Two, particularly through the application of integration principles such as visibility, discoverability, affordance, mapping, feedback, and constraints, as discussed by Norman (2013:28–56). However, it is important to note that simply incorporating these interaction principles is not enough. Users often lose attention and focus, leading to usability problems.

One effective solution to engage users and maintain their attention is through UI Animation (Hannah 2023). Rachel Nabors (2017:1) defines animation in its simplest form as the act of changing (animating elements). Hannah (2021) defines User Interface Animation (UIA) as the “process of adding motion to UI elements to enhance a product’s interactivity”. Hannah (2021) states that UIA helps guide users through the digital interface, warns them when something changes, affects their decisions, and shows how things are connected. By implementing well-designed UIA, designers can greatly enhance the usability of digital interfaces and improve the overall user experience (Hannah 2023). Head (2016:21) adds that static interfaces

can feel dated or even a little monotonous and lack sophistication in comparison with interfaces that incorporate animation into their design. Therefore, I argue that UIA is an essential component in modern digital interface design. UIA not only captures users' attention but also provides visual cues that guide their interactions and make the interface more engaging that interaction principles cannot achieve on their own.

1.2 Rationale for the Study

In my research study, I aim to focus on enhancing interaction principles through UIA by directly addressing the challenges designers and users encounter in digital interfaces. The significance of this research lies in investigating usability issues and harnessing the potential of UIA to enhance interaction principles in digital interfaces, ultimately improving usability. Head (2016:63) explains that the goal of a particular animation may be derived from the UX problem it is intended to help solve. By understanding the potential benefits of UIA on interaction principles, I will be providing evidence-based guidelines and best practices for incorporating UIA and designing more intuitive and user-friendly interfaces. I aim to empower UI designers to use UIA in their designs to increase usability. By addressing both the practical and theoretical aspects of UIA, my research study aims to provide a comprehensive understanding of its role in amplifying the interaction principles.

1.3 Aim and Objectives

My research aim is to investigate and provide insights into how interactive UIA can enhance the existing interaction principles.

The aim of my research will be attained by the following objectives:

- To review existing literature on interaction principles and UIA to establish a comprehensive theoretical foundation.
- Establish guidelines and best practices for UIA that outline the principles, techniques, and considerations for incorporating UIA in digital interfaces.
- Examine Airbnb (2023) and *Duolingo* (2023) mobile applications to identify how UIA can enhance the interaction principles in digital interfaces.
- Based on research results, provide designers with a UIA toolkit in the form of a live website, instructions and examples on how to use interactive UI animation in their digital interface.

1.4 Theoretical Framework & Literature Review

A key source that I am making use of is *The Design of Everyday Things* (2013) written by Don Norman a research professor and director of *The Design Lab*. Norman is widely recognised as a leading authority in design principles and usability, which makes his work a valuable resource for understanding interfaces and interaction principles (Norman 2013:28-56). Norman (2013:297) is pivotal for my research as his book offers a solid foundation in human-centred design, and usability, allowing me to delve into the core principles of effective design. By drawing upon Norman's insights, I can gain a deeper understanding of user-centred design, which is fundamental to comprehending how UIA can be effectively employed to enhance interaction principles. Norman's (2013) work provides the theoretical underpinnings and practical guidance needed to create more user-friendly and intuitive interfaces that align with the goals of my research.

An important book that I have identified is *Designing Interface Animation Meaningful Motion for User Experience* (2016) written by Val Head, a Principal Designer at Adobe specialising in UX animation. This source helps facilitate a better understanding of the role and the benefits of UIA in digital interfaces. *Designing Interface Animation Meaningful Motion for User Experience* (2016) is a relevant source for me as a UI designer; it provides valuable insights and guidance on

incorporating animation into user interfaces to enhance the overall user experience. Head (2016:8) discusses the relevance of motion and animation in user interface design to improve the overall user experience. The source provides useful tips on how to create animations that assist users and improve the usability of digital interfaces. Head (2016:8) explains that "animation can improve feedback, aid in orientation, direct attention, and show causality". Concepts and theories presented in Head's book broaden my understanding to gain a solid foundation for using animation for UI design where I am implementing the principles directly into my work. This source by Val Head is particularly valuable because it not only offers insights into the significance of animation in user interface design but also provides practical tips for its implementation, making it an exceptional resource for UI designers seeking both theoretical understanding and actionable guidance in enhancing user experiences through animation.

I am making use of the book *Animation at Work* (2017) by Rachel Nabors an award-winning cartoonist and artist, who also specialises in animation in web design as it explores the importance of animation in digital interfaces. This reading emphasises the role of animation in creating engaging and intuitive user experiences. Nabors (2017:28) states that "the web is rich with information, but it [is] not inherently rich with context and feedback". She (Nabors 2017:28) continues by saying that to draw a user's attention to a critical update, animation can and should provide feedback to help them understand what is happening on the interface. In regards to digital interfaces, animation's true purpose is to give context (Nabors 2017:28).

The goal of using all the literature mentioned above is to accumulate and identify the role of and best practices, as well as the benefits of incorporating UIA into digital interfaces. By analysing and synthesising the literature, it is expected to gain a comprehensive understanding of how UIA can enhance user experience and improve usability.

1.5 Methodology

My study takes a qualitative research approach to investigate how UIA enhances the interaction principles of user interfaces and improves usability. This approach is taken to understand the role of UIA in digital interfaces and the potential to enhance the interaction principles by examining the appropriate academic readings described in the literature review. I aim to analyse the use of UIA on digital interfaces and identify the successful use of UIA and potential problems it might cause.

User testing is conducted with two self-generated functional applications, namely the *Money Matters* financial application and the *Easy Med* booking application that I have created with UIA to assess the impact of animations on digital interfaces. The user testing allows me to capture the users' actions, behaviours, and challenges in real time, giving me valuable insights into how UIA influences their actions. By observing the user's reactions to the UIA, I can identify areas for improvement and make necessary adjustments to enhance their overall experience while helping the users through digital interfaces. The research explores the potential limitations and challenges associated with implementing UIA by closely analysing user feedback and performance during testing, which provides insights into areas where UIA might fall short or introduce usability issues in digital interfaces. This information informs me as to what UIA examples and guidelines to include in my toolkit, which is the main practical component of my research.

As part of the research, I created a website to host *UI Animate Guide*, the UIA toolkit that supports the practical component of the study. *UI Animate Guide* includes a set of guidelines such as keeping animations constant, best practices like using animation with a purpose to help the user and avoid overwhelming them and animated examples for designing animations. The toolkit acts as a resource for designers who want to improve the usability of their digital interfaces by incorporating UIA to amplify the interaction principles.

1.6 Delimitations

It is essential to recognise that user preferences and behaviours exhibit significant variations across diverse user groups, contextual settings, and specific interface types, which may render the findings of this study context-specific. As such, I must acknowledge that the outcomes and insights generated by my research may have limited generalisability and may not be universally applicable to all digital interfaces or user populations.

My study focuses primarily on short-term effects and immediate user actions, as capturing and analysing long-term effects and user behaviours would entail a more in-depth and extensive investigation. Furthermore, long-term effects can be influenced by a variety of external factors that are beyond the scope of my study.

I recognise that technological limitations can impact the efficacy of user interface animation. Different devices, screen sizes, and operating systems may have varying animation performances. I may encounter technical constraints and compatibility issues that compromise the consistency and quality of animation experiences for users. Due to the limited scope of my study, my focus will be exclusively on mobile animated examples, and I will not have the capacity to encompass all the animations intended for desktop screens and other context screens.

1.7 Practical Section

The main practical component of my research study is the *UI Animate Guide, a* UIA toolkit. The toolkit is created for UI designers to incorporate UIA into their digital interface designs and consists of a set of guidelines and best practices for designing animations. The toolkit has a library of animated examples categorised by each interaction principle that designers can use as a starting point or inspiration. The goal

of the *UI Animate Guide* is to act as a valuable resource for designers who want to improve the usability of their digital interfaces and help guide user actions by incorporating UIA.

The *UI Animate Guide* is hosted on a website that I created so that designers can view it on their desktop and mobile devices. The toolkit has mobile animated examples to demonstrate the role of UIA and how it can be applied to mobile digital interfaces to help users with task compilation, guide user actions, provide a better comprehension of the interface, grab attention to important elements on the interface, and draw their attention to important information and actions that have taken place.

The link between my research and the practical component is that the toolkit aims to empower UI designers to use animation effectively in their designs. By doing so, I'm exploring how UIA can amplify interaction design principles, improving user guidance and overall interface quality. This project aims to enhance user experiences and demonstrate the crucial role of UIA in digital interfaces.

I conducted user testing to see what effect using animation on digital interfaces has on the user's actions and comprehension of the digital interface to allow me to further improve on the developed animations. I used the *Money Matters* financial application and the *Easy Med* booking application that I created and prototyped to test UIA on mobile interfaces. Information is gathered based on how users interact with interfaces that incorporate UIA. The information is analysed to determine if UIA positively impacts user engagement, task completion, and overall satisfaction. The research explores the potential limitations and challenges associated with implementing UIA. Ultimately, the findings contribute to the development of best practices for UIA in digital interfaces.

The primary aim for the practical component is the creation of the *UI Animate Guide*, a comprehensive toolkit aimed at empowering UI designers to seamlessly integrate

UIA into their mobile digital interface designs, further detailed in the following bulleted objectives:

- Identify the best practice to serve as guidelines for incorporating UIA to include in the *UI Animate Guide*.
- Create an intuitive toolkit interface that is easy to navigate and comprehend for designers with animated examples of each of the interaction principles.
- Provide a library of examples of pre-designed animations in Figma[1] files that cover the use of UIA and showcase how the animations are prototyped.
- Build the UI Animate Guide on a live website.

To attain my practical outcomes I first identify the role of UIA and the best practices in incorporating UIA into digital interfaces. I include these findings in an existing interface and investigate to see if UIA can help aid users through digital interfaces.

This is where user testing will be imperative. I use the self-generated *MoneyMatters* financial banking and the *Easy Med* booking system applications with UIA to test the effective use of UIA and how it is incorporated into these applications. The intention is not to analyse and test the designs of the applications themselves but rather use them as a basis to recognise where UIA can be used on digital interfaces to help users with task completion, understanding the interface better and making navigation easier. The participants are asked in the user tests to perform tasks and give their impressions of the animations as they complete the tasks.

By conducting usability testing I hope to find the impact of the role that UIA plays in aiding user actions and helping them complete set tasks. Based on the feedback, I identify instances where UIA is beneficial to the users and where it falls short and can be improved. These findings are incorporated into the *UI Animate Guide* as examples to ensure that the UIA in the toolkit provided to designers serves a

[1] Figma design is a design tool to create, share, and evaluate designs for websites, mobile applications, and other digital products and experiences (Figma Learn 2023).

purpose and will help elevate their digital designs rather than complicate their interface.

1.8 Preliminary Chapter Outline

In Chapter One, my research study is introduced by giving the background and context on interaction design, UI, UX, interaction principles and UIA. The problem is stated and usability issues that users face on digital user interfaces are identified. UIA is identified as a potential solution to help enhance interaction principles to improve digital interfaces.

Chapter Two examines the role of UIA, exploring its significance in digital interfaces and the guidelines and best practices that define its integration. By understanding the context of UIA and its increasing use, I can develop a comprehensive understanding of the principles and techniques that underpin effective design.

In Chapter Three, *Airbnb* (2023) & *Duolingo* (2023) mobile applications are analysed as case studies to identify the role of UIA in enhancing fundamental interaction principles and integrating animation into digital interfaces seamlessly. By examining real-life examples, I can find useful insights and recommendations for incorporating UIA into digital interfaces. Through this analysis, I hope to gain a better understanding of how UIA can enhance digital interfaces and improve user interaction.

Chapter Four applies Chapter Two's theory to my main practical component, which is the UI Animation toolkit (*UI Animate Guide*). In Chapter Four , the goals are outlined for the design of the *UI Animate Guide* that enables UI designers to successfully incorporate UIA into their digital interfaces. The aim is to prove the link between

theoretical and practical research, highlighting the benefits and impact of UIA on users and digital interfaces.

Chapter 5 gives a summary of my research findings. I provide a possible solution to my research question and summarise the main ideas presented in Chapters 1, 2, 3 and 4. Finally, Chapter 5 concludes by introducing further avenues of research for the study.

CHAPTER TWO: INTERACTION PRINCIPLES AND UI ANIMATION

2.1 Introduction

In Chapter 2, I explore the interaction principles and UIA by examining the existing body of research, I aim to establish a link between the role and best practices of UIA and the enhancement of interaction principles. Before delving into the nuances of UIA, I provide an overview of the fundamental interaction principles. This foundation paves the way for a better understanding of how UIA, when strategically applied, enhances these principles to create more engaging and user-friendly digital experiences.

2.2 Interaction Principles

2.2.1 Introduction to the Interaction Principles

When designing an interface, there is more to it than just design. Jaye Hannah (2023) a content writer and strategist at *EdTech*, elaborates on interface design in *What Is User Interface (UI) Design? A Comprehensive Guide* (2023). Hannah (2023) explains that when it comes to designing, a designer makes use of multiple principles that need to be utilised to make it an effective means of communication. Don Norman (2013:28-56) the author of *The Design of Everyday Things* (2013), lists multiple fundamental principles of interaction namely visibility, discoverability, affordance, mapping, feedback and constraints. Hannah (2023) adds to Norman by saying that a proper UI design makes use of design principles and that these principles allow designers to “understand how users interpret and process complex stimuli around them”. This understanding helps designers create interfaces that are intuitive, user-friendly, and visually appealing. By incorporating considerations such as readability and ease of navigation, designers can ensure that their interface effectively communicates information and facilitates a positive user experience. This understanding helps designers create interfaces that are easy to navigate (Hannah (2023). Additionally, Hannah (2023) highlights the importance of ensuring that the interface is not only visually appealing but also functional and user-friendly.

Ultimately, successful UI designers should strive to enhance the overall user experience and facilitate effective communication between the user and the system.

This raises the question, ‘How can we design a system that makes users comprehend a system more easily?’. Don Norman (2013:27–28) explains in response to this query that a proper design is human-centred. Human-centred design is about designing with the user in mind since the user is the focal point. (Norman 2013:27). According to Norman (2013:29), understanding is a framework that a designer must consider; yet, this framework is not the only thing to consider; interaction principles are also crucial. These principles defy the manner in which users physically and psychologically interact (Norman 2013:22–23). The following section lists the interaction principles as (1) visibility, (2) discoverability, (3) affordance, (4) mapping, (5) feedback and (6) constraints.

2.2.2 Principle of Visibility

Visibility is a fundamental principle in interaction design, emphasising the importance of making elements and features readily noticeable to users (Norman 2013:29). Patric McNeil (2014) a UX Architect with more than 20 years of experience as a veteran of the web industry, describes visibility as making important parts of an interface design more visible, making it easy for users to see and find tasks. Norman (2013:29) adds that the more prominent and apparent an element is within a user interface, the greater the likelihood that users will be aware of its existence and understand how to utilise it effectively.

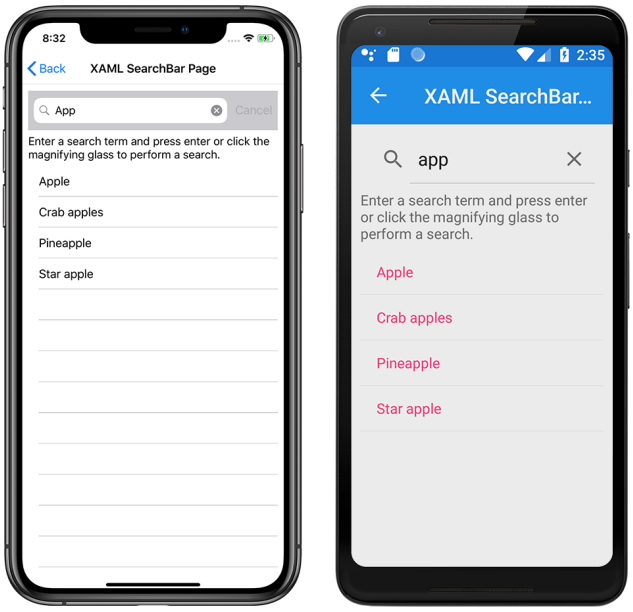


Figure 1: Code Sample. *Xamarin.Forms SearchBar.* 2021. Digital Design. (Microsoft Ignite 2021).

For example (Figure 1), in an application, a visible and easily accessible search bar ensures that users can quickly locate it and understand its purpose. The animations allow users to easily find specific content, enhancing their overall experience and increasing the efficiency of their interactions with the interface (Norman 2013:31).

2.2.3 Principle of Discoverability

Discoverability is how “we need to figure out how to work” (Norman 2013:29) with a product, or in this case, an interface. Discoverability goes back to our understanding of the product, as our comprehension determines how long it will take us to master the product and its features. Norman (2013:74) emphasises that a well-designed interface should provide clear and intuitive cues that guide users towards discovering how to interact with it without the need for trial and error. Understanding, on the other hand, refers to the user's conceptual model of how a product operates and their ability to anticipate its behaviour (Norman 2013:74). Understanding the product requires comprehension of its function, purpose, and how it integrates into users existing mental models (Norman 2013:74). By designing interfaces with

comprehension in mind, designers can improve the user experience and reduce frustration or confusion.

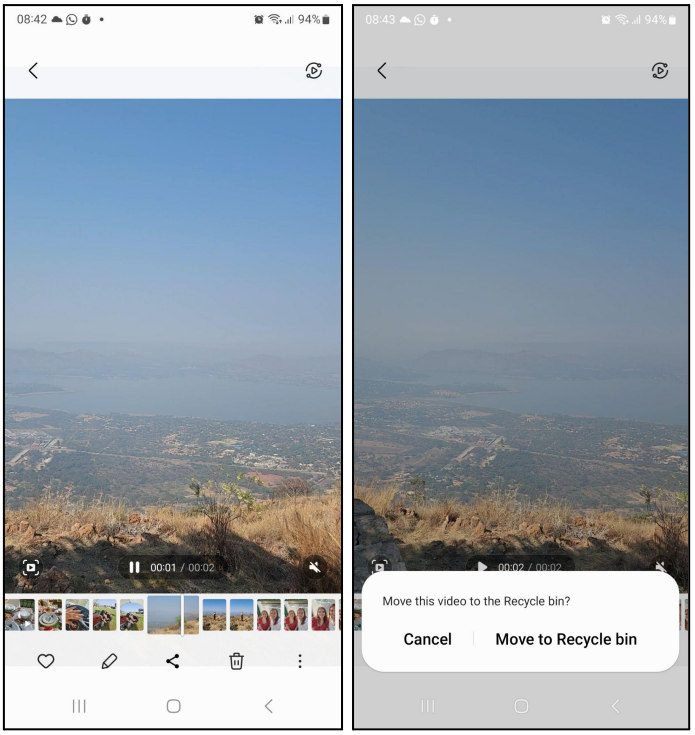


Figure 2: ‘Camera Gallery’. Screenshot from *Samsung Gallery* (2023).

The use of universally understood symbols (Norman 2013:45), like a trash can for deletion, contributes to users' understanding of how to interact with the device, fostering a smoother and more intuitive experience. For example, on the Samsung camera gallery (Figure 2), the trashcan icon is visible, signifying the action of deleting images or videos, which is consistent with other applications and mobile devices.

2.2.4 Principle of Affordance

According to the Cambridge Dictionary (2023), affordance is something that people notice because of how they see or experience it and what it's used for. The affordances principle refers to the perceived action possibilities that an object or environment presents to a user and how the properties and design of an interface propose how it can be used or interacted with (Norman 2013:29).

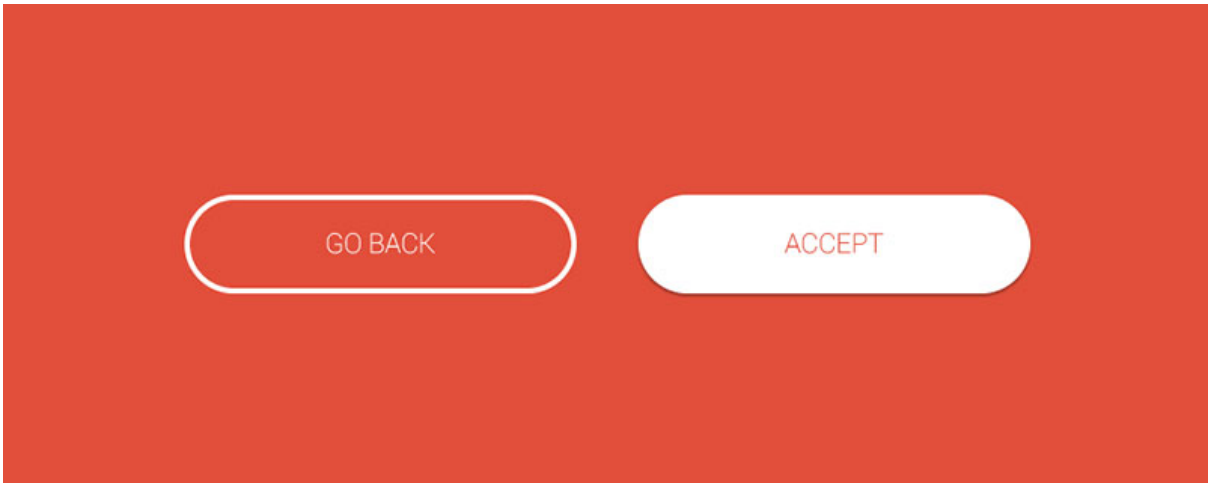


Figure 3: Amelia. *Explicit-affordances*. 2019. Digital Design. (Amelia 2019).

For instance (Figure 3), a website button has an affordance for clicking, signifying to the user that the button can be pressed. Signifiers indicate potential actions or functions of an object or system (Norman 2013:31). These indicators can be auditory, visual, or tactile signals that direct the user's interaction with the product (Norman, 2013:31). Signifiers aid users in discovering and comprehending a product's affordances and facilitate intuitive use (Norman 2013:32).

2.2.5 Principle of Mapping

Mapping is a fundamental design principle that connects controls to their resultant actions (Norman 2013:40). Saba Reham (2023) explains that mapping acts as a link between the conceptual models of users and the design elements they interact with, showing the user the relationship between the interface controls and the results they produce. Effective mapping ensures that the layout or arrangement of controls corresponds to the expected actions, thereby providing clear interaction signals (Norman 2013:40). Norman (2013:41) continues to say that because mapping employs spatial correspondence between the control layout and the devices being controlled, it is simple to figure out how to use them.

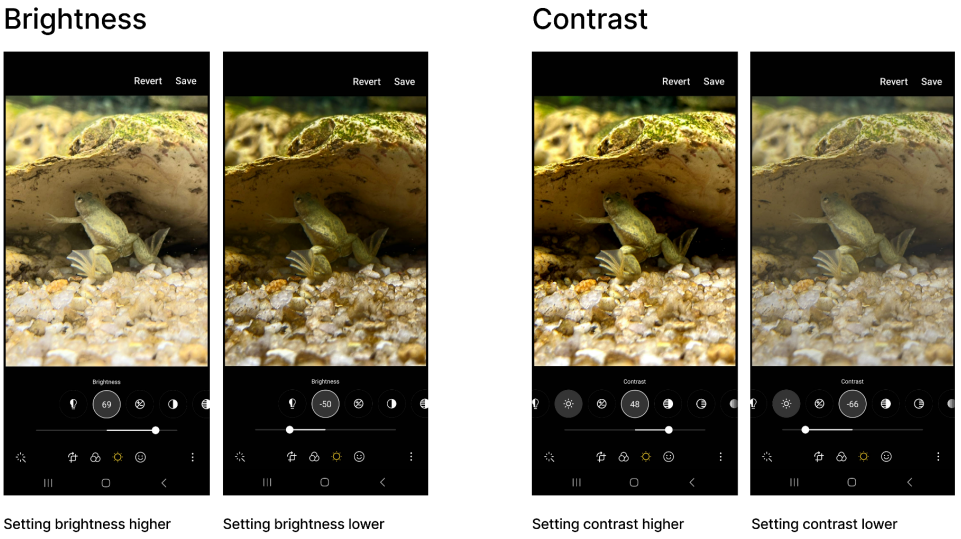


Figure 4: ‘Photo Editor - Brightness & Contrast’. Screenshots from *Samsung Photo Editor* (2023).

For example, in Figure 4 mapping is showcased, when users slide the "brightness" control to the right, the image becomes brighter, and sliding it to the left darkens the image. Similarly, when users adjust the "contrast" control to the right, the image's contrast increases, and sliding it to the left decreases the contrast (Figure 4). The example of the brightness and contrast slider control shows the user the link between the control, the slider and the action being produced, with the image getting brighter or darker.

2.2.6 Principle of Feedback

Feedback is another essential principle that complements mapping by informing users about their actions and the system's response (Norman, 2013:43). Preece *et al.* (2019:31) state that the principle of feedback entails communicating information about what action was taken and what was accomplished, allowing the individual to continue the activity. This feedback assists users in validating their interactions and making informed decisions based on the system's signals (Norman 2013:43). In interaction design, various types of feedback are available, including audio, tactile,

verbal, visual, and combinations therefore, it is essential to determine which combinations are suitable for various types of activities and interactions Preece *et al.* (2019:31). Preece *et al.* (2019:31). Preece *et al.* (2019:31) continue to say that using feedback effectively can also provide the necessary visibility for user engagement. Feedback is a crucial interaction principle, fostering user engagement and interaction effectiveness in digital interfaces.

Figure 5: TechJunkie. *Checkmarks in Whatsapp*. 2018. Screenshot. (TechJunkie 2018).

When a user clicks a button or completes a task, visual or audible cues are a good example of design feedback because they reassure and affirm that the system has acknowledged their action. The WhatsApp chat section (Figure 5) is also a good example to look at. After tapping the "Send" button to send a message, the button briefly turns blue and displays a single checkmark. This visual feedback reassures the user that their message has been successfully sent and is now delivered to the recipient.

2.2.7 Principle of Constraints

Constraints are limitations or restrictions placed on an object or system to assist users in determining how to interact with it (Norman 2013:139–140). There are physical limitations, psychological limitations, cultural limitations, and logical limitations (Norman 2013:40-140). While this principle is a valuable guideline for

designing digital user interfaces, it is not suitable for amplification through UIA and will not be used further in this study. I will not be using the principle of constraints because of the limited applicability of the constraint principle in UIA. Head (2016:58) states that dynamic components are designed to engage and guide users through a fluid, intuitive experience. The introduction of constraints, which are inherently restrictive, could conflict with the goal of seamless interaction. Therefore, while constraints are crucial in certain aspects of design, they do not have a suitable place in the realm of UIA, where other principles better support the goals of interaction and engagement.

UIA can play a pivotal role in enhancing the application of interaction principles in user interface design. While interaction principles offer valuable guidelines for creating user-friendly interfaces, they often fall short of addressing the dynamic and engaging nature of modern digital experiences. UIA, as the next section will elaborate, is a powerful tool that can bridge this gap by infusing life into these principles, making them not only more engaging but also more intuitive for users.

2.3 UI Animation

2.3.1 The Role of UI Animation

The popularity of UIA is on the rise, and one of the main contributing factors is the changing attitude of users towards screens (Head 2016:21). Head (2026:21) continues to say that users have started to expect more dynamic and engaging experiences as screens like smartphones have become an essential part of our daily lives and that static interfaces feel dull and outdated. Animation enhances design aesthetics, making interfaces more intuitive and user-friendly.

Head (2016:63), like Nabors (2017:8), discusses the importance of using animation in the proper context, but Head focuses more on how "animation might be drawn from a UX issue" that can be resolved by using animation. Head (2016:63) emphasises that animation should not be used as a decorative element, but rather as a solution to a specific user experience problem. By identifying the issue at hand

and strategically incorporating animation, designers can effectively guide users through the interface and improve their overall satisfaction with the product. Animations should not create obstacles for the user, as they should be used in a balanced manner (Head 2016:63). Head (2016:63) further argues that excessive or unnecessary animations can lead to confusion and frustration for users. Therefore, designers must carefully consider the purpose and impact of each animation, ensuring that it enhances rather than hinders the user experience. The animation must be implemented in such a way that it guides the user but does not interfere with their ability to navigate and interact with the interface. Animations that are subtle, understandable, and responsive to user actions can accomplish this.

Head (2016:68) goes on to state that "animation is generally linear in nature," whereas "interaction, on the other hand, is nonlinear". When animation and interaction are combined, it is important to find a balance that enhances the user experience rather than hindering it. To overcome the challenge of combining linear animation with nonlinear interaction, designers can focus on creating seamless transitions and providing clear visual cues that allow users to easily understand and navigate through the interface (Head 2016:68). By carefully considering the timing, speed, and purpose of animations, designers can ensure that they enhance the overall user experience without interfering with their ability to interact with the interface (Head 2016:74-75). By striking the right balance, designers can create a seamless and enjoyable user experience that effectively communicates information and enhances usability. Designers should also consider the performance implications of animations, which can potentially slow down the interface if not properly implemented. UIA has the potential to bring interfaces to life and engage users in a more interactive and dynamic way by providing visual cues, guiding users through tasks, and creating a sense of fluidity and continuity.

2.3.2 Best Practices for incorporating UI Animation

Best practises in UIA are important in determining the success of enhancing interaction principles and ensuring user engagement and satisfaction while avoiding potential usability issues. Rachel Nabors (2017), the author of *Animation at Work*, talks about UIA and explains that when it comes to using animation within a design, it is imperative to keep consistency with the design (Nabors 2017:57–61). Nabors (2017:57–61) speaks of consistency in terms of the visual style, timing, and purpose of the animation. This means that animations should align with the overall aesthetic of the interface and be timed appropriately to enhance the user experience. Additionally, animations should serve a clear purpose, whether it is to provide feedback, guide users through a process, or simply add delight to the interaction (Nabors 2017:57–61). By maintaining consistency in these aspects, UI animation can effectively contribute to a seamless and engaging user interface. Nabors (2017:57–61) builds up another point with animation: to use it purposefully and not just for the sake of adding visual flair. By aligning animation with the overall user experience goals, designers can create a seamless and intuitive interface that enhances usability and engagement.

The consideration of the best practises of UIA in this study is important, as it not only dictates the degree of success in enhancing interaction design principles but also helps avoid potential pitfalls. By keeping the best practises in mind, designers can ensure that UIA contributes positively to user engagement, feedback effectiveness, and overall user experience, fostering the achievement of interaction design goals and user satisfaction while avoiding distracting or confusing animations that might hinder these principles.

2.3.3 The Benefits of Using Animation in Digital Interfaces

The benefits of UIA lie in its ability to make designs feel modern and sophisticated, with a broader impact on the user experience (Head 2016:22). In order to

understand why animation can make an interface feel more user-friendly and intuitive, potential benefits are examined.

Head (2016:22) emphasises that UIA has potential brain benefits by reducing cognitive load for users when animating between the various states of an interface. Head (2016:22) defines cognitive load as the “total amount of mental effort being used in working memory". By using animation to guide users through different states and transitions, it helps to visually communicate the changes occurring in the interface, making it easier for users to understand and process information (Head 2016:23). Head (2016:23) continues to state that animation improves decision-making capabilities and helps people learn and remember spatial relationships. This is especially important for interfaces with different content on different layers, as limited screen real estate on smaller screens makes it impossible to have every available item on screen at all times. This can ultimately result in a more enjoyable and seamless user experience.

Head (2016:24–25) discusses the additional communication that occurs when animation is used, as animation communicates differently to other mediums such as colour. Head (2016:24–25) states that it is human nature to attribute meaning to why something is moving based on your knowledge of "real-world physics or by anthropomorphising animated objects". This means that animation has the power to convey emotions, intentions, and narrative in a way that static images or text cannot, as it creates a sense of reality and familiarity. By using animation in user interfaces, designers can add depth, context, and life to interactions. For example, a simple loading animation can let users know that their action is being processed, reducing frustration and providing a sense of progress (Head 2016:24–25).

2.4 Conclusion

UIA emerges as an effective tool for improving interaction principles and enhancing the user experience. The integration of UIA, as discussed in this chapter, contributes to the progress and sophistication of digital interfaces by allowing designers to

communicate information, reduce cognitive load, and create engaging, user-friendly interactions. UIA, when executed thoughtfully and in accordance with best practises, holds the potential to transform digital interfaces into dynamic and intuitive experiences, ultimately fostering user satisfaction and usability.

CHAPTER THREE: CASE STUDY: ENHANCING INTERACTION PRINCIPLES

3.1 Introduction

In Chapter Three, I explore the role of UIA in amplifying core interaction principles while integrating UIA into digital interfaces. This exploration takes shape through an analysis of two distinct case studies: the *Duolingo* (2023) mobile application and the *Airbnb* (2023) mobile application. By examining these real-world examples, the chapter gives a detailed depiction of how UIA can enhance interaction principles and transform user experiences while offering valuable insights into effective UIA in digital interfaces.

3.2 Introducing Duolingo and Airbnb: Significance of UI Animation Analysis

Duolingo (2023) is a popular educational mobile application created by Luis von Ahn and Severin Hacker that aims to make language learning accessible and enjoyable for users worldwide. Jasmine Vahidsafa and Kevin Lenzo (2022) from Duolingo add that *Duolingo* (2023) demonstrates the effectiveness of animation in creating engaging experiences by using animation to guide users through processes, provide feedback, and create a sense of progress. *Duolingo* (2023) serves as a prime example of how UIA can effectively enhance interaction design principles.

Airbnb (2023), an online marketplace for short-term homestays and experiences, was founded by Brain Chesky, Nathan Blecharczyk and Joe Gebbia (Airbnb Help Centre 2023). The *Airbnb* (2023) mobile application specifically, helps users store all of their essential trip information in a single location, allowing them to quickly access or share their itinerary (Google Play 2023). *Airbnb's* (2023) interface makes strategic use of animations to enhance user experiences. Cal Stephens (2022) at *Airbnb* states that motion contributes significantly to the usability and enjoyment of digital experiences. Stephens (2022) continues to say animations bring the *Airbnb* application to life and contribute to its distinct personality while assisting users to maintain context as they navigate through the interface.

Analysing *Airbnb* (2023) through the lens of UIA, provides a perspective on enhancing core interaction principles, demonstrating the crucial role of animation in creating user-friendly digital interfaces. Similarly, examining *Duolingo* (2023) yields valuable insights into how UIA can be seamlessly integrated within digital interfaces, enriching user interactions, as demonstrated below.

3.3 Duolingo and Airbnb Unwrapped: How UIA's Role in Amplifying the Interaction Principles

As mentioned in Chapter Two, the interaction principles include the five principles of (1) visibility, (2) discoverability, (3) affordances, (4) feedback, and (5) mapping, all of which help users understand how to interact with a digital interface and what to expect from the user's interactions (Norman 2013:29). The following is an analysis of the interaction principles and how they are enhanced through the use of UIA.

3.3.1 Visibility

The principle of visibility is that the clearer an element is, the more likely users will be aware of the element and how it should be used (Norman 2013:29). According to Head (2016:107) UIA can be used to guide the user's attention by directing users' focus towards interactive elements, for example using gentle motion on features and buttons. Using UIA to highlight important elements can potentially enhance the principle of visibility. Another effective way UIA can enhance visibility is through the concept of progressive disclosure. Progressive disclosure refers to the gradual presentation of information or content, revealing it progressively as users interact with the interface (Head 2016:229).

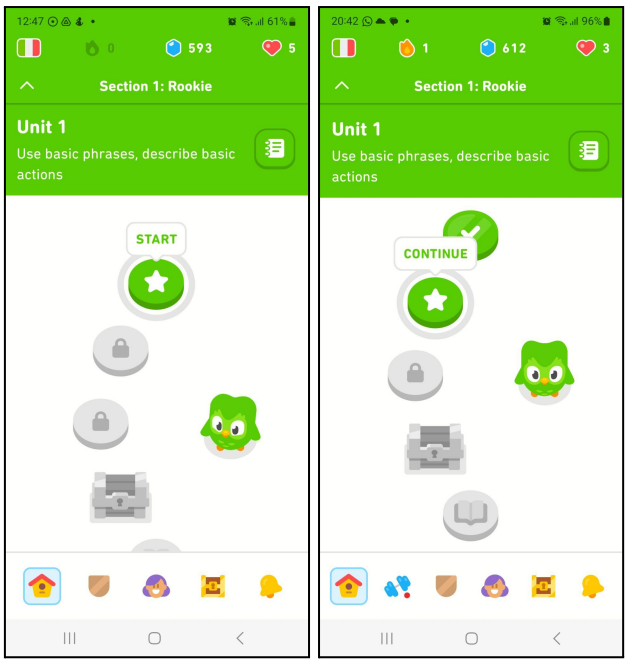


Figure 6: ‘Homescreen - Section 1 Rookie, Unit 1’. Screenshot from *Duolingo* (2023).

Duolingo’s (2023) interface amplifies the principle of visibility through the implementation of UIA, when the user arrives on the home screen, their course journey is shown (Figure 6), and a subtle bouncy animation appears to showcase where the users are in their course journey and indicate where they should “Start” or “Continue” with their lessons. Animating the elements onto the screen can draw the user's eyes to the relevant content, making it immediately visible (Head 2016:107). UIA in the *Duolingo* (2023) application enhances visibility by guiding attention, and this ensures that users can quickly understand their current status and where they should continue, making the learning experience more intuitive and user-friendly (Head 2016:107).

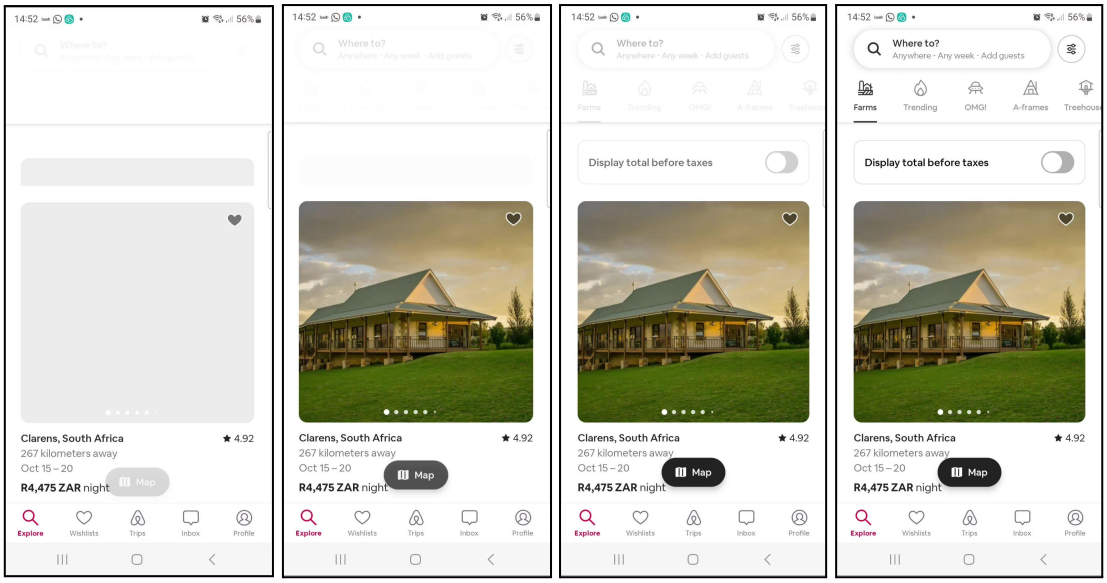


Figure 7: 'Homepage'. Screenshot from *Airbnb* (2023).

The principle of visibility in the *Airbnb* (2023) application is amplified through the use of progressive disclosure. In the case of *Airbnb* (2023), when users first enter the homepage (Figure 7), the housing options gradually appear one by one, making it a good example of this animation technique to enhance visibility. Head (2016:229-230) states that progressive disclosure engages users by introducing content one step at a time, this gradual reveal captures their attention and reduces cognitive overload. Instead of bombarding users with all the information at once, the interface allows them to focus on each element individually, making the element more visible and enhancing the principle of visibility.

3.3.2 Discoverability

In short, the principle of discoverability is how easy it is for users to locate features within a user interface (Norman 2013:29). Head (2016:83) states that animation can be used to imply boundaries and layers, as well as to hint at what lies beyond the visible screen. Head (2016:83) extends this by saying that small visual cues can aid users in comprehending an interface's layout at first glance.

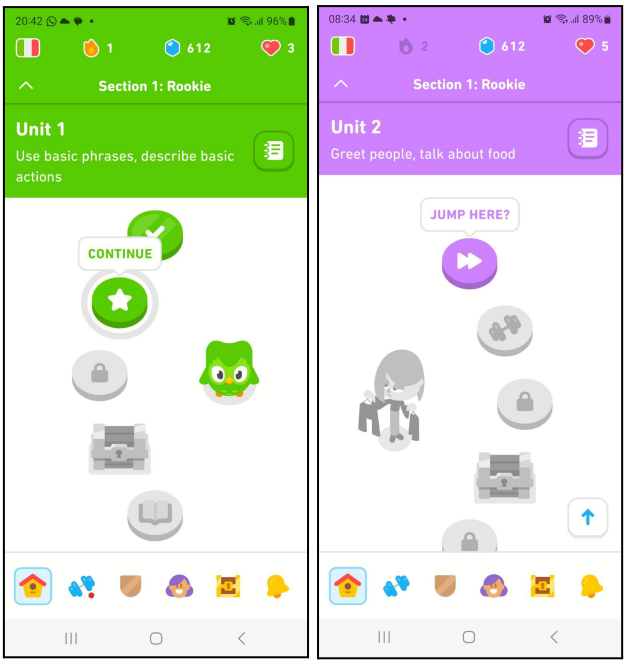


Figure 8: 'Homescreen - Section 1 Rookie, Unit 2'. Screenshot from *Duolingo* (2023).

In the *Duolingo* (2023) application, the principle of discoverability is effectively boosted through the strategic use of UIA, as users navigate through the available language courses on the home screen (Figure 6). The placement of the course tiles and the direction of the movement of Duo (the Duolingo owl) hint that the course journey continues to different sections and units. By scrolling down the user can confirm that the context has changed from section 1 unit 1 to unit 2 (Figure 8), as the colours are animated from green to purple. Animating the unit change shows that this is still the same content displayed in a different way (Head 2016:99). According to Head (2016:99), users can observe the state change without having to maintain the connection themselves, thus it is simpler to follow because it is presented to the user visually.

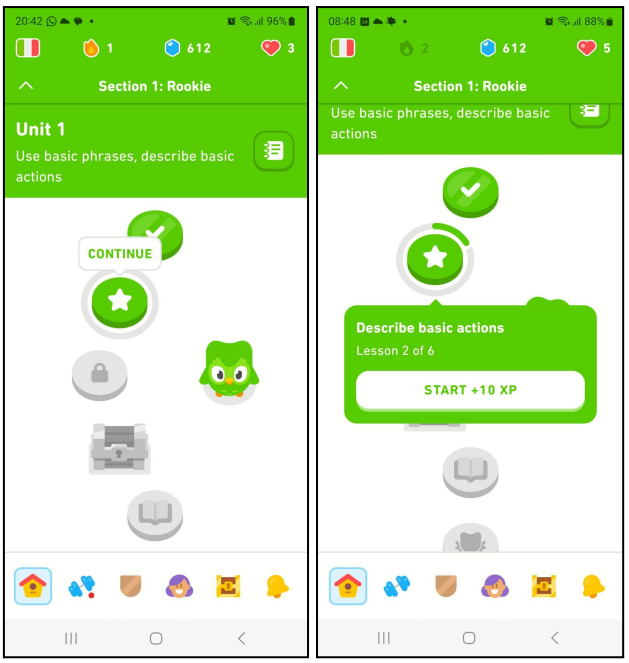


Figure 9: 'Homescreen - Section 1 Rookie, Unit 2'. Screenshot from *Duolingo* (2023).

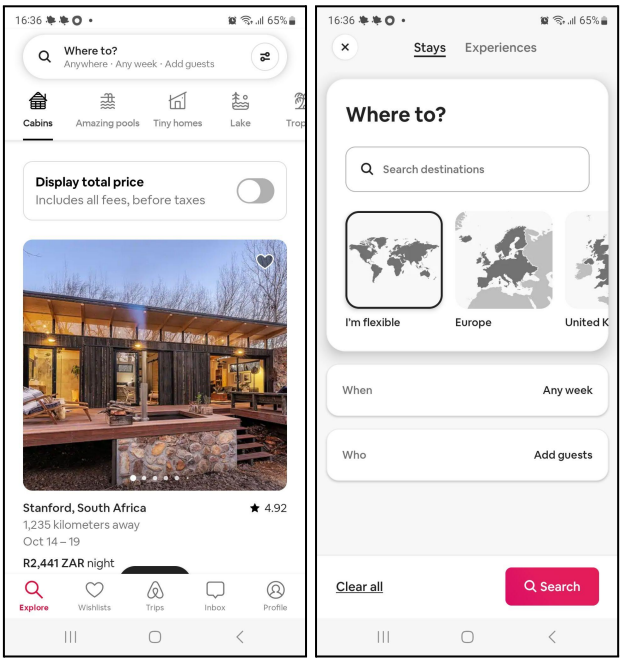


Figure 10: 'Homescreen & Search Bar'. Screenshot from *Airbnb* (2023).

Another way UIA adds to discoverability is how the animation (Figure 9) in *Duolingo* (2023) draws the user's attention to the interactive nature of the tiles, intuitively conveying that they can click to access the course content. Upon clicking the button, a brief overview of what the user can expect in the lessons is given. Changing the

context and providing more information can make it easier for users to understand the content they are looking at (Head 2016:98).

The *Airbnb* (2023) application demonstrates discoverability similarly but with the use of transitions between layers and bringing off-screen elements into view to help reinforce the spatial relationships of the interface for users (Head 2016:84). On the home screen (Figure 10) of the *Airbnb* (2023) application, at the top of the screen is a search bar where the user can search for accommodation. When the user clicks on the search field, an animated transition is applied, leading to the gradual appearance of information sections like “Where to”, "When," and “Who” (*Airbnb* 2023). Transitions are good for user-initiated interactions by giving the UI a quick, responsive feel and guiding the user to information that they can interact with and visualise what is expected of them (Nabors 2017:31-37). By employing the aforementioned animation, *Duolingo* (2023) and *Airbnb* (2023) enhance the discoverability of available courses, making it more inviting for users to explore and engage with the lessons.

3.3.3 Affordance

Head (2016:126) explains affordance as the idea of using an object's features to show how it works and what it can be used for. In other words, it is how visual cues denote an object's functioning or potential functioning. Animation can be used similarly to show how something works on an interface, especially when the affordances and functionalities include gestures (Head 2016:126). UIA can accentuate affordances by animating interactive elements, and this is where the principles of affordance and discoverability are closely interconnected, as exemplified in Figure 6 of the Duolingo (2023) application. In *Duolingo* (2023) discoverability is shown with the course tiles with the title “Start” or “Continue” for the button, with a gentle up-and-down motion indicating where the users are in their language lesson. The bouncy gesture of the title hints at the affordance that the button can be pressed to “Start” or “Continue” their language journey. Affordance

hints can be very subtle; the simple up and down motion is enough to hint and encourage the user to click on the button to start their lesson (Head 2016:126-127). When the user clicks on the “Start” or “Continue” button, animations signify that it's an actionable element, supporting the principle of clear affordance and linking back to discoverability when the information about the lesson is displayed. This example illustrates how UIA can elevate the principle of affordance by utilising animations that accentuate interactive elements.

3.3.4 Feedback

Feedback entails sending back information about what action the user has taken and what they have achieved, thereby allowing the user to continue with the activity (Norman 2013:43). Head (2016:146) builds on Norman's argument by stating that when something is going on behind the scenes, it's critical to demonstrate that something is going on or has happened, even if the input indicates that something went wrong. She (Head 2016:146) continues to say that good feedback maintains the "conversation between the interface and the user" during these inevitable waiting periods.

One of the reasons why animation can be useful for providing feedback is its ability to capture the user's interest (Head 2016:146). Head (2016:146) further explains that incorporating animation into the feedback system of a designer's interface can improve the user's timeliness and effectiveness.

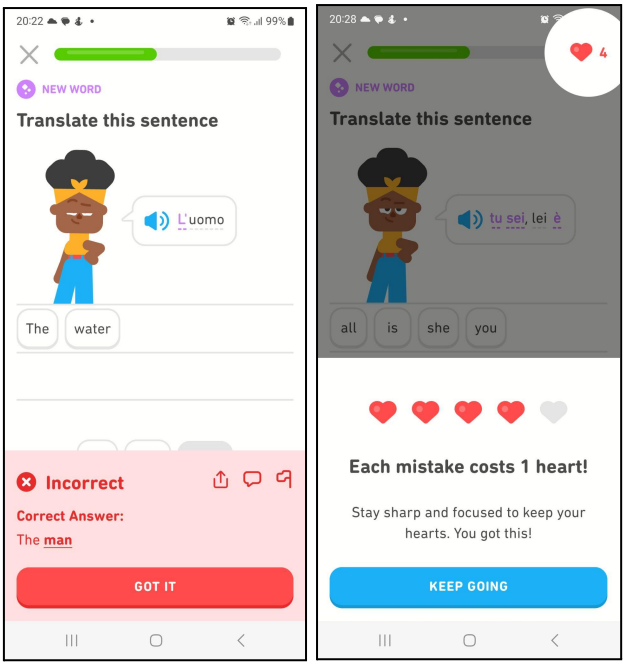


Figure 11: 'Incorrect Answer'. Screenshot from *Duolingo* (2023).

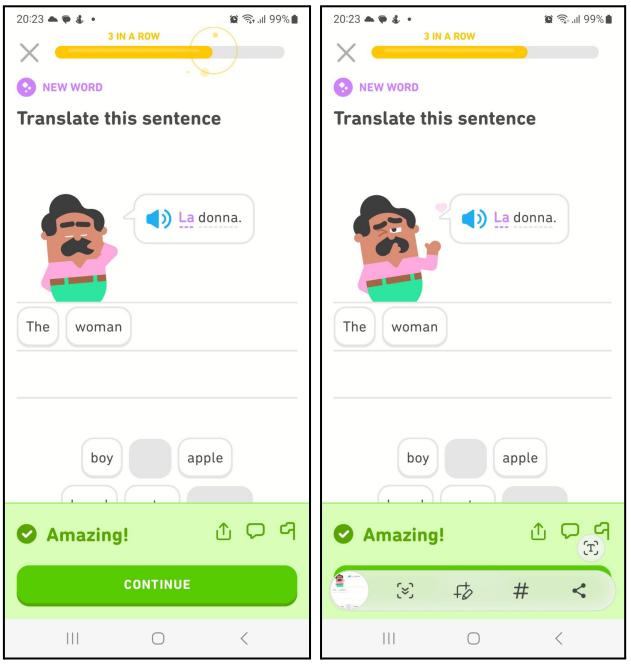


Figure 12: 'Correct Answer'. Screenshot from *Duolingo* (2023).

Examining error and success messages is a great way to evaluate UIA's feedback capabilities. Using animation to create error and success messages can help them stand out more clearly (Head 2016:147), as *Duolingo's* (2023) UIA offers immediate feedback to users as they engage with language exercises. When the user is

completing a language exercise and answers an incorrect task, a big pop-up in red will appear, and the character's attitude will change to being sad or disgusted (*Duolingo* 2023). According to Head (2016:147), responding to an error creates feedback that the user will not miss. When users select incorrect (Figure 11) and correct (Figure 12) answers or complete tasks, the animations provide visual cues such as the character's expressions and green and red popups showcasing the correct or incorrect answer, aligning with the principle of providing clear feedback.

3.3.5 Mapping

According to Norman (2013:41-42), mapping is the relationship between controls, actions, and their real-world outcomes. It's about how users perceive how their interactions with a system or object lead to specific results (Norman 2013:41-42). The principle of mapping can be enhanced through UIA by looking at visual continuity proposed by Head (2016:116). Head (2016:116) defines visual continuity as letting an element stay the same during a state change or when animation is applied. Visual continuity makes transitions easier to understand for users because each element stays the same even throughout the animation (Head 2016:116).

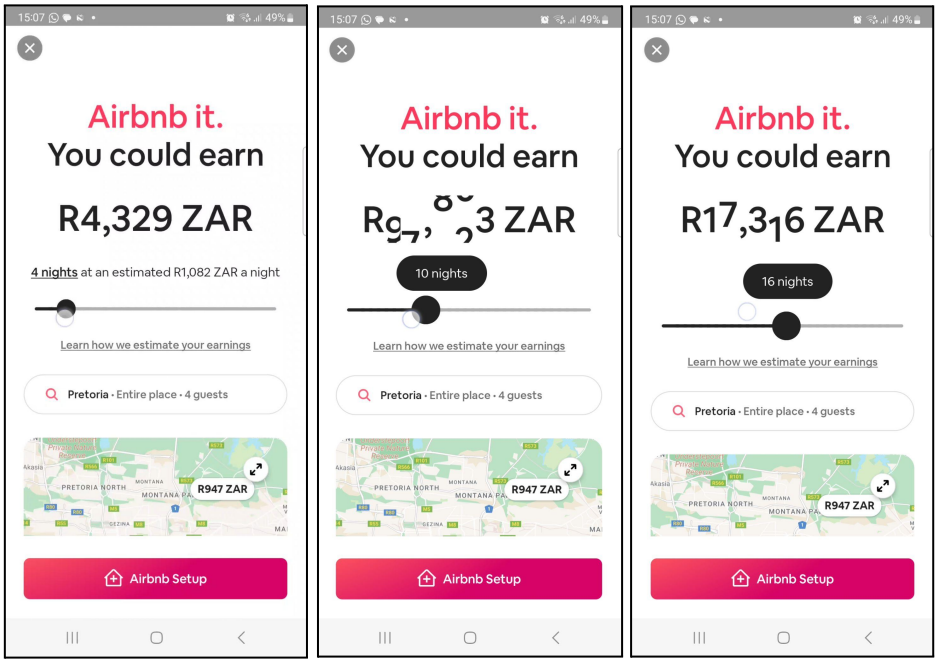


Figure 13: ‘Airbnb it’. Screenshot from *Airbnb* (2023).

Airbnb (2023) serves as a great example for illustrating how UIA enhances the principle of mapping by clearly connecting user actions to immediate and understandable system responses. When a user is considering renting out a property as an *Airbnb,* a price indicator is shown with the price that can be expected per night on the *Airbnb* (2023) application. As shown in Figure 13, the total amount animates and changes like slot cards as the user drags the slider bar from left to right, and the amount of nights pops up above the slider (Airbnb 2023). This example demonstrates a direct, understandable connection between the user's action and the system's response (Head 2016:116). The concept of visual continuity helps enhance the principle of mapping by emphasising the importance of maintaining consistency and clarity in the relationship between controls, actions, and outcomes during transitions (Head 2016:116). The example from *Airbnb* (2023) demonstrates that UIA through visual continuity effectively, amplifies the principle of mapping in user interface design.

3.4 Conclusion

In conclusion, this chapter sheds light on the critical role of UIA in amplifying core interaction principles within digital interfaces. Through analysing the Duolingo (2023) and Airbnb (2023) applications as the case studies, it has become apparent that UIA is a potent tool for enhancing user experiences by strategically addressing principles such as visibility, discoverability, affordance, feedback, and mapping.

Furthermore, the analyses of Duolingo (2023) and Airbnb (2023) have underscored the diverse ways in which UIA can be harnessed to optimise user interactions and overall usability. By drawing users' attention to features, making them easier to find, emphasising affordances, giving timely feedback, and strengthening the connection between controls and outcomes, UIA becomes an important tool for designers. This chapter's findings emphasise the need for a nuanced and strategic approach to UIA,

where its application aligns seamlessly with the fundamental principles of user interface design.

CHAPTER FOUR: UNVEILING UI ANIMATION'S BEST PRACTICES

4.1 Introduction

As digital interfaces continue to shape our world and UIA becomes more prevalent, it is imperative that designers understand its use and functionality to avoid confusion. The *UI Animate Guide* emerges as a transformative resource, dedicated to shedding light on the potential of UIA. This chapter explores the essence of the *UI Animate Guide*, its fundamental goals, objectives, and its overarching mission to redefine the user interface design experience. Chapter Four delves into the design and development process, providing insights into the motivation behind the toolkit and its vision to simplify the incorporation of UIA as a means to amplify interaction principles. The chapter is structured to present the creation and purpose of the *UI Animate Guide*, followed by the research and execution phases, ultimately concluding with a reflection on the guide's potential to reshape the way users interact with digital interfaces. Additionally, the methodologies employed in the research process are introduced, namely the user testing of two distinct self-generated applications, *Money Matters* financial application and *Easy Med* booking system application to evaluate the impact of UIA on interaction principles and usability. This chapter serves as an introduction to the transformative potential of UIA and how it can elevate digital user interfaces.

4.2 UI Animate Guide

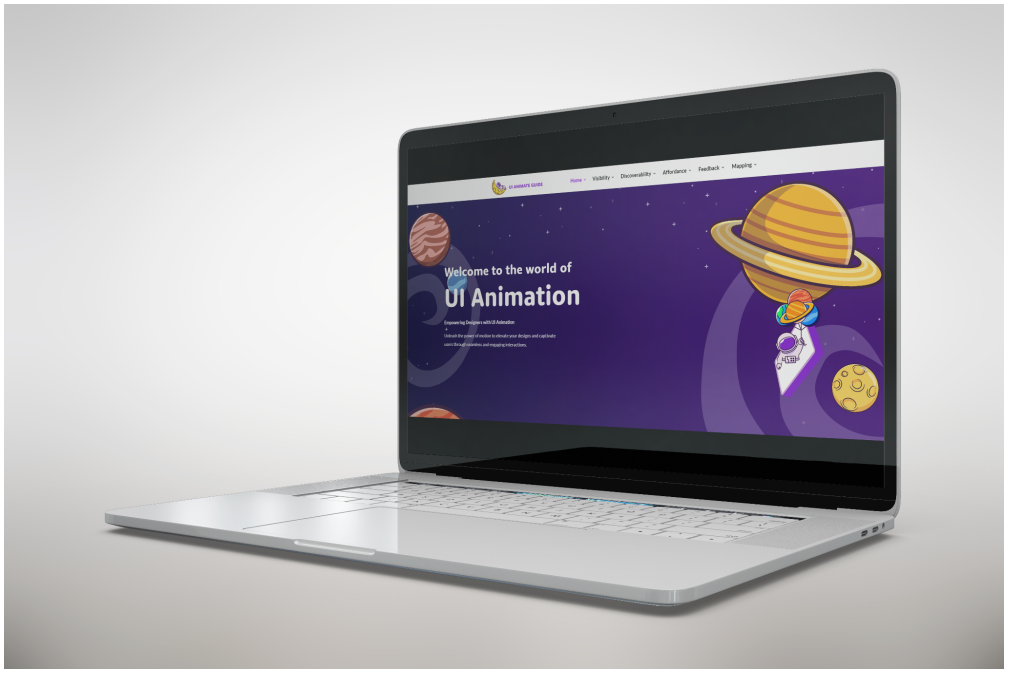


Figure 14: Ivana De Vittorio, UI Animate Guide, 2023. Digital Mockup. Artwork in possession of artist.

In designing the *UI Animate Guide* (Figure 14), my primary aim is to create a valuable resource tailored to the needs of designers seeking to enhance the usability of their digital interfaces. This toolkit serves as a guide for UI designers, facilitating the incorporation of UIA as a means to amplify the interaction principles that underpin effective user interface design. It provides a clear path and a set of practical instructions to help designers harness the full potential of UIA to elevate user experiences and ensure that digital interfaces are intuitive and engaging.

The main goal of the *UI Animate Guide* is to collect information about the many ways that UIA can be used strategically to improve interaction principles. To achieve this, user testing was conducted, involving the evaluation of applications such as the *Money Matters* financial application and the *Easy Med* medical appointment booking application with embedded UIA. The user testing phase aimed to explore how UIA could potentially enhance processes and potentially elevate interaction principles.

Subsequently, the animations that proved successful in improving the user experience were carefully selected and included in the *UI Animate Guide* as

illustrative examples. These examples serve as a practical guide for UI designers, demonstrating how they can incorporate these UIAs into their designs, thereby elevating the overall quality and effectiveness of digital interfaces.

The name "UI Animate Guide" is chosen for its clarity and precision. It succinctly communicates the toolkit's core focus on UIA while implying its role as an educational resource. This choice aligns with the toolkit's purpose of guiding UI designers in incorporating animation effectively, enhancing the interaction principles and overall usability of digital interfaces.

The visual identity of the *UI Animate Guide* is characterised by a space-themed stylisation, selected firstly to create a fun and inviting atmosphere, aiming to encourage UI designers to actively engage with the resource. By infusing an element of enjoyment into the learning experience, the UIA toolkit seeks to make the journey both informative and pleasurable. Secondly, the space theme aligns perfectly with the spirit of UI design and animation, symbolising the idea of *exploring the unknown*. In the realm of UI design, where designers constantly push boundaries to enhance user experiences, this theme serves as an inspirational backdrop. It metaphorically transports UI designers into a new world of animation, emphasising the guide's academic and practical significance in ushering designers into an immersive realm of limitless possibilities for UIA and interaction design principles.

An important milestone in the project's development was achieved with the thorough collection of information, illustrative examples, and development of the chosen visual style. This means that all of the resources and ideas, unify the academic goal of exploring interaction principle enhancement through interactive UIA and establishing comprehensive theoretical foundations for UIA principles and best practises. It also fits with the practical goal of making the easy-to-use *UI Animate Guide*, a helpful set of guidelines, animated examples, and pre-made animations in Figma files that will make it easier for UI designers to incorporate UIA into their digital interface designs.

4.3 UI Animate Guide Process: Research Phase

4.3.1 Identifying Interaction Principles

Before doing user testing in both the *Money Matters* and *Easy Med* applications, it was possible to find ways of interacting that could be made better with UIA. This pre-identification involved analysing the applications' design, focusing on principles like visibility, discoverability, affordance, feedback, and mapping. For instance, in *Money Matters*, a lack of visual feedback during account transactions and discoverability issues related to certain features were evident. Similarly, in *Easy Med*, the booking process required improvements in visibility and feedback to guide users through consultation options. This initial analysis laid the foundation for strategically implementing UIA to address these identified issues and enhance the overall user experience in both applications.

4.3.2 Money Matter Application & User Testing

Figure 15: Ivana De Vittorio, *Money Matters application*, 2023. Digital Mockup. Artwork in possession of artist.

I created a financial banking application called *Money Matters* to do user testing with different UIA. The rationale behind my decision to conduct testing on a financial

banking application is that it is a good foundation to explore and showcase the effectiveness of UIA in amplifying interaction principles. By integrating UIA thoughtfully, designers can simplify interactions, provide visual feedback, enhance onboarding, and create engaging experiences. Overall, the financial banking application demonstrates how UIA can elevate interaction principles, resulting in a user-friendly and visually appealing interface.

I designed the *Money Matters* application based on the existing *FNB* mobile application. The reason why I chose to rebrand the *FNB* application to the *Money Matters* application is that I am not testing the design but rather the animations within the design. In short, the design layout and flow are not my focus. The focus is on how UIA can be incorporated. Looking at different banking apps, I identified *FNB* with its simple UI and the potential to add UIA. Rebranding allows users to approach the application with a fresh perspective, free from any preconceived notions or biases they might have about the original design. This helps gather more objective feedback on the application's usability and user experience. User testing of the *Money Matters* application allows me to address pain points that animation can help solve.

For the user testing phase of this research, a total of six participants were selected to provide valuable insights into the impact of UIA on digital interfaces. The recruitment process began by advertising the opportunity within community groups such as *Facebook* and *WhatsApp* groups that I am a part of, targeting individuals who expressed an interest in participating in user testing sessions. Subsequently, interested candidates were requested to complete a *Google Forms* User Screener questionnaire (Appendix A), which served a dual purpose. Firstly, the questionnaire aimed to determine the suitability of the participants for the study, ensuring that they met the necessary and ethical criteria of being over 18 and having an *FNB* bank account. Secondly, the screening questionnaire also sought to obtain informed consent from the participants, outlining the purpose and scope of the user testing sessions and their voluntary participation. In addition to gauging the participants' suitability and consent, the questionnaire also assessed their familiarity with banking

applications and online banking, helping to ensure that the participants had relevant experience and insights to contribute to the user testing process. The selection process was meant to get feedback from the participants, which would give an idea of how well UIA works at improving the way people interact with digital banking apps.

Before starting the user testing process, two versions, namely a non-animated and an animated version of the *Money Matters* application, were designed and prototyped, and a full user script (Appendix B) was created. The primary reason for having two versions (animated and non-animated) of the *Money Matters* application in the user tests was to assess and compare the impact of UIA on the user experience. This approach allows me to determine whether the inclusion of animations is beneficial and to what extent they can improve interaction principles and the overall usability of the application. By having both versions, I can provide an evaluation of the potential benefits and best practises of UIA.

The participants were given access to the two versions of the *Money Matters* mobile application, an animated and non-animated version, along with a full explanation of the tasks they were supposed to do while using this interface. After the participants finished their tasks, they were asked a series of questions (Appendix B) designed to determine what they thought about the interface and how they felt about using the animated and non-animated versions of the *Money Matters* application. After the testing process, the participants were asked post-test questions to find out how they felt about their experiences overall. After the post-test questions, there was a debriefing session where any extra information or user comments were carefully collected and examined.

Before proceeding to present the user testing findings, it is essential to emphasise a potential issue that emerged. Throughout the user testing phase, it became evident that while valuable insights and feedback were obtained, the testing scope for the *Money Matters* application proved to be limited. *Money Matters* excessively simplistic and straightforward design left insufficient space for the incorporation of UIA that could maximise user benefits. Nevertheless, it is essential to note that the user

testing process, despite its constraints, yielded valuable outcomes. This is why I decided to test the *Easy Med* medical booking application as well.

4.3.3 Easy Med Application and User Testing

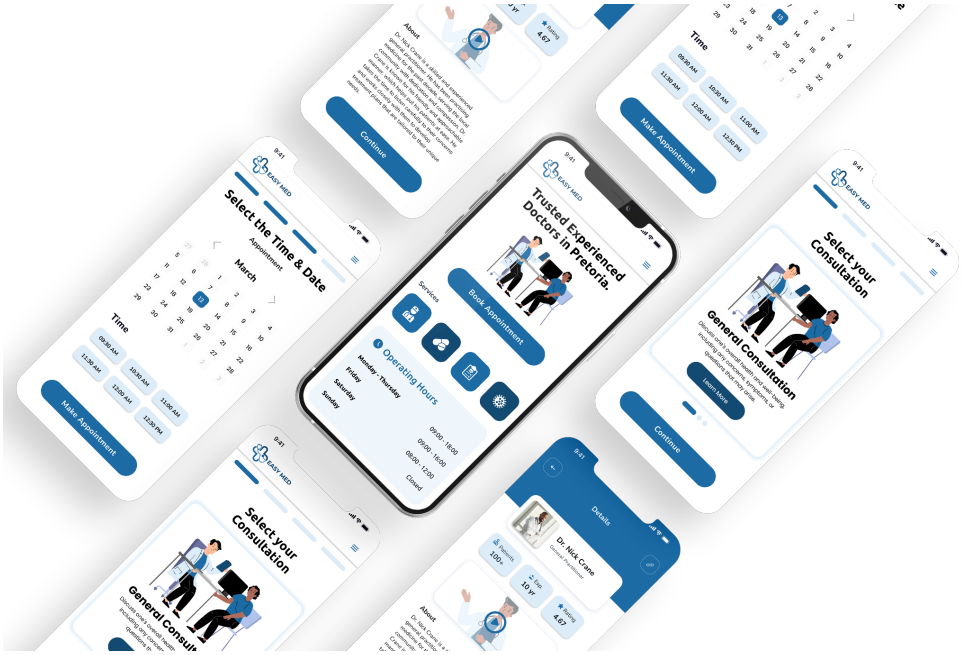


Figure 16: Ivana De Vittorio, *Easy Med application,* 2023. Digital Mockup. Artwork in possession of the artist.

I designed the *Easy Med* application, incorporating UIA to make it easier for participants to understand complex concepts and help them through the consultation booking system. Testing a consultation booking application like *Easy Med* is a good choice for user testing and UIA evaluation because it involves a crucial and often complex user task and scheduling a doctor's appointment. This process typically requires clear, intuitive navigation and the effective presentation of information, making it an ideal context to assess how UIA can enhance the user experience by simplifying interactions, reducing errors, and improving task completion rates. Additionally, this choice allows for a practical and relatable scenario where UIA can potentially have a significant impact on user satisfaction and task efficiency. The user testing of the *Easy Med* application followed a similar user testing script (Appendix

C) with a pre-questionnaire, questions during the process and debrief questions. The tasks were primarily focused on the participant booking a consultation with a doctor.

4.3.4 Findings: Successful UI Animation Amplifying Interaction Principles

The findings from the user testing of UIA in the *Easy Med* and *Money Matters* applications have revealed a series of significant improvements in the amplification of interaction principles. These findings encompass enhanced (1) visibility, (2) discoverability, (3) affordance, (4) feedback, and (5) mapping, culminating in a more enjoyable user experience, improved task efficiency, and reduced errors, ultimately contributing to higher user satisfaction. Because of the study's limited space, only one example of each interaction principle from user testing findings will be shown to demonstrate how UIA enhanced the principles. The rest of the user testing findings can be found in Appendices B and C.

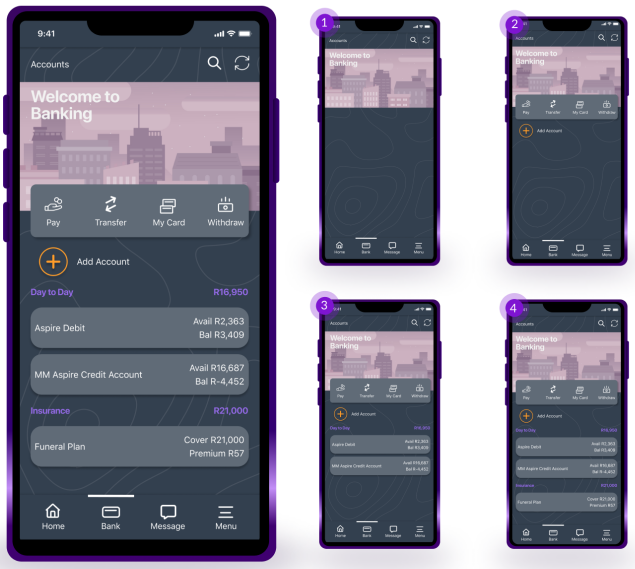


Figure 17: Ivana De Vittorio, *Money Matters_Account History*, 2023. Digital Design. Artwork in possession of artist.

UIA is used to make the "Account History" section of the *Money Matters* app more visible by using fade-ins and sliding motions to reveal hidden content gradually

(Figure 17). This makes sure that participants are aware of new information without being too overwhelmed. The participants expressed that the slide-in motions of the elements displayed on the screen made the information more digestible.

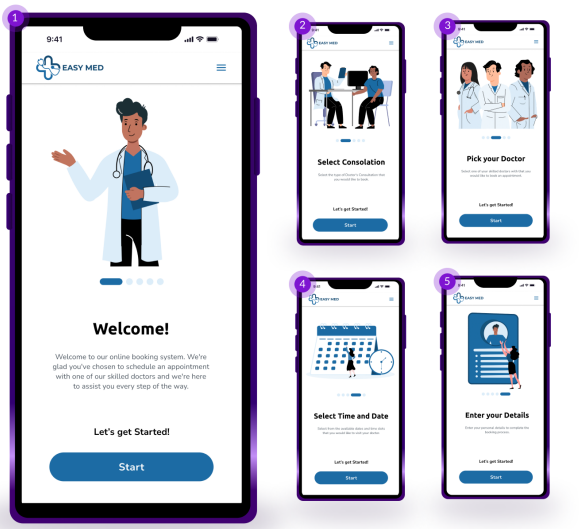


Figure 18: Ivana De Vittorio, *Easy Med_Onboarding*, 2023. Digital Design. Artwork in possession of artist.

When the participants entered the *Easy Med* application for the first time they were met with an onboarding screen (Figure 18) showcasing what they could do in the application, like selecting a consultation, doctor, time and date. Discoverability was enhanced by using animation during onboarding, which introduced the participants to core interactions, making it easier for them to engage with the interface. Participant 1 expressed their appreciation, stating, “The onboarding screen really helped me understand what I needed to do to book a doctor's appointment.” This direct feedback highlights the practical significance of UIA in improving user interactions.

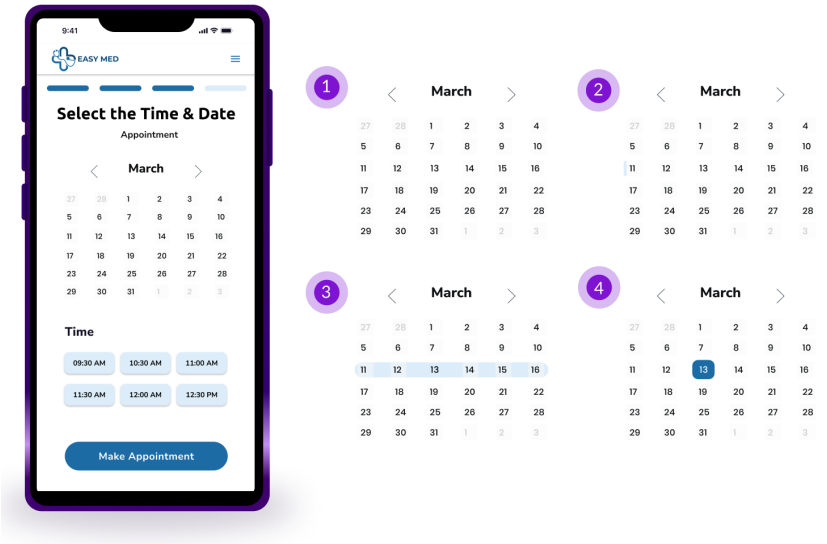


Figure 19: Ivana De Vittorio, *Easy Med_Select date & time*, 2023. Digital Mockup. Artwork in possession of artist.

In the *Easy Med* application, where the participant should select a time and date for their doctor's appointment (Figure 19), the principle of affordance is enhanced through animated interface elements showing the possible outcomes of the participants' interactions, clarifying the affordance associated with those actions. To accomplish this, the participant must highlight the week on the calendar that they should choose to schedule their doctor's appointment. The animation gave the participants a sense of clarity and gave them the impression that they could book their appointment for the following week.

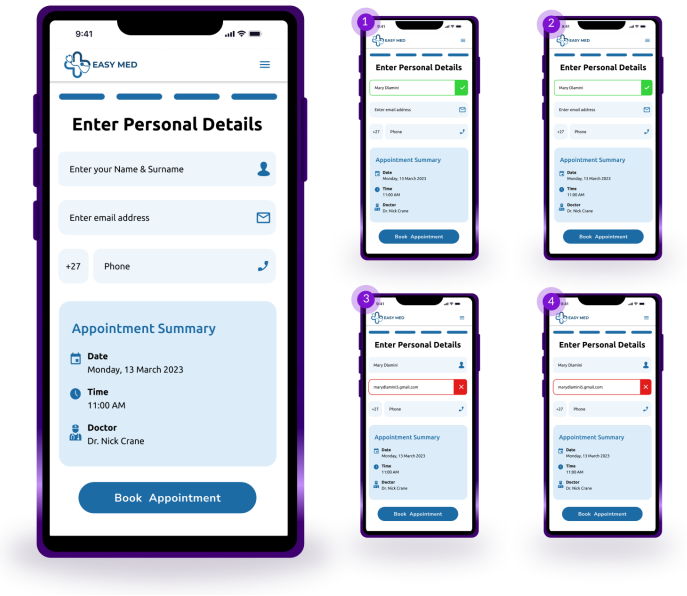


Figure 20: Ivana De Vittorio, *Easy Med_Enter Personal Details*, 2023. Digital Mockup. Artwork in possession of artist.

The principle of feedback in the *Easy Med* application was enhanced on the "Enter Personal Details" page (Figure 20) through real-time form input validation using animations. One participant noted, "It made the process less frustrating, ensuring that all my information is correct". As participants entered their information into the form fields, UIA provided immediate feedback by altering the field outline to green for valid entries and red for invalid ones. Additionally, a subtle bounce effect drew attention to the field, while the accompanying icon, such as the user, email, or phone icon, transformed into a checkmark or a cross mark to signify the validity of the entered information.

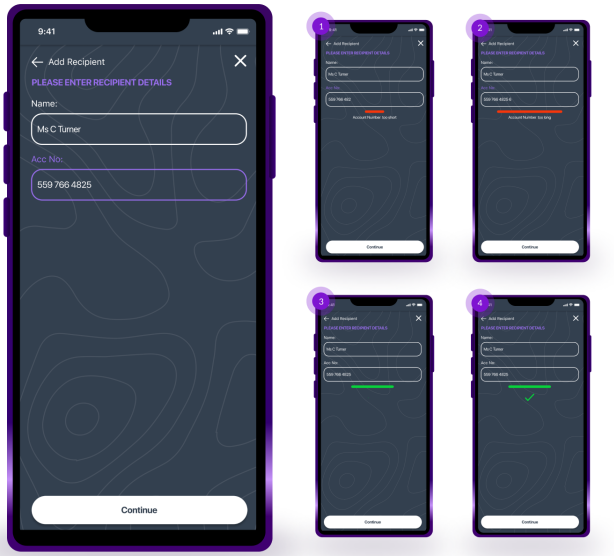


Figure 21: Ivana De Vittorio, *Money Matters_Add Recipient*, 2023. Digital Mockup. Artwork in possession of artist.

In the *Money Matters* application (Figure 21), when a participant adds a beneficiary and enters the beneficiary's account number, mapping is effectively enhanced through UIA. As the user inputs an account number, real-time animations display a line in red if the number is either too short or too long. Participant 3 stated the account number length animation was insightful: "It helped me avoid double-checking my input and made the process less stressful and more user-friendly". This dynamic response indicates the length of the account number, bridging the gap between user input and feedback and facilitating quicker comprehension. This shows the mapping between the account number length and the feedback provided to the participant.

Overall, these findings demonstrate that incorporating UIA made the interface more pleasurable to use. From the data collected in Appendices B and C, my research findings indicate that 5 out of 6 participants reported a positive emotional response to animations. It contributed to a better user experience and led to a more favourable perception of the interfaces. The process of using the applications felt faster, and the enhanced retention led to higher user satisfaction. Users expend less mental effort, making it easier for them to focus on their primary tasks and goals. The animations

helped the users avoid errors, and fewer errors contributed to a more frustration-free experience. More information and successful animation can be found in Appendices B and C.

4.4 UI Animate Guide Process: Planning Phase

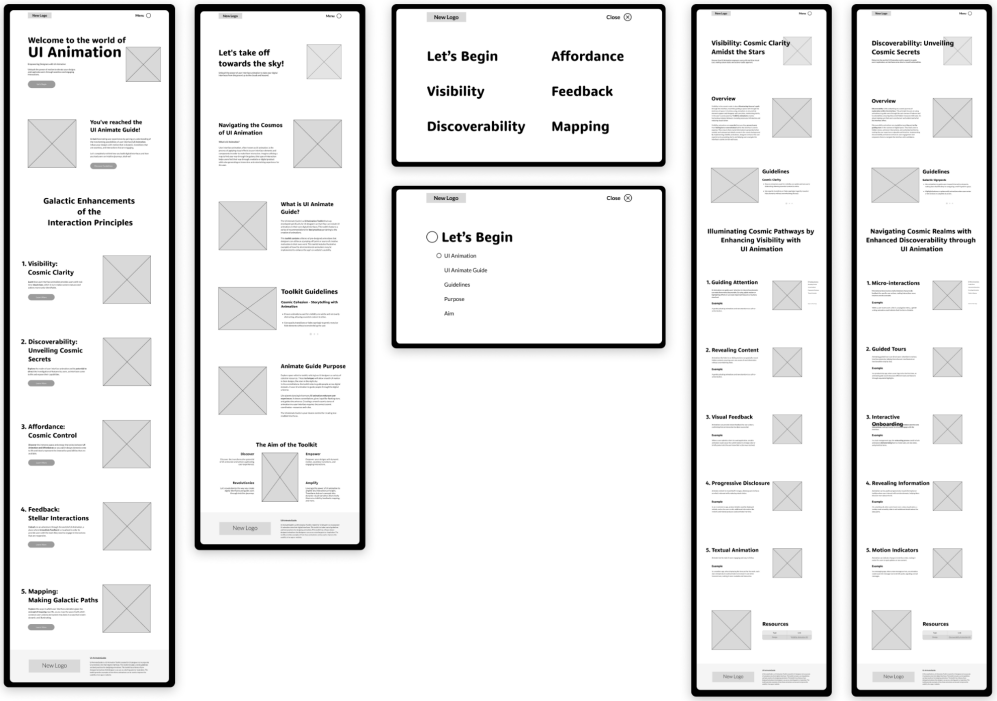


Figure 22: Ivana De Vittorio, *UI Animate Guide_High-fidelity wireframes*, 2023. Digital Design. Artwork in possession of artist.

In the planning phase, I developed high-fidelity wireframes (Figure 22) for the *UI Animate Guide* to explore the link between UIA and core interaction design principles. The guide is divided into sections, each put together to show the impact of UIA on interaction principles, fostering a more intuitive and engaging digital user experience.

The guide's organisational framework includes a home page introducing its purpose and goals. Secondly, it delves into sections dedicated to the core principles of visibility, discoverability, affordance, feedback, and mapping. Within each principle, a multifaceted approach is undertaken, commencing with an overview that sets the

academic context. This is followed by guidelines for enhancing the respective principle through UIA. Furthermore, each section elucidates the specific strategies, such as guiding attention and revealing content under visibility or employing micro-interactions and guided tours under discoverability.

4.5 UI Animate Guide Process: Execution Phase

The execution phase of the *UI Animate Guide* is designed to provide a seamless and informative user experience, catering to the overarching space-themed stylization. This phase encompasses six main pages, which include the homepage and principle-specific pages focusing on visibility, discoverability, affordance, feedback, and mapping.

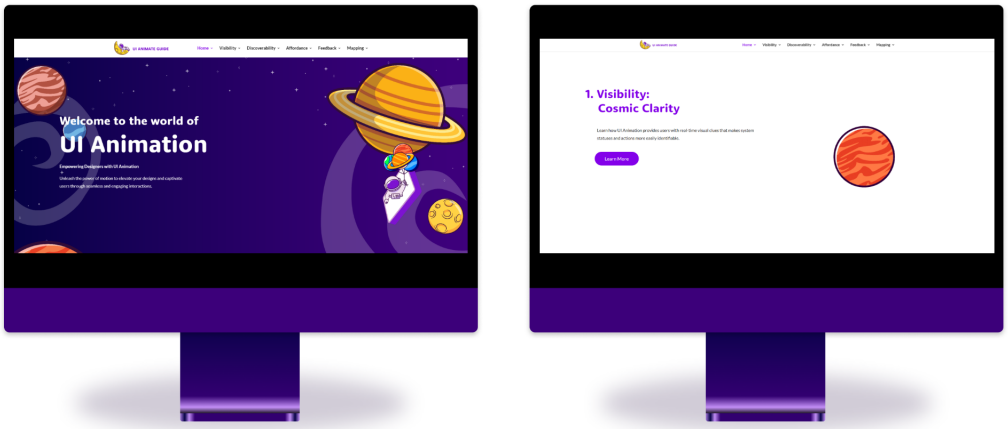


Figure 23: Ivana De Vittorio, *UI Animate Guide_Homepage*, 2023. Digital Mockup. Artwork in possession of artist.

On the homepage (Figure 23), the designers are introduced to the *UI Animate Guide*, providing a clear definition of UIA, the guide's purpose, its aim, and a set of guidelines. Brief sections on each principle are also presented and each is accompanied by a "Learn More" button, allowing designers to delve into the specific principle pages for more in-depth information.

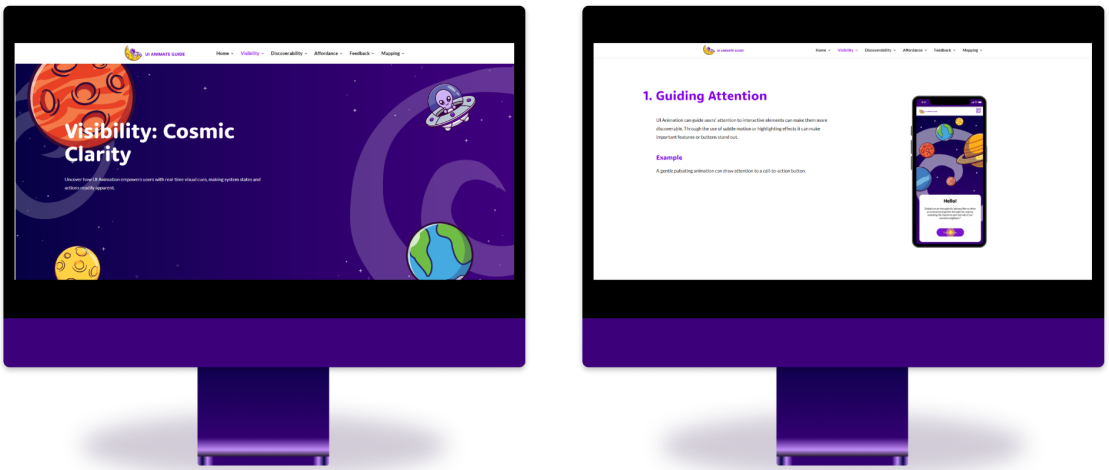


Figure 24: Ivana De Vittorio, *UI Animate Guide_Visibility page*, 2023. Digital Design. Artwork in possession of artist.

The principle-specific pages (Figure 24) follow a structured format, commencing with an overview section that sets the academic context for the principle. Following this are guidelines for the particular principle, which give designers precise instructions to follow when incorporating UIA. The highlight of these pages is the animated example section, where each principle is elucidated with an animated example description.

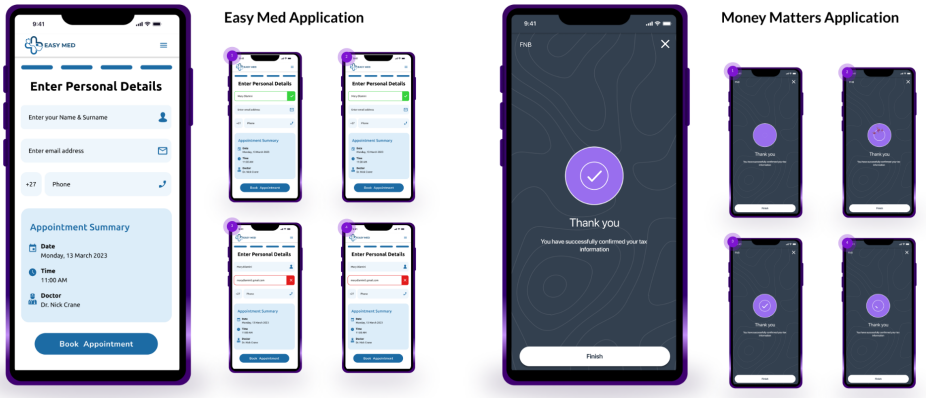


Figure 25: Ivana De Vittorio, *Easy Med & Money Matters Applications_Examples*, 2023. Digital Design. Artwork in possession of artist.

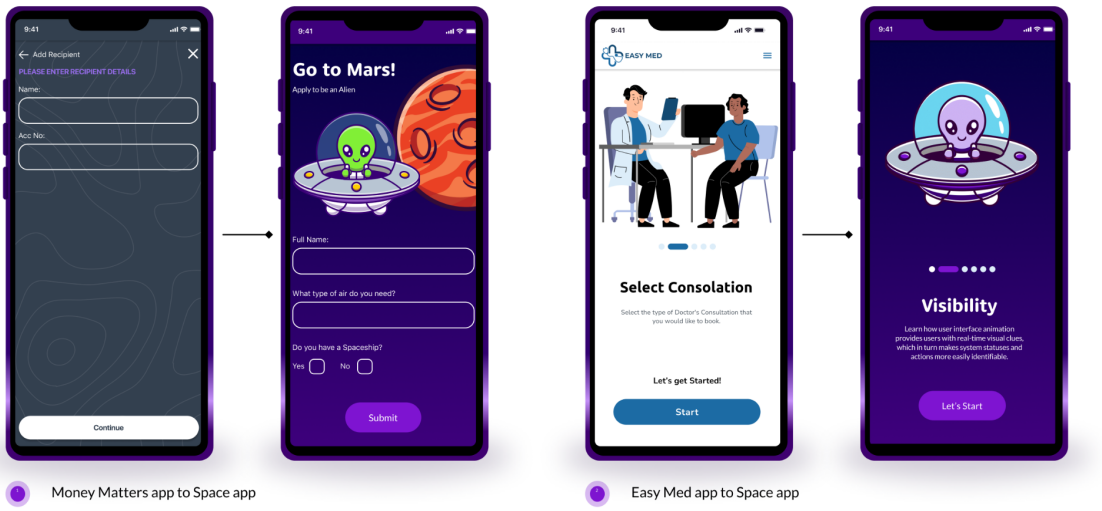


Figure 26: Ivana De Vittorio, *Change from Money Matters and Easy Med application to the Space application*, 2023. Digital Design. Artwork in possession of artist.

The approach to designing the animated examples for the *UI Animate Guide* involved a thoughtful evolution of the original concept: The initial idea centred around utilising the successful animations from the *Money Matters* and *Easy Med* applications (Figure 25) as examples within the guide. However, as the space-themed stylization of the toolkit took shape, it became clear that the existing animations needed an update to seamlessly integrate with the guide's theme and provide an immersive user experience. By reimagining and enhancing these animations, the *UI Animate Guide* can now offer a more cohesive and intuitive user journey. Choosing to make a space-themed app (Figure 26) to hold these updated animations makes sure that they fit in well with the look of the guide, avoiding any visual problems and letting designers focus on the educational content fully. Designers can gain an understanding of how UIA enhances the principle, accompanied by an illustrative GIF showcasing how this animation is applied to a digital interface. This approach not only educates designers but also enables them to visualise how these principles are transformed through UIA.

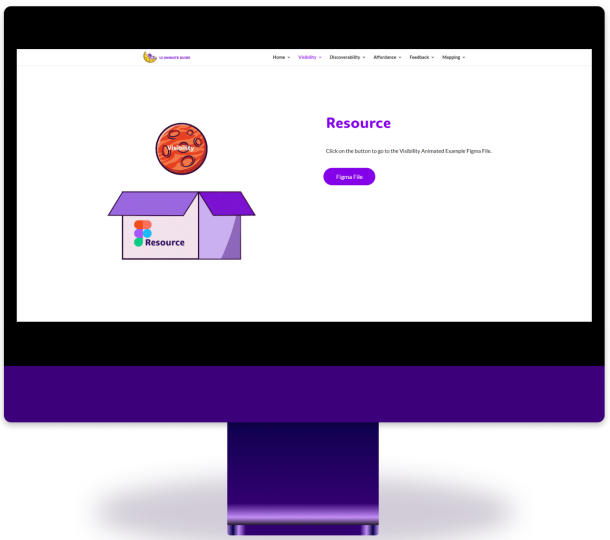


Figure 27: Ivana De Vittorio, *UI Animate Guide_Visibility page - Resources*, 2023. Digital Design. Artwork in possession of artist.

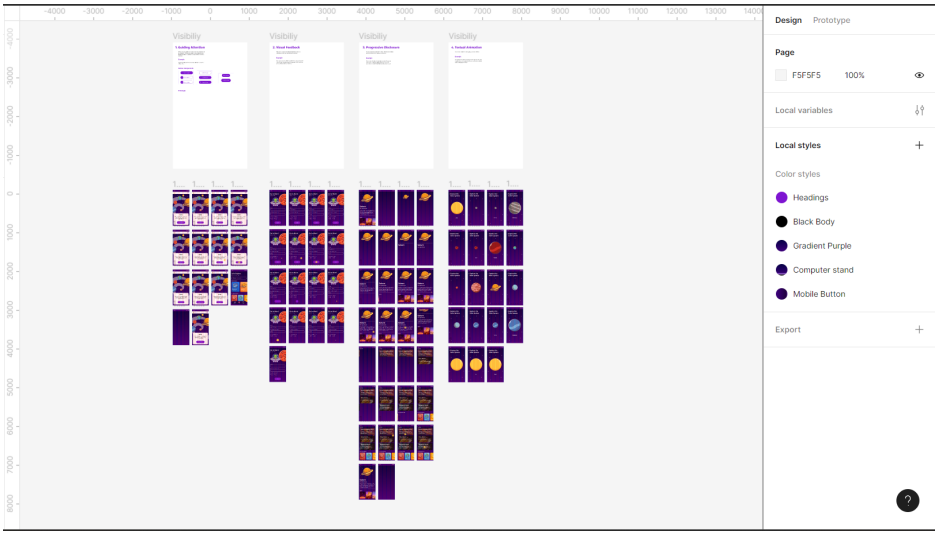


Figure 28: Ivana De Vittorio, *UI Animate Guide_Visibility Resources*, 2023. Screenshot. Artwork in possession of artist.

In addition, each principle page includes a Figma resource, as seen in Figure 27. By tapping on the "Figma File" button, designers are led to a specific principle's Figma file. Referring to Figure 28, the visibility figma file, the designer can explore and dissect the animated elements used as a reference, offering a practical tool for UI designers to apply UIA effectively to improve interaction design principles. This

approach ensures that the *UI Animate Guide* is a comprehensive and user-centric resource, empowering designers to create captivating and user-centric digital interfaces.

4.6 Conclusion

In conclusion, the *UI Animate Guide* is more than just a guide; it is a step into the possibilities of UIA, a transformative resource that empowers designers and developers to create interfaces that are not only functional but also captivating and user-centric. It is an invitation to explore, learn, and create, with the potential to reshape the way we interact with technology.

CHAPTER 5: RESEARCH PROCESS & FINAL CONCLUSIONS

5.1 Research Overview

This research paper explores the transformative potential of UIA in enhancing interaction principles. Chapter 5 summarises the significant points presented in Chapters 1 through 4, provides the final research outcome, suggests avenues for future research, and offers a conclusive assessment of the study's findings. The research paper and practical component both centre on the aim of enhancing interaction principles through interactive User Interface Animation (UIA) and providing a valuable resource for UI designers.

The research paper delves into exploring and investigating how UIA can improve existing interaction principles, building a theoretical foundation, and examining real-world applications like *Airbnb* (2023) and *Duolingo* (2023) to identify the impact of UIA. The practical component aims to create the *UI Animate Guide*, a comprehensive toolkit designed to empower UI designers by providing guidelines, animated examples, and pre-designed animations for incorporating UIA into digital interfaces. Together, the research and practical components aim to bridge the gap between academic research and practical design, fostering a better understanding of UIA principles and their application in the digital design world.

5.2 Findings and Insights

The groundwork is laid by delineating the historical context of UIA and the contemporary importance of interaction principles in interaction design. Chapter One provides the necessary context and direction for the ensuing investigation. The main interaction principles of (1) visibility, (2) discoverability, (3) affordance, (4) feedback, and (5) mapping are examined, each principle is broken down to show the importance it is in guiding how users interact with each other and how they feel about their experiences. Chapter 2 lays the theoretical foundation for the subsequent analysis of the impact of UIA on these principles.

Duolingo (2023) and *Airbnb* (2023) are used as examples of real-world applications. These case studies show how easily UIA can be added to digital interfaces and how it can be used to improve interaction principles. By looking at these best practices, one can learn about how UIA can be applied in digital interfaces.

The *UI Animate Guide*, a live website of the toolkit is discussed. This toolkit has been carefully put together to give UI designers the knowledge and tools they need to use UIA effectively. It explains the toolkit's goals, the process that I followed, and the results of user testing. I also elaborated on how UIA affects interaction principles in digital interfaces.

5.3 Final Outcome

The completion of this research journey reveals that UIA exceeds mere aesthetics to become a potent tool for enhancing interaction principles. In the context of interaction principles, UIA acts as a catalyst by increasing visibility through guided user attention, improving discoverability through guided tours and onboarding, making affordance clear, giving useful feedback, and making mapping easier through smooth transitions.

The UI Animate Guide is an example of this outcome. It is a valuable resource that will give UI designers the knowledge and digital interface examples they need to use UIA in their designs without any problems.

5.4 Possibilities for Future Research

It is crucial to acknowledge the avenues for future research that stem from this study. There are possible directions for this research to further develop by delving into advanced animation techniques and tools that can further elevate interaction principles. The study can further explore tailoring UIA to specific user groups to enhance accessibility and inclusivity. Methodologies can be investigated to ensure

the consistency of UIA across diverse platforms and devices. The effects of UIA on user engagement, retention and conversion metrics can be analysed.

5.5 Final Conclusion

In conclusion, this research illuminates the substantial potential of UIA in the context of amplifying interaction principles. By enhancing visibility, discoverability, affordance, feedback, and mapping, UIA emerges as a key part of making the digital user experience better. The *UI Animate Guide* key part of making the digital user experience better.

As time goes on, the combination of UIA and interaction design principles promises to lead to user interfaces that are not solely functional but also captivating, user-centric, and inherently enjoyable. This research paper serves as a stepping stone into the realm of possibilities associated with UIA, a tool that is continually reshaping the contours of human interaction with technology and the digital world.

APPENDIX A: USER TESTING SCREENER

The goal and purpose of the user screener were to identify suitable participants for the subsequent user testing phase. By utilising the screener, the aim was to select individuals with varying levels of familiarity with banking applications and online banking. This screening process was crucial to ensure that participants chosen for the user testing represented a diverse range of experiences and perspectives, allowing for a more comprehensive evaluation of the impact of UIA within the context of financial banking applications, ultimately contributing to the research objectives of the project.

User Screener - Identifying FNB users

Dear Participant,
Thank you for your interest in participating in my user testing session for the *MoneyMatters* mobile banking app. The purpose of this questionnaire is to help me ensure that I select participants who meet the criteria for my user testing.

Your feedback will contribute to improving the app's user interface, functionality, and overall user experience.
Please take a few moments to answer the following questions honestly and to the best of your knowledge. Your responses will help me determine if you are a suitable candidate for the user testing study.

I assure you that all information provided will be treated with strict confidentiality and used solely for the purpose of participant selection and research analysis. Your personal information will not be shared with any third parties.

Thank you for your time and cooperation. I greatly appreciate your willingness to contribute to my study and look forward to your valuable insights.

* Indicates required question

Participants Consent
Please note that by participating you confirm that you have read and understood the information provided and that you voluntarily agree to participate in this research study. Please note that your participation is completely voluntary, and you may withdraw at any time. Your responses will be kept anonymous, confidential, and only used for research purposes.

Consent Form Link

1. Name & Surname

2. Email *

3. Contact Number

User Screening Questions

4. Are you over the age of 18? *

Mark only one oval.

- ◯ Yes
- ◯ No

5. Are you willing to participate in user testing *

Mark only one oval.

- ◯ Yes
- ◯ No

6. Are you an existing customer of FNB (First National Bank)? *

Mark only one oval.

- ◯ Yes
- ◯ Other: _____

7. How long have you been a customer of FNB? *

Mark only one oval.

- ◯ Less than a year
- ◯ 1-2 Years
- ◯ 2-4 Years
- ◯ More than 5 years

8. *Do you actively use the FNB mobile banking app?* *

Mark only one oval.

- ◯ Yes
- ◯ No

9. How frequently do you use the FNB app for your banking needs? *

Mark only one oval.

- ◯ Daily
- ◯ 1- 2 times a week
- ◯ Only on payday
- ◯ Less than once a month
- ◯ Once in a while
- ◯ Rarely
- ◯ Never

10. Do you use FNB online banking? *

Mark only one oval.

- ◯ Yes
- ◯ No

11. How often do you use online banking? *

Mark only one oval.

- ◯ Daily
- ◯ 1-2 times a week
- ◯ Less than once a month
- ◯ Only on payday
- ◯ Once in a while
- ◯ Rarely
- ◯ Never

12. Have you performed tasks such as checking account balances, making payments, or transferring funds? *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Other: _____

13. When performing the tasks mentioned above do you prefer online banking over mobile banking *

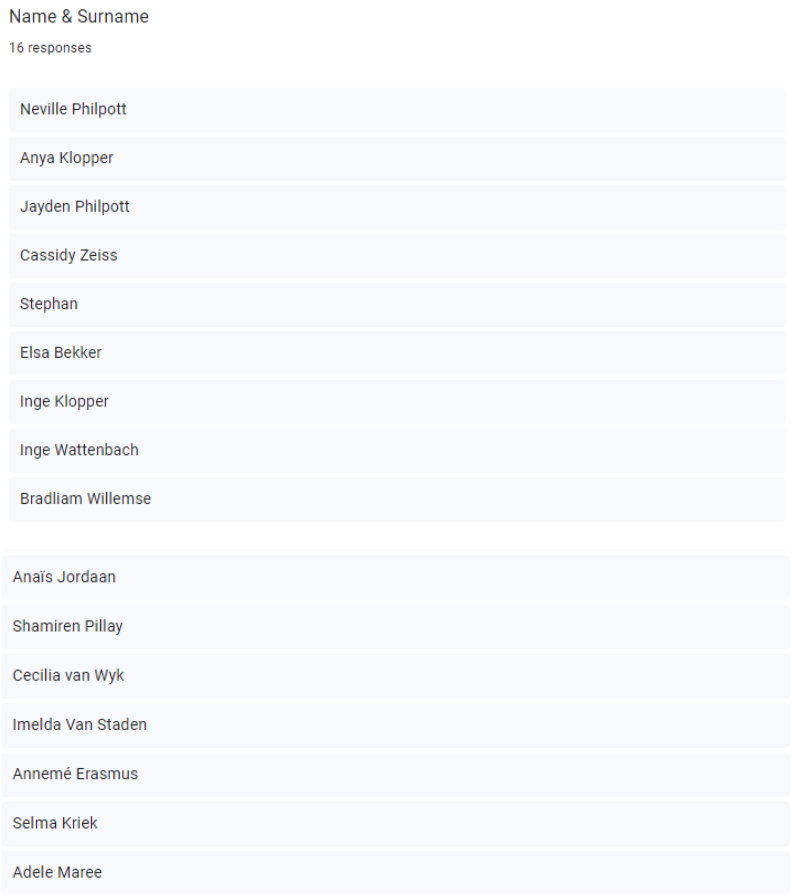
Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Unsure
- ◯ Still deciding

14. If you answered yes on the previous question, please give a short explanation.

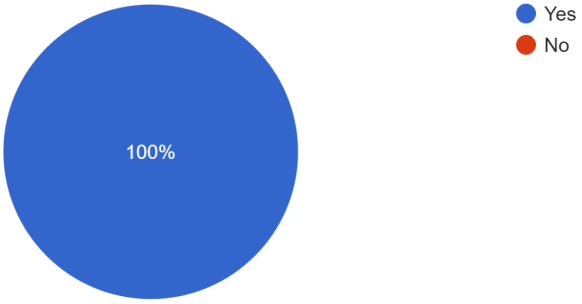
Participants Responses:

Due to privacy and consent reasons, the participants' personal information collected during the user screener will not be disclosed. This information was solely used for the purpose of maintaining communication with participants throughout the user testing process and ensuring a smooth and organised testing procedure. Protecting the privacy and confidentiality of participants is of utmost importance, and their personal information will not be shared or used for any purposes other than those directly related to the user testing activities. This approach is consistent with ethical standards and privacy regulations, demonstrating a commitment to safeguarding participants' rights and personal data.



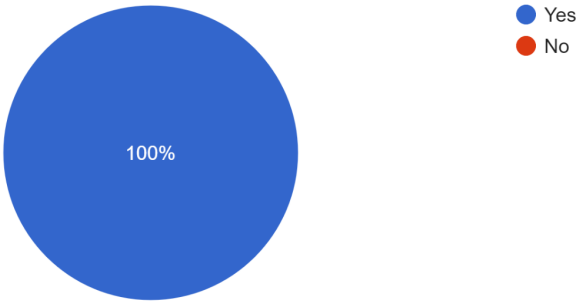
Are you willing to participate in user testing

16 responses



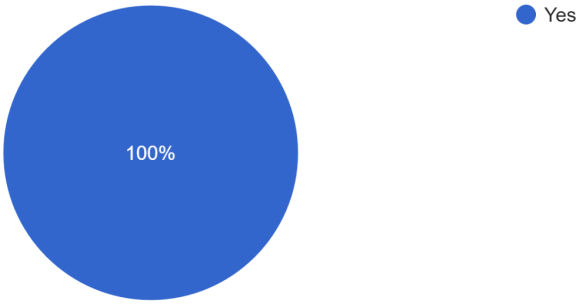
Are you over the age of 18?

16 responses



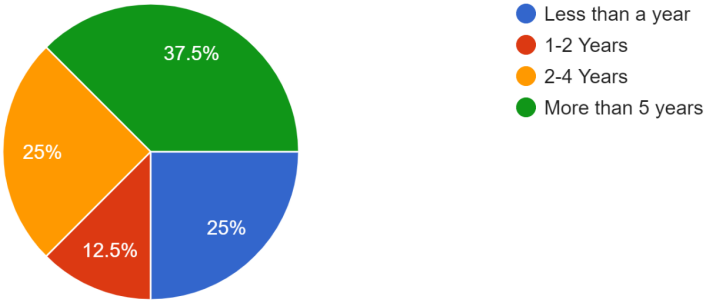
Are you an existing customer of FNB (First National Bank)?

16 responses



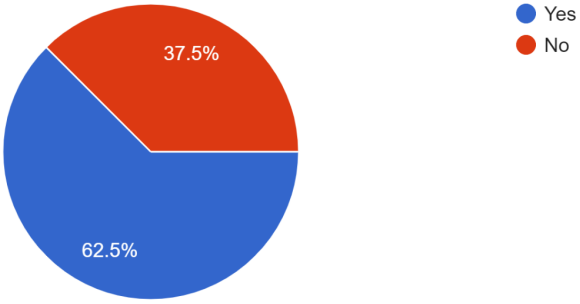
How long have you been a customer of FNB?

16 responses



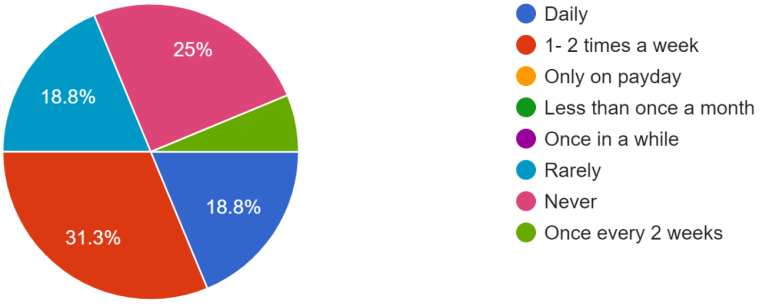
Do you actively use the FNB mobile banking app?

16 responses



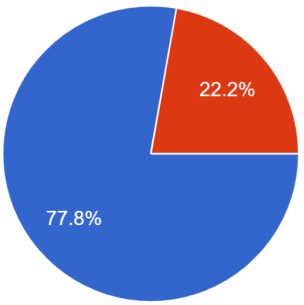
How frequently do you use the FNB app for your banking needs?

16 responses



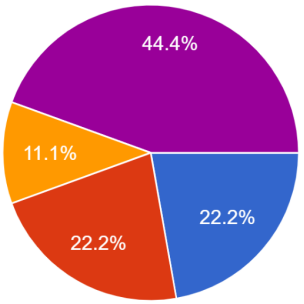
Do you use FNB online banking?

9 responses



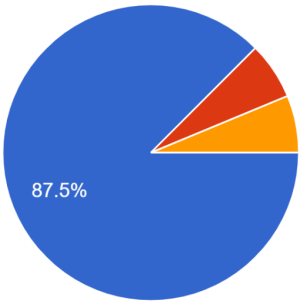
How often do you use online banking?

9 responses



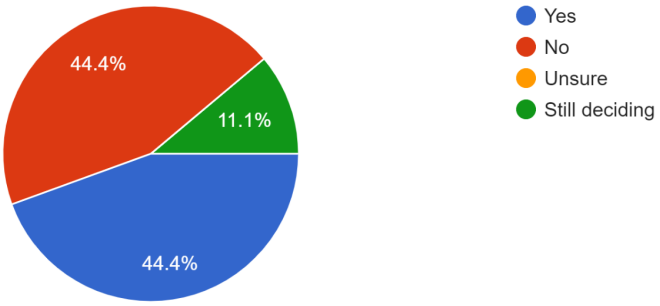
Have you performed tasks such as checking account balances, making payments, or transferring funds?

16 responses



When performing the tasks mentioned above do you prefer online banking over mobile banking

9 responses



APPENDIX B: USER TEST FINDINGS - MONEY MATTERS FINANCIAL APPLICATION

The goal and purpose of the user testing conducted with the *Money Matters* application revolved around evaluating the effectiveness of UIA in enhancing interaction principles and usability within a financial banking context. This testing aimed to provide valuable insights into how UIA can be strategically incorporated to improve user experiences and simplify interactions, especially within digital financial platforms. By assessing the impact of UIA on the *Money Matters* application, this testing sought to inform the development of the *UI Animate Guide*, which serves as a practical resource for UI designers seeking to enhance digital interface designs through the strategic use of UIA.

Participants

Participant 1: Adele Maree
Participant 2: Bradliam Willimese
Participant 3: Imelda van Staden
Participant 4: Inge Wattenbach
Participant 5: Jayden Phillpott
Participant 6: Neville Philpott

User Test Script – Money Matters Mobile Application

Introduction and Setup

Dear, Participant.

Thank you for agreeing to participate in this user testing session.

I am Ivana De Vittorio. I will be conducting the user testing session.

I am a student at Open Window, completing my honours degree in Interaction Design. I am currently conducting a study to explore the benefits of UI animation in guiding user actions on digital interfaces.

The purpose of the user testing is to gather feedback on the *Money Matters* Mobile Banking application which is a revamped version of the FNB mobile application that incorporated UI animation in hopes of improving its usability and helping to guide the user's actions through banking interfaces.

I just want to make a few things clear before we start with the user testing session.

Your participation in this study is voluntary, and you may withdraw at any time. All information you provide will be kept confidential and used solely for research purposes.

Please let me know if you have any questions or concerns before we begin the testing. Thank you again for your participation.

The testing will consist of Three main sections:

1. **Money Matters Mobile Application (Non-Animated Version)**

   Task Explanation & Execution:
   I will provide you with the link to the Money Matters mobile application the non-animated version and explain the tasks that you will need to complete while using this interface. After you have completed the tasks, I will ask you a few questions based on your experience using this interface.
2. **Money Matters Mobile Application (Animated Version)**

   Task Explanation & Execution:
   Once again I will I provide you with the link to the Money Matters mobile application. But this time it will be a redesigned version of the Money Matters mobile application including UI animations. I will explain similar tasks that you will need to preform while using this interface. After you have completed the tasks, I will ask you a few questions based on your experience using this interface and if the UI animation helped you complete these tasks more effectively.
3. **Post-Test Questions and Debrief:**

   This is to gain feedback from your overall experience and debrief the session by gathering any additional insights or comments you might have.

1 Money Matters Mobile Application (Non-Animated Version)

Task Explanation

This section is to ensure that the participant has a link to the *Money Matters* mobile application prototype that I have created. They need to understand the task that they will need to complete on the interface.

Note: The tasks will not be a step-by-step demonstration and the participant will not receive help throughout the process of completing the tasks. This is just what I want them to complete on their OWN.

Please click on this link (provided user the link to the prototype) here to open the interface that you will be navigating. I want you to think out loud when using the Money Matters mobile application.

I want you to complete the following tasks:

1. Check your account balance and view your transaction history.

2. Add the recipient. Their information is the following:
    - Account Name: J Ramirez
    - Account Type: Savings
    - Account Number: 458 745 4521
    - Bank: Absa
    - Own Reference: J Ramirez Payment
    - Receipt Reference: Payment
    - Send Proof of Payment
    - Email: jramirez.99@gmail.com
    - Phone number: 082 457 4444

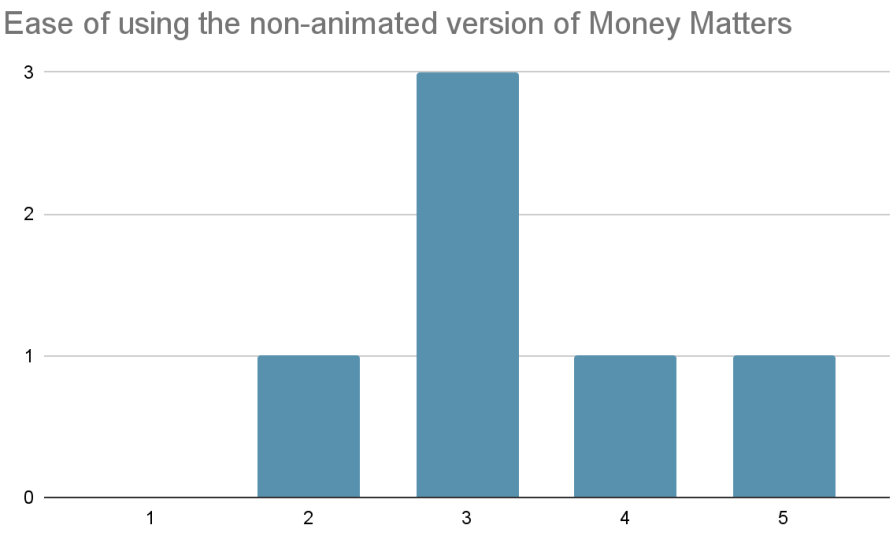
3. Make a payment to the recipient Ms Elisabeth Mendoza.
    - Amount: R550
    - Own Ref: Payment
    - Own Ref: Payment

4. Transfer R550 from your Debit Account to your Savings Account.
    - Amount: R550
    - Reference: Savings

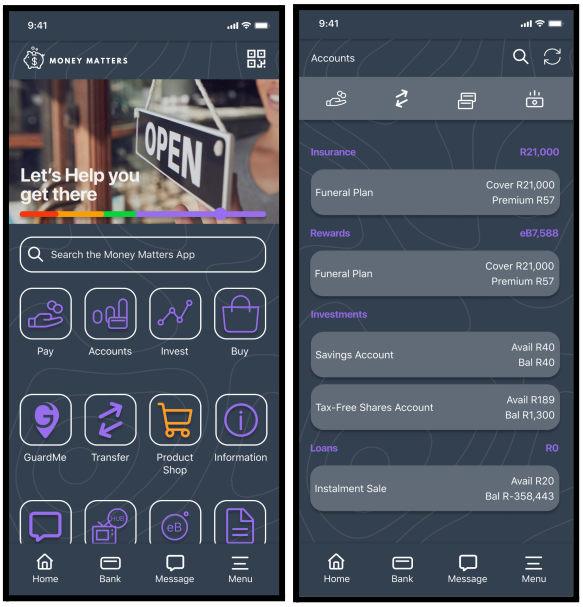
5. Make an Invest in shares account.
    - City of birth: Pretoria
    - Acc no: 0422 5766 874
    - (then go to Account option)

Task Explanation – Questions and Findings

1. On a scale of 1-5, how easy was it for you to complete the tasks?



2. How easy or difficult was it for you to find the option to check your account balance?



Participant 1: "Well, it wasn't super easy for me to find the option to check my account balance. I wasn't too sure where to look at first, but I eventually found it after searching around for a bit."

Participant 1 Extra Notes: Had initial difficulty but eventually found the option after searching.

Participant 2: "I'd say it was somewhat challenging to locate the option to check my account balance. It took me a little while to figure out where it was, but I managed to find it after some searching."

Participant 2 Extra Notes: Found it somewhat challenging, took some time to locate.

Participant 3: "Honestly, I found it quite difficult. I had a hard time finding the option to check my account balance. It wasn't very intuitive, and I had to really dig around to locate it."

Participant 3 Extra Notes: Found it quite difficult, not intuitive, and had to dig around.

Participant 4: "I found it difficult to find the option to check my account balance. It took me longer than I expected, and I think it could be made more user-friendly."
Participant 4 Extra Notes: Had a hard time, suggests improving user-friendliness.

Participant 5: "I didn't find it too difficult because I've used the FNB App before. So, I was familiar with the process, and that made it easier for me to locate the option."
Participant 5 Extra Notes: Not too difficult, familiar with FNB app.

Participant 6: "It wasn't too hard for me to find the option to check my account balance. I'm pretty familiar with the FNB app, so I knew where to look."
Participant 6 Extra Notes: Found it relatively easy due to prior experience.

3. Were you able to view your transaction history easily? Did you encounter any challenges or confusion during this task?

Participant 1: "I had some real trouble with this one. I couldn't figure out how to view my transaction history at first, and it took me a while to get it."
Participant 1 Extra Notes: Encountered significant difficulty and delay in accessing transaction history.

Participant 2: "Yes, I was able to view my transaction history, but it wasn't super easy. I had to explore a bit to find it."
Participant 2 Extra Notes: Accessed transaction history but with some difficulty.

Participant 3: "I did manage to view my transaction history, but it wasn't straightforward. There were a few moments of confusion, but I got there eventually."

Participant 3 Extra Notes: Experienced some confusion but succeeded in accessing transaction history.

Participant 4: "I found it a bit tricky to view my transaction history. It wasn't as intuitive as I expected, but after a bit of searching, I got there."
Participant 4 Extra Notes: Faced minor difficulty, managed to access transaction history after searching.

Participant 5: "I had no problem viewing my transaction history."
Participant 5 Extra Notes: Easily accessed transaction history due to prior experience.

Participant 6: "It was pretty easy for me to view my transaction history."
Participant 6 Extra Notes: Accessed transaction history smoothly due to prior experience.

4. Did you find the presentation of the account balance and transaction history clear and understandable?

Participant 1: "I had some trouble with the presentation. It felt cluttered, and I had to spend more time than I wanted to understand my balance and transactions."

Participant 1 Extra Notes: Felt it was cluttered and took extra effort to understand.

Participant 2: "I found the presentation clear and understandable. It was well-organized, and I didn't have any issues with it."
Participant 2 Extra Notes: Presentation was clear and well-organized.
Participant 3: "I found the presentation of the account balance and transaction history to be pretty clear and understandable. It was organized well, and I could easily track my transactions."
Participant 3 Extra Notes: Found presentation clear and organized.

Participant 4: "Overall, it was okay, but I felt like it could be a bit clearer. There was some information that felt a bit cluttered, but I could still understand my account balance and transactions."

Participant 4 Extra Notes: Found it generally clear but noted some clutter.

Participant 5: "It was pretty clear to me. I could easily see my account balance and transaction history. No major complaints here."

Participant 5 Extra Notes: Found it clear with no major issues.

Participant 6: The presentation was fine for me. I didn't find it cluttered or confusing. It met my expectations."

Participant 6 Extra Notes: Satisfied with the presentation, no major issues.

5. Were you able to locate the payment feature easily? How intuitive was the process of making a payment?

Participant 1: "Absolutely, locating the payment feature was a breeze, and making a payment was a walk in the park. The whole process felt very user-friendly."

Participant 1 Extra Notes: The participant had no trouble with making a payment.

Participant 2: "I had no trouble finding the payment feature, and the process of making a payment was very intuitive. It was well-designed and easy to follow."

Participant 2 Extra Notes: Participant had a smooth experience with both locating the feature and making payments, suggesting a well-designed interface.

Participant 3: "Entering the payment amount was a breeze, but I did have a slight difficulty in initially locating the beneficiary. However, I found it after a short search."

Participant 3 Extra Notes: Participant found the payment amount task easy but had a minor issue locating the beneficiary initially, suggesting a potential usability improvement.

Participant 4: "The payment feature was easy to find, and making a payment was intuitive. I didn't face any challenges, and it all made sense."

Participant 4 Extra Notes: Faced minor difficulty, managed to access transaction history after searching.

Participant 5: "Finding the payment feature was easy, and the process of making a payment was very intuitive. It was a hassle-free experience."

Participant 5 Extra Notes: Participant found both the location of the payment feature and the payment process easy and user-friendly.

Participant 6: "Yes, I had no trouble locating the payment feature, and the process of making a payment was very intuitive. It was straightforward and easy to follow."

Participant 6 Extra Notes: Participant found both locating the payment feature and the payment process straightforward, indicating usability.

6. Did you encounter any issues or confusion while entering the payment amount or selecting the beneficiary?

Participant 1: "I didn't encounter any issues with entering the payment amount or selecting the beneficiary. It was smooth and easy to understand."

Participant 1 Extra Notes: The participant had a trouble-free experience with both tasks, suggesting good usability.

Participant 2: "I had no issues entering the payment amount or selecting the beneficiary. It was straightforward and easy to do."
Participant 2 Extra Notes: The participant had a smooth experience with both tasks, indicating good usability.

Participant 3: "I did manage to view my transaction history, but it wasn't straightforward. There were a few moments of confusion, but I got there eventually."
Participant 3 Extra Notes: Experienced some confusion but succeeded in accessing transaction history.

Participant 4: "Entering the payment amount was effortless, but I did struggle a bit to see the beneficiary at first. It took me a little extra time, but I eventually found it."
Participant 4 Extra Notes: Participant faced a slight challenge in locating the beneficiary, indicating a possible need for improved visibility.

Participant 5: "Entering the payment amount was a breeze, and I quickly located the beneficiary without any delay. It all made sense."
Participant 5 Extra Notes: Participant found both tasks to be straightforward and intuitive, indicating a well-designed interface.

Participant 6: "I had no trouble entering the payment amount, and I immediately found the beneficiary without any delay. It was familiar to me."
Participant 6 Extra Notes: Participant had a seamless experience with both tasks due to prior familiarity with the app, suggesting that returning users may have an advantage.

7. How satisfied are you with the feedback or confirmation provided after making the payment?

Participant 1: "I had a neutral experience with the feedback. It was there, but it didn't leave a strong impression. It confirmed my payment."

Participant 1 Extra Notes: The Participant expressed a neutral stance, indicating that the feedback fulfilled its primary role of confirming the payment.

Participant 2: "The feedback after making the payment was okay for me. It didn't stand out, but it gave me the necessary confirmation."
Participant 2 Extra Notes: Participant expressed an impartial stance regarding the feedback, considering it sufficient for confirmation.

Participant 3: "The feedback after making the payment was okay for me. It did its job, but it wasn't something that stood out in my experience."
Participant 3 Extra Notes: The participant indicates that the feedback met the basic requirements.

Participant 4: "I'm pretty neutral about the feedback. It didn't strike me as important or noticeable, but it did provide the confirmation I needed."
Participant 4 Extra Notes: Participant didn't find the feedback particularly remarkable.

Participant 5: "I'm fine about the feedback provided after making the payment. It didn't grab my attention".
Participant 5 Extra Notes: Considering the feedback functional but not exceptional.

Participant 6: "The feedback after making the payment was all right. It did the job, but I didn't find it particularly noteworthy."
Participant 6 Extra Notes: Participant had a neutral response, indicating that the feedback was functional but not exceptional.

8. Was it clear how to add a new beneficiary in the app? Did you encounter any difficulties in finding the relevant options?

Participant 1: "I had a bit of trouble at first figuring out where to add a new beneficiary, but once I found it, the process was easy."

Participant 1 Extra Notes: Participant initially had some difficulty finding the option to add a new beneficiary but managed to complete the task.

Participant 2: "Adding a new beneficiary was straightforward, and I didn't face any difficulties. It was clear where to find the relevant options."
Participant 2 Extra Notes: Participant found adding a new beneficiary to be a smooth and trouble-free process.

Participant 3: "I had no trouble at all with adding a new beneficiary. It was clear and easy to find the relevant options."
Participant 3 Extra Notes: Participant found adding a new beneficiary to be effortless and intuitive.

Participant 4: "I found it a bit tricky to view my transaction history. It wasn't as intuitive as I expected, but after a bit of searching, I got there."
Participant 4 Extra Notes: Participant had some initial difficulty locating the option but successfully added a new beneficiary with ease.

Participant 5: "I knew exactly where to find the option to add a new beneficiary because I'm familiar with the app. For someone new, it might not be as obvious."
Participant 5 Extra Notes: Participant, being familiar with the app, had no issues adding a new beneficiary but noted that it might not be as obvious for newcomers.

Participant 6: "It was clear how to add a new beneficiary. I didn't encounter any difficulties in finding the relevant options. It was straightforward."

Participant 6 Extra Notes: Participant found adding a new beneficiary straightforward and didn't face any issues.

9. How straightforward was the process of entering the beneficiary's information, such as the account name, number, bank, and branch code?

Participant 1: "I had no trouble entering the beneficiary's information. The app made it simple by having a step-by-step process."

Participant 1 Extra Notes: The participant had a straightforward experience when entering beneficiary information.

Participant 2: "Entering the beneficiary's information was effortless. The app made it easy to input information without any hassle."
Participant 2 Extra Notes: The participant had a smooth experience with entering beneficiary information.

Participant 3: "I found it very straightforward to enter the beneficiary's information."
Participant 3 Extra Notes: The participant had a user-friendly experience when entering beneficiary information.

Participant 4: "The process of entering the beneficiary's details was quite easy. I didn't have any trouble inputting everything."
Participant 4 Extra Notes: The participant found it hassle-free to enter the beneficiary's information.

Participant 5: "The process of entering the beneficiary's information was easy and intuitive. I didn't face any challenges, and it all made sense."
Participant 5 Extra Notes: The participant didn't encounter any issues when entering beneficiary information.

Participant 6: "The process of entering the beneficiary's information, including the account name, number, bank, and branch code, was very straightforward. I didn't encounter any difficulties."

Participant 6 Extra Notes: Ivana Extra Notes: The participant found entering beneficiary information to be easy and straightforward.

10. Did you receive clear instructions or feedback on the successful addition of the beneficiary?

Participant 1: "The feedback on adding the beneficiary was fine. It wasn't very prominent, but it did provide the confirmation I needed, so it was okay."

Participant 1 Extra Notes: The participant found the feedback sufficient for confirming the addition of the beneficiary, despite not being very prominent.

Participant 2: "The feedback on adding the beneficiary was okay. It was there, but it wasn't particularly attention-grabbing. Still, I got the confirmation I needed."

Participant 2 Extra Notes: The participant considered the feedback sufficient but not attention-grabbing.

Participant 3: “The feedback I received on successfully adding the beneficiary was okay. It didn't stand out.”

Participant 3 Extra Notes: The participant considered the feedback adequate for confirming the addition.

Participant 4: "I received feedback on adding the beneficiary, and it was fine.”

Participant 4 Extra Notes: The participant found the feedback acceptable for confirming the addition of the beneficiary.

Participant 5: "I got some feedback, and it was alright. It could have been more noticeable, but it did confirm that I added the beneficiary successfully."

Participant 5 Extra Notes: The Participant thought the feedback could have been more noticeable but still found it sufficient.

Participant 6: "I received some feedback on the successful addition of the beneficiary, and it was fine. It could have been a bit more noticeable, but it did the job."
Participant 6 Extra Notes: Ivana Extra Notes: The participant found the feedback acceptable but thought it could be more noticeable.

11. Did you encounter any challenges or confusion while entering the transfer amount or selecting the appropriate accounts?

Participant 1: "I had no trouble entering the transfer amount or selecting the accounts. It was straightforward and clear, making it easy to proceed."

Participant 1 Extra Notes: The participant had a straightforward experience with both tasks.

Participant 2: "Entering the transfer amount and selecting the accounts was easy. I didn't encounter any confusion or difficulties."
Participant 2 Extra Notes: The participant found it hassle-free to complete both tasks.

Participant 3: "Entering the transfer amount and selecting the accounts was a breeze. I didn't face any challenges or confusion throughout the process."
Participant 3 Extra Notes: The participant had a trouble-free experience with both tasks.

Participant 4: "I had no issues with entering the transfer amount or selecting the accounts. It was clear and straightforward."
Participant 4 Extra Notes: The participant found the process clear and straightforward.

Participant 5: "The process of entering the transfer amount and selecting the accounts was smooth. I didn't encounter any difficulties."
Participant 5 Extra Notes: The participant found both tasks intuitive and easy to complete.

Participant 6: "I didn't face any challenges or confusion when entering the transfer amount or selecting the accounts. It was a straightforward process."
Participant 6 Extra Notes: Ivana Extra Notes: The participant had a smooth experience with both tasks, indicating good usability.

12. Were there any specific features or aspects of the app that stood out to you positively or negatively during the testing?

Participant 1: "The app's ease of use was a big positive for me. But I had a slight issue with the card-swiping; it wasn't immediately obvious that I could use it to switch between bank accounts."

Participant 1 Extra Notes: Feedback on ease of use but mentioned a slight issue with the card-swiping feature.

Participant 2: "I found the app quite user-friendly, and the process flows made sense. However, I did face a minor challenge with the card-swiping; it wasn't immediately obvious to me."
Participant 2 Extra Notes: Mentioned a minor issue with the card-swiping feature.

Participant 3: "What I liked about the app was how clear and intuitive most of the features were. On the downside, I didn't realize I could swipe on the card to change accounts initially."
Participant 3 Extra Notes: Feedback on clarity but noted an issue with the card-swiping feature.

Participant 4: "I liked how the app was generally straightforward. However, one thing that stood out negatively was that I didn't realize I could swipe on the card to change bank accounts."
Participant 4 Extra Notes: Positive feedback overall, but noted a negative aspect related to the card-swiping feature.

Participant 5: "It was easy as I was familiar with the FNB app."
Participant 5 Extra Notes: The participant finds the process quite easy.

Participant 6: "The app was straightforward to use, there are more stylised comments that I can make but feel it is not necessarily as it is not your focus."
Participant 6 Extra Notes: The app is simplistic but the stylization of the app that the participant is referring to like headings, etc. is not a priority of the user testing and this will most likely be the change of hierarchy which is not my main focus.

13. Is there anything you found particularly confusing or frustrating while using the app?

Participant 1: "Overall, the app was easy to use, but one thing that was a bit frustrating was the lack of clear instructions for some features."

Participant 1 Extra Notes: The participant found the app generally easy to use but noted frustration with the absence of clear instructions for certain features.

Participant 2: "The app was fine for the most part, but I got a bit confused when trying to navigate back to the main menu from certain screens."
Participant 2 Extra Notes: The participant had some confusion when attempting to navigate back to the main menu from specific screens.

Participant 3: "The app was straightforward, but I was a bit confused when I couldn't locate the search function within the transaction history."
Participant 3 Extra Notes: The participant didn't find the app confusing overall but experienced confusion when searching for the transaction history's search function.

Participant 4: "The app was mostly clear, but it was a bit frustrating when I couldn't find a quick way to switch between multiple accounts."
Participant 4 Extra Notes: The participant found the app clear overall but was frustrated by the lack of a quick account-switching feature.

Participant 5: "I didn't find the app particularly confusing, but I did get a bit frustrated when I couldn't immediately find a specific transaction in the history."
Participant 5 Extra Notes: The participant didn't find the app confusing overall but experienced frustration when searching for a specific transaction.

Participant 6: "The app was straightforward to use, there are more stylised comments that I can make but feel it is not necessarily as it is not your focus."
Participant 6 Extra Notes: The app is simplistic but the stylization of the app that the participant is referring to like headings, etc. is not a priority of the user testing and this will most likely be the change of hierarchy which is not my main focus.

2 Money Matters Mobile App (Animated Version)

Task Explanation

This section is to ensure that the participant has a link to the UI animated *Money Matters* mobile application prototype that I have created. They need to understand the task that they will need to complete on the interface.

Please click on this link (the link will generate once the design prototype has been created) here to open the interface that you will be navigating. I want you to think out loud when using the UI-animated version of the Money Matters mobile application.

I want you to complete the following tasks:

1. Check your account balance and view your transaction history.

2. Add the receipt. Their information is the following:
    - Account Name: Ms C Turner
    - Account Type: Savings
    - Account Number: 559 766 4825\
    - Bank: Nedbank
    - Branch Code: 198 765
    - Own Reference: C Turner Payment
    - Receipt Reference: Payment
    - Send Proof of Payment
    - Email: cturner.01@gmail.com
    - Phone number: 073 457 5555

3. Make a payment to the receipt Elisabeth Mendoza.
    - Amount: R1000
    - Own Ref: Payment

- Own Ref: Payment

4. Transfer from your Debit Account to your Savings Account.
    - Amount: R550
    - Reference: Savings

5. Make an Invest in shares account.
    - City of birth: Pretoria
    - Acc no: 0422 5766 874
    - (then go to Account option)

Task Explanation - Questions

1. Did the UI animation provide clear visual cues or guidance on how to check your account balance?

    Participant 1: "Yes, the UI animation was helpful."
    Participant 1 Extra Notes: Found the UI animation to be a helpful and intuitive guide for checking their account balance.

    Participant 2: "The UI animation was definitely helpful in guiding me on how to check my account balance. I specifically liked the arrow indicator, showing that I can go down to see the rest of the features on the app."
    Participant 2 Extra Notes: The participant appreciated the UI animation for its role in making the account balance-checking process clearer and more user-friendly.

Participant 3: "I found the UI animation very useful. It provided me with guidance, making it easy to understand how to check my account balance as the information was displayed gradually."
Participant 3 Extra Notes: The participant considered the UI animation very useful in providing clear guidance. Gradual presentation of information and features helped.

Participant 4: "Yes, the UI animation was a great help. Checking my account balance was very easy, I liked the arrow animation."
Participant 4 Extra Notes: The participant found the UI animation to be a great help, specifically the arrow scroll-down animation.

Participant 5: " The UI animation provided context and made the process of viewing transaction history much clearer. "
Participant 5 Extra Notes: The participant appreciated the UI animated transitions.

Participant 6: "I found the UI animation to be really helpful."
Participant 6 Extra Notes: The participant thought the UI animation was really helpful in providing clear guidance.

2. How did the UI animation enhance or simplify the process of viewing your transaction history?

Participant 1: " It provided clear visual cues on how to check my account balance, and I found it quite intuitive, especially how the main features appear then the rest."
Participant 1 Extra Notes: Prompting the features one by one made the features stand out and easier to follow.

Participant 2: "Animation helped by providing context to the transaction history. It made it easier to understand the details and actions related to each transaction."

Participant 2 Extra Notes: UI animation provided context and made transaction details and actions clearer.

Participant 3: " The UI animation made the process of viewing transaction history much clearer. It simplified the way I interacted with the information and helped me focus on what I needed to do."

Participant 3 Extra Notes: The participant found the animation and transitions simplified the interaction with transaction history, making it clearer and helping them focus on tasks.

Participant 4: "The UI animation enhanced the transaction history by making the information more visible. It was easier to grasp and navigate through the transactions."

Participant 4 Extra Notes: The participant noted that the UI animation improved visibility, making it easier to grasp and navigate through transactions.

Participant 5: "The UI animation provided context and made the process of viewing transaction history much clearer. Although I am familiar with this application it did make a change in how I viewed the history."

Participant 5 Extra Notes: The process is more clear and simplified.

Participant 6 : "I felt like the transitions made a difference in how I perceived the information that was given to me."

Participant 6 Extra Notes: Animated transitions helped process information.

3. How did the UI animation assist you in locating and selecting the payment feature?

Participant 1: "What I previously mentioned."

Participant 2: "The animation gave more context to me."

Participant 2 Extra Notes: UI animation provided context.

Participant 3: " I don't know how to describe it but it felt easier to comprehend with fade-ins."

Participant 3 Extra Notes: Easily comprehended.

Participant 4: "I have already said it."

Participant 5: "The highlighted features help the components on the page stand out more."

Participant 5 Extra Notes: Features stand out more.

Participant 6 : "You can skip this one"

4. Did the UI animation effectively guide you through the process of entering the payment amount and selecting the beneficiary?

All Participant : "Yes"

5. Did the UI animation provide helpful feedback or visual indicators during and after making the payment? Did the UI animation help simplify the process of entering the beneficiary's information, such as account name, number, bank, and branch code?

Participant 1: " The pop effect animation at the payment made the action that I need to take so much more cleared, I was a bit unsure with the non-animated version. But now seeing the animation, I actually understood what I needed to do."

Participant 1 Extra Notes: Gestures helped participant understand what action they needed to take.

Participant 2: "I really liked it when it showcased when the account number was too long or too short, I felt like I did not have to look so many times at the account number to get it right. "It helped me avoid double-checking my input and made the process less stressful and more user-friendly".
Participant 2 Extra Notes: Reduces errors and the need to double-check.

Participant 3: " The line bounce animation that gave feedback on the account numbers length was nice, I liked how it informed me. The process felt a bit easier somehow."
Participant 3 Extra Notes: The participant found the animation and transitions simplified the interaction with transaction history, making it clearer and helping them focus on tasks.

Participant 4: “It felt clear, I felt more confident entering the account number. I am always someone who second-guesses myself and it felt like it was something extra taken off my shoulder. ”
Participant 4 Extra Notes: Gave participant confidence to enter account number.

Participant 5: “The UI animation provided context and made the process of viewing transaction history much clearer. Although I am familiar with this application it did make a change in how I viewed the history.”
Participant 5 Extra Notes: The process is more clear and simplified.

Participant 6 : "I felt like the transitions made a difference in how I perceived the information that was given to me.”
Participant 6 Extra Notes: Animated transitions helped process information.

6. Did the UI animation provide clear feedback or visual cues upon the successful addition of the beneficiary?

Participant 1: " It provided clear visual cues on how to check my account balance, and I found it quite intuitive, especially how the main features appear then the rest."

Participant 1 Extra Notes: Prompting the features one by one made the features stand out and easier to follow.

Participant 2: "Animation helped by providing context to the transaction history. It made it easier to understand the details and actions related to each transaction."

Participant 2 Extra Notes: UI animation provided context and made transaction details and actions clearer.

Participant 3: " The UI animation made the process of viewing transaction history much clearer. It simplified the way I interacted with the information and helped me focus on what I needed to do."

Participant 3 Extra Notes: The participant found the animation and transitions simplified the interaction with transaction history, making it clearer and helping them focus on tasks.

Participant 4: "The UI animation enhanced the transaction history by making the information more visible. It was easier to grasp and navigate through the transactions."

Participant 4 Extra Notes: The participant noted that the UI animation improved visibility, making it easier to grasp and navigate through transactions.

Participant 5: "The too-long or too-short animation helped me graph the account number entry better and helped me avoid errors."

Participant 5 Extra Notes: Error prevention

Participant 6 : "I felt like the transitions made a difference in how I perceived the information that was given to me."

Participant 6 Extra Notes: Animated transitions helped process information.

7. How did the UI animation assist you in finding and selecting the transfer feature?

   All Participant: "Yes"

8. Did the UI animation effectively guide you through the process of entering the transfer amount and selecting the appropriate accounts?

   All Participants: All of the participants agreed that UI animation with showing gestures to select the accounts made its features more clear and took away unnecessary.

9. Based on your experience with UI animation in the FNB mobile app, do you feel it helped in guiding you through the tasks more effectively?

   All Participants: "Yes".

10. How did the presence of UI animation impact your overall user experience?

    Participant 1: " Personally the animation did not confuse me in any way, it was mostly the layout and structure of the app that confused me more than anything."

    Participant 1 Extra Notes: Structure and layout problem, not animation.

    Participant 2: "With the animations, especially when I completed something and there was that confetti animation, that made me feel like I accomplished something."

    Participant 2 Extra Notes: Positive deminer toward animations.

Participant 3: " I much preferred the card indicator that was animated to showcase that I can swipe on the cards, I am not really on the FNB app myself and would have never guessed at first glance that I should swipe the cards to change recipients or types of cards and accounts. So that was pretty cool."

Participant 3 Extra Notes: Animation helped indicate features and task that was not as obvious to the participant.

Participant 4: “The payment process felt better and more fun. How I can describe it, is that I didn't feel as stressed and unsure when completing the payment process or beneficiary.”

Participant 4 Extra Notes: Is more positive about the payment process.

11. Were there any instances where the UI animation was distracting or confusing?

Participant 1: "Personally the animation did not confuse me in any way, it was mostly the layout and structure."

Participants 2-6: Participant all agreed that there was not really animations that were confusing to them.

3 Post-Test Questions and Debrief

The post-test and debrief section would include a few questions to gather the participant's overall impressions of the *Money Matters* mobile application and the UI animation used in the second version. The purpose of this section is to gather any additional feedback or comments from the participant about their experience using the interface.

Before we conclude the user testing session. I just have a few follow-up questions for you about your overall experience using the *Money Matters* mobile application.

1. Do you believe that UI animation improved the usability and ease of completing tasks compared to the non-animated version of the app?

   All Participants: "Yes".

2. Were there any specific aspects of the app that stood out to you in terms of usability, functionality, or user experience?

   All Participants: All participants previously mentioned it in the above-mentioned questions.

3. Between the non-animated version of the app and the version with UI animation, which one did you prefer? Why?

   All Participants: "Yes".
   Also above mentioned reasons.

4. Is there anything else you would like to share about your experience with the Money Matters mobile application or the user testing process in general?

   Participants did not have anything else to add.

5. Are there any specific areas of the app or features that you feel could be further improved or optimized?

   Participants did not have anything else to add. They thought the animation that was used was fine and just to check if something was obviously not to add unnecessary information.

6. Do you have any suggestions or recommendations for enhancing the usability or user experience of the app, considering both the UI animation and other aspects?

   Participant 2: "I think you can add more and make it more dynamic, I do not have something specific in mind, but I can let you know if I have an idea."

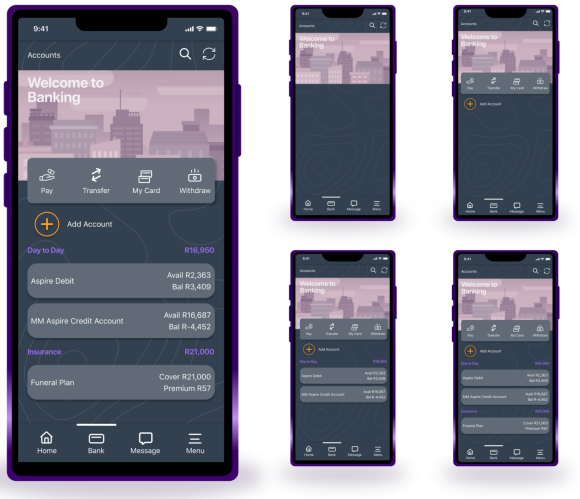
   The Rest of the participants did not add too much they felt like the animations were appropriate for the financial app as the animations were not too much or overwhelming.

This concludes the end of the user testing session. If you have any follow-up questions or concerns afterwards you are more than welcome to contact me. I greatly appreciate that you participated in the user testing for my study.

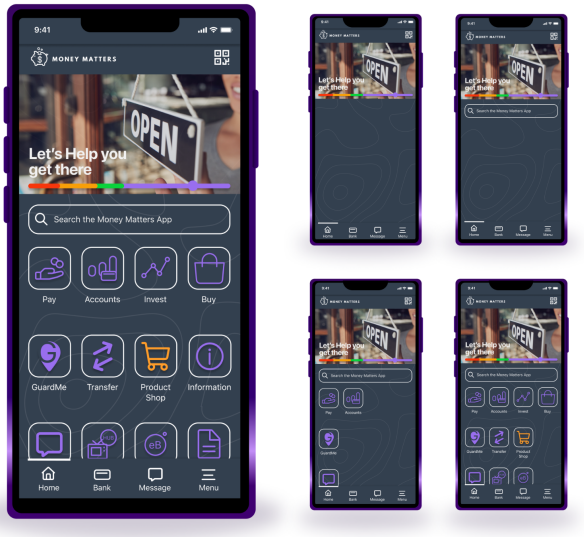
Thank the participants for taking the time to complete the user testing.

Additional Notes and Observations

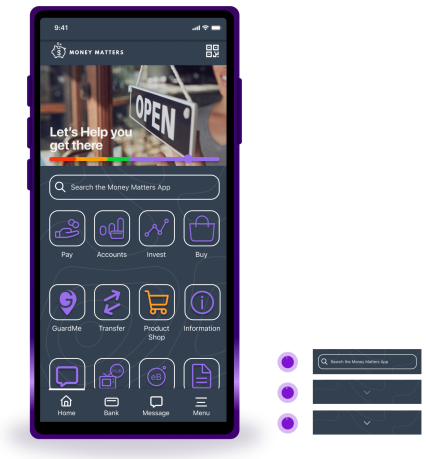
Animated content revealed itself in stages and allowed the users to focus on what was relevant while reducing visual clutter. When the information was animated in sections on the Account screen the users found the information more digestible.



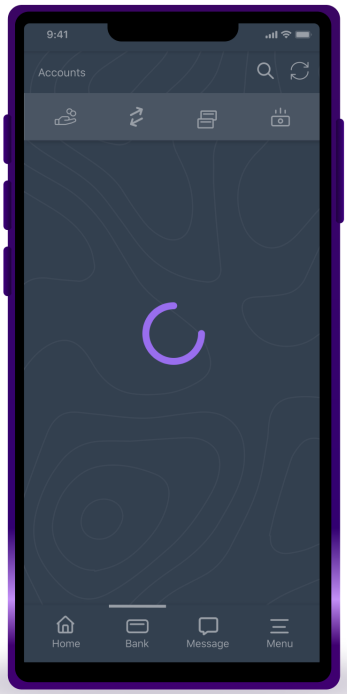
The animation was used to progressively reveal information when users interacted with the interface, helping them discover more about the interface layout and features. This was displayed as the user entered the Money Matters app and the features were displayed.



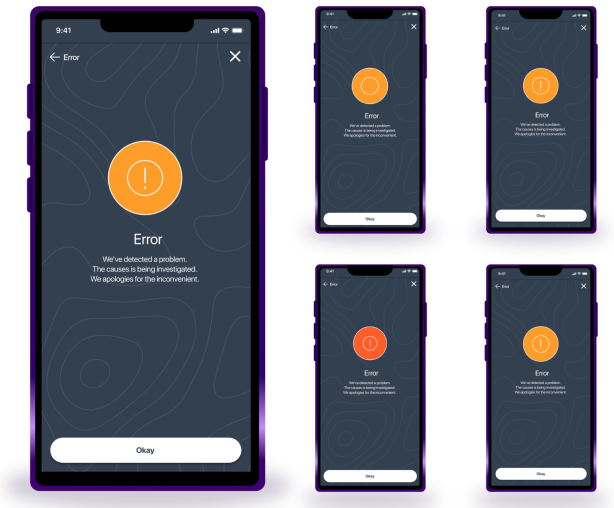
Animated scrollable content showed its interaction potential, it made it clear that users could interact with it. This was shown through the arrow motion indication down. Some users just suggested that the placement should be different to indicate the swiping down better.



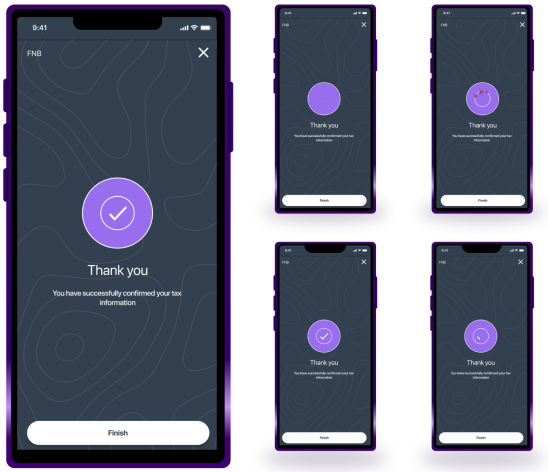
The Animations informed the users that a process was underway, preventing frustration by indicating progress.



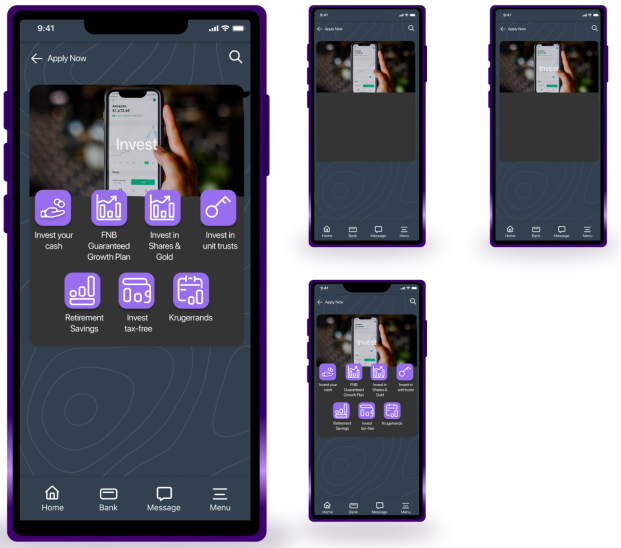
Animation was used to communicate errors to users in a clear and non-intrusive manner.



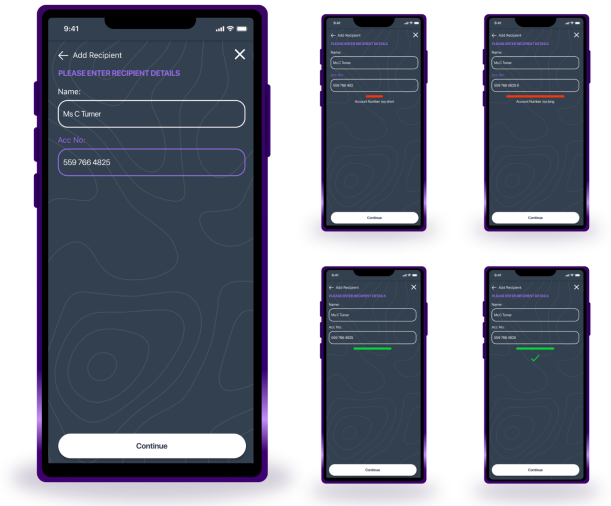
The animation was used to indicate when the system was processing or saving data. This helped the users understand that their actions have been saved.



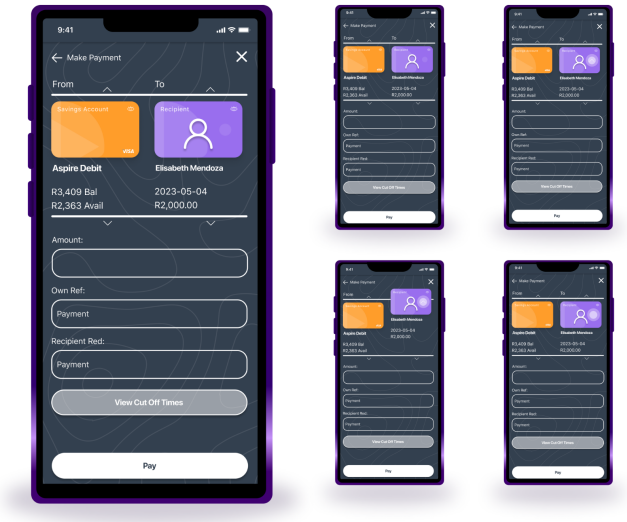
Animations were used to smoothly transition between different states or views, helping users follow the interface's structure.



Animations were used to validate form input in real-time, helping users correct errors as they typed. The user appreciated it when they typed the account number showcasing if it was too long or too short reducing the need to look back and forth at the account number when typing.



Animations were used to layer and rearrange interface elements based on user interactions, helping users understand the context.



APPENDIX C: USER TEST FINDINGS - EASY MED BOOKING SYSTEM APPLICATION

Introduction to Easy Med app user testing

Participants

Participant 1: Adele Maree

Participant 2: Bradliam Willimese

Participant 3: Imelda van Staden

Participant 4: Inge Wattenbach

Participant 5: Jayden Phillpott

Participant 6: Neville Philpott

User Test Script – Easy Med Mobile Application

Introduction and Setup

Dear, Participants

Thank you for agreeing to participate in this user testing session.

I am Ivana De Vittorio. I will be conducting the user testing session.

I am a student at Open Window, completing my honours degree in Interaction Design. I am currently conducting a study to explore the benefits of UI animation in guiding user actions on digital interfaces.

The purpose of the user testing is to gather feedback on the *Easy Med* Mobile app which is a medical booking system where you can make an appointment with a general practitioner. I hope to find ways to best incorporate UI animation into the digital interface and test if it will help enhance the app.

I just want to make a few things clear before we start with the user testing session.

Your participation in this study is voluntary, and you may withdraw at any time. All information you provide will be kept confidential and used solely for research purposes.

Please let me know if you have any questions or concerns before we begin the testing. Thank you again for your participation.

The testing will consist of Three main sections:

1. **Pre-Test Questions:** I will ask you a few questions to understand your familiarity with booking systems or medical booking apps.
2. **Easy Med Mobile App (Animated Version)**

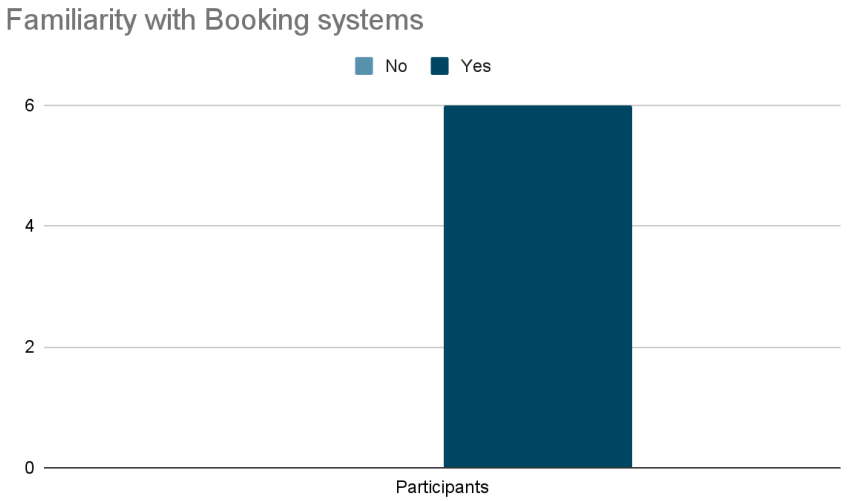
   Task Explanation & Execution:
   I will provide you with the link to the Easy Med mobile application (animated version) and explain the tasks that you will need to complete while using this interface. After you have completed the tasks, I will ask you a few questions based on your experience using this interface.
3. **Post-Test Questions and Debrief:**

   This is to gain feedback from your overall experience and debrief the session by gathering any additional insights or comments you might have.

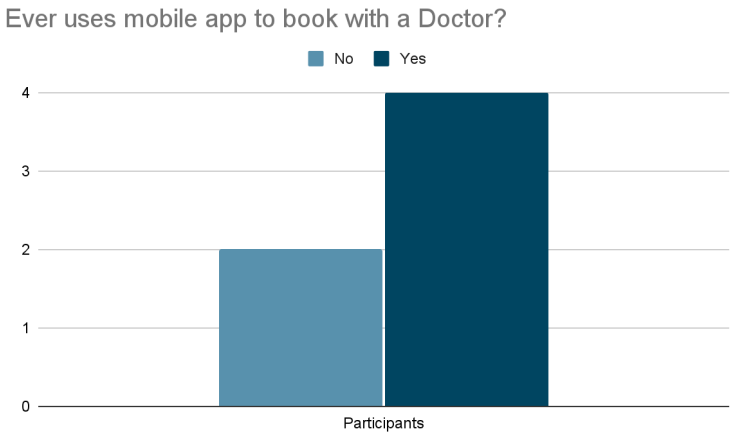
1 Pre-Test Questions

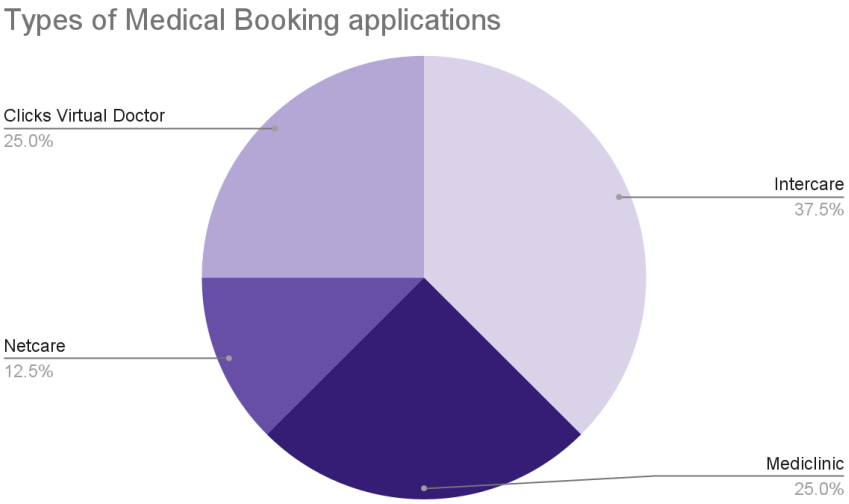
This section is to learn a bit more about the participant's past experiences with online appointment booking and their familiarity with medical booking apps. I will be asking you a few questions to understand your background and perceptions before we proceed to the interactive testing phase.

1. Are you familiar with booking appointments online, whether it's for medical services or other purposes?

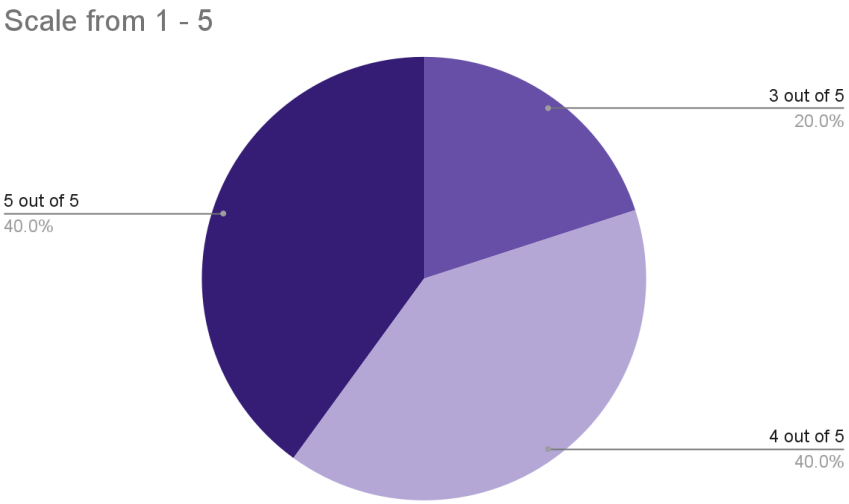


2. Have you ever used a mobile app or website to book an appointment with a doctor or healthcare professional? If yes, which one(s)?





3. On a scale of 1 to 5, how comfortable are you with using online platforms for appointment bookings?



2 Easy Med Mobile App (Animated Version)

Task Explanation

This section is to ensure that the participant has a link to the UI animated *Easy Med* mobile application prototype that I have created. They need to understand the task that they will need to complete on the interface.

Note: The tasks will not be a step-by-step demonstration and the participant will not receive help throughout the process of completing the tasks. This is just what I want them to complete on their OWN.

Please click on this link (the link will generate once the design prototype has been created) here to open the interface that you will be navigating. I want you to think out loud when using the Easy Med mobile application.

I want you to complete the following tasks:

1. Start the booking process.
2. Explore Consultation with procedure.
    - Ultrasound
3. Book an appointment with Dr Nick Crane.

Questions During Task

Please go ahead and book an appointment with a general practitioner using the Easy Med mobile app. Think aloud as you navigate and interact with the app.

1. What do you understand from the UI animations you see during the booking process? Do they provide any guidance or visual cues?

   Participant 1: The animations were helpful in guiding me through the booking process. I noticed that buttons flickered to indicate where to tap, which made it clear that I could book an appointment."
   Participant 1 Extra Notes: Participant found the UI animations useful for guiding them through the booking process, with a specific mention of buttons flickering for clarity.

   Participant 2: "The animations were quite instructive. I liked how the calendar animations worked; they made it clear that I could book and select a date. The illustrative animations for different procedures were a nice touch too."
   Participant 2 Extra Notes: Appreciated the instructive nature of the UI animations, particularly highlighting the clarity of the calendar animations and the appeal of illustrative procedure animations.

   Participant 3: "The UI animations played a significant role in providing guidance during the booking process. They made it evident where to tap and book an appointment. I also liked the illustrative animations for different procedures."
   Participant 3 Extra Notes: Found the UI animations to be a significant help in providing guidance, specifically noting their role in indicating where to tap and book appointments.

   Participant 4: "The UI animations were quite clear in their guidance. The buttons flickered, making it evident where to tap and book an appointment.

The calendar animations worked well to show I could select a date, and the illustrative animations for procedures were a nice touch."
Participant 4 Extra Notes: Appreciated the clarity of the UI animations, with specific mentions of buttons flickering, calendar animations, and illustrative procedure animations.

Participant 5: It was helpful in guiding me through the booking process. I noticed that buttons flickered to indicate where to tap for booking. The calendar animations were clear in showing how to select a date, and the illustrative animations for different procedures were a bonus."
Participant 5 Extra Notes: Found the UI animations helpful in guiding them through the booking process, with particular mentions of buttons flickering, calendar animations, and illustrative procedure animations.

Participant 6: "The UI animations provided excellent guidance during the booking process."

2. Did you encounter any challenges or confusing elements while using the app to book an appointment?

   All participants responded no to the question. 2 participants did mention that the animation when selecting a time was unnecessary because it is self-explanatory that after selecting a date they should select a time.

3. How did you decide which options to choose during the booking process? Were the UI animations helpful in making those decisions?

   Participant 1: "I found the animated buttons helpful during the booking process; they made it clear where to tap. The illustrative examples for different types of doctor consultations were quite useful in understanding my options."

Participant 1 Extra Notes: Appreciated the clarity of animated buttons and found the illustrative examples valuable in understanding their booking options.

Participant 2: "The animated buttons were a helpful visual cue, making it easy to choose options during the booking process. The illustrative examples for different types of doctor consultations provided a clear picture of what was available."

Participant 2 Extra Notes: Participant found the animated buttons to be helpful visual cues and valued the clarity provided by the illustrative examples of different doctor consultations.

Participant 3: "The animated buttons made it easy to decide during the booking process. I could clearly see where to tap. The illustrative examples for different types of doctor consultations were informative and guided my decisions."

Participant 3 Extra Notes: Participant found the animated buttons helpful in making decisions and appreciated the informative nature of the illustrative examples for doctor consultations.

Participant 4: "The animated buttons were a great help in deciding which options to choose. They provided clear guidance. The illustrative examples for different doctor consultations made it easier to comprehend my choices."

Participant 4 Extra Notes: Participant liked the animated buttons for their clear guidance and found the illustrative examples valuable in understanding their choices during the booking process.

Participant 5: "The animated buttons helped me make choices during the booking process by providing clear visual cues. The illustrative examples for different types of doctor consultations were insightful and aided my decision-making."

Participant 5 Extra Notes: Participant found the animated buttons to be helpful in making choices and appreciated the insights provided by the illustrative examples for doctor consultations.

Participant 6: "The animated buttons were great for making decisions during the booking process. They made it clear where to tap. The illustrative examples for different types of doctor consultations were informative and guided my choices. Also, having a video of the doctor on the detailed page made me trust the service more."
Participant 6 Extra Notes: Found the animated buttons and illustrative examples helpful for decision-making and highlighted the trust-building effect of having a video of the doctor on the detailed page.

4. Were there any specific parts of the UI animations that caught your attention? How did they contribute to your understanding of the process?

Participant 1: “The onboarding screen really helped me understand what I needed to do to book a doctor's appointment. The illustrative examples for each procedure caught my attention and greatly contributed to my understanding. They made it clear what types of procedures were offered, and I appreciated that.”
Participant 1 Extra Notes: found the illustrative examples helpful in clarifying the offered procedures and valued this aspect.

Participant 2: "The detailed view of the ultrasound procedure caught my attention and made it more enjoyable. It provided a better understanding of what to expect from the process."
Participant 2 Extra Notes: Appreciated the detailed view of the ultrasound procedure, which enhanced their understanding and enjoyment.

Participant 3: The wipe motion during consultation selection caught my attention, and it felt more engaging. It contributed to my understanding of the process and made it more interactive."

Participant 3 Extra Notes: Found the swipe motion engaging and believed it enhanced their understanding, adding an interactive element to the process.

Participant 4: "The illustrative examples for each procedure were quite attention-grabbing and made it easier to comprehend what was offered. It was a clear and informative aspect of the UI. Also not to mention the filling of my personal details I liked the feedback that I received when entering details if it was incorrect and inaccurate. It made the process less frustrating, ensuring that all my information is correct"

Participant 4 Extra Notes: The participant was drawn to the illustrative examples for procedures and found them clear and informative. Appreciated the form validation feedback.

Participant 5: "The detailed view of the ultrasound procedure was a standout feature for me. It made the process more enjoyable and provided a deeper understanding of what to expect."

Participant 5 Extra Notes: Valued the detailed view of the ultrasound procedure, which improved their enjoyment and understanding.

Participant 6: "The swiping motion during consultation selection was exciting and caught my attention. It felt more engaging and contributed to my understanding of the process. Additionally, having a video of the doctor on the detailed page made me trust the service more. The best part was after I selected the date and time and needed to fill in my personal details, I got feedback in real-time telling me if the information that I inserted was valid or invalid."

Participant 6 Extra Notes: Found the swipe motion engaging and enhanced their understanding, along with the trust-building effect of the doctor's video on

the detailed page. Appreciate the feedback to ensure that their information is valid or invalid.

5. How did you feel about the pace and timing of the UI animations? Did they feel appropriately timed and engaging?

   All participants responded yes.

6. Were there any moments during the booking process where you felt the UI animations were distracting or unnecessary?

   Participant 1: "The selection of the detailed procedure, the highlighting effect, felt a bit unnecessary. It was a nice gesture, but don't think you need to add it."
   Participant 1 Extra Notes: Highlighted that the animation on the detailed view page is not necessary.

   Participants 2-6 did not have much to add.

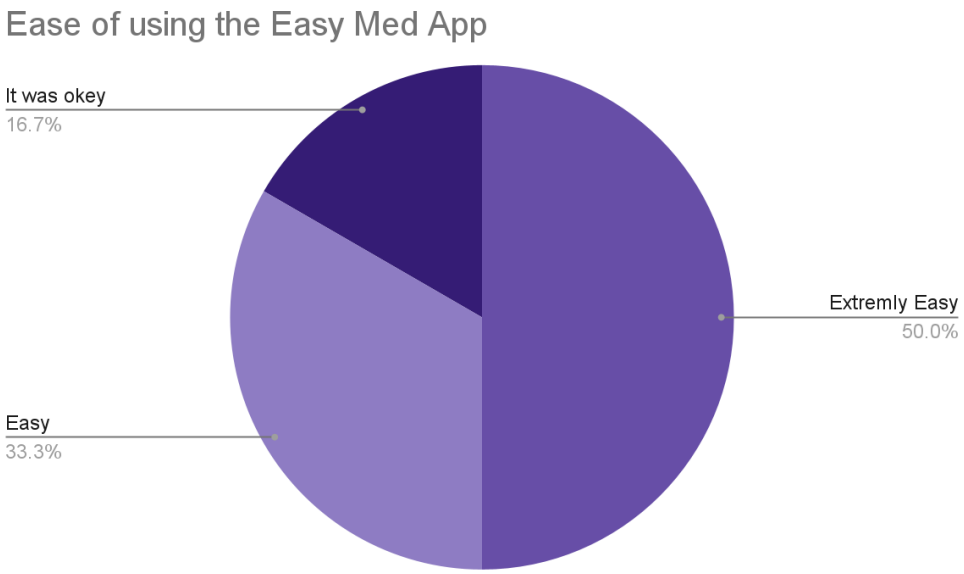
Additional observations will be made.

3 Post-Test Questions and Debrief

The post-test and debrief section would include a few questions to gather the participant's overall impressions of the *Easy Med* mobile application. The purpose of this section is to gather any additional feedback or comments from the participant about their experience using the interface.

Before we conclude the user testing session. I just have a few follow-up questions for you about your overall experience using the *Easy Med* mobile application.

1. Overall, how was your experience using the Easy Med app to book an appointment? Was it intuitive, easy, or challenging?



2. Did you notice any UI animations during the booking process? If so, how do you think they impacted your experience?

   Participant 1: "Yes, I noticed the UI animations, and they made the booking process easier. The animations helped aid my understanding and made it a smoother experience."

   Participant 1 Extra Notes: found the UI animations to be helpful in aiding their understanding and making the booking process smoother.

Participant 2: "I did notice the UI animations, and they had a positive impact. It felt like the process was faster, and the animations made it feel less like a tedious task."
Participant 2 Extra Notes: Participant appreciated the UI animations for making the process feel faster and less tedious.

Participant 3: "The UI animations were noticeable, and they made the booking process more engaging. It felt more fun and contributed to a positive experience."
Participant 3 Extra Notes: Found the UI animations engaging, contributing to a more enjoyable and fun experience.

Participant 4: "Yes, the UI animations were evident, and they made the booking process easier to navigate. They aided in understanding and made it a smoother experience."
Participant 4 Extra Notes: Participant noted that the UI animations aided in navigation, understanding, and a smoother booking experience.

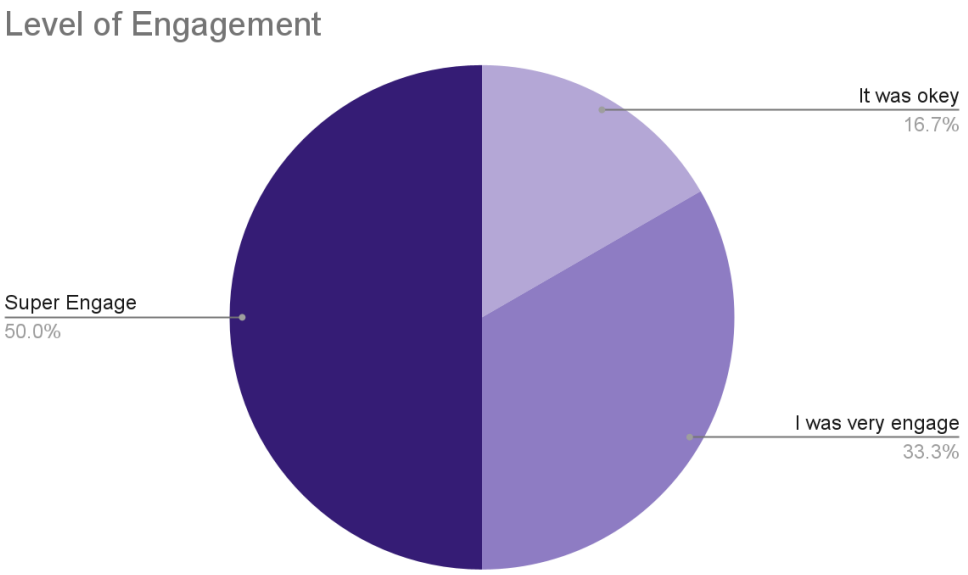
Participant 5: "The UI animations were noticeable, and they positively impacted my experience. It felt like the process was faster, and the animations made it more engaging and fun."
Participant 5 Extra Notes: Appreciated the UI animations for making the process feel faster, engaging, and fun.

Participant 6: "I definitely noticed the UI animations, and they made the booking system more enjoyable. It felt like a fun task, and the animations contributed to a positive experience. Also, having a video of the doctor on the detailed page made me trust the service more."
Participant 6 Extra Notes: Participant found the UI animations enjoyable and fun, contributing to a positive experience, and mentioned the trust-building effect of the doctor's video on the detailed page.

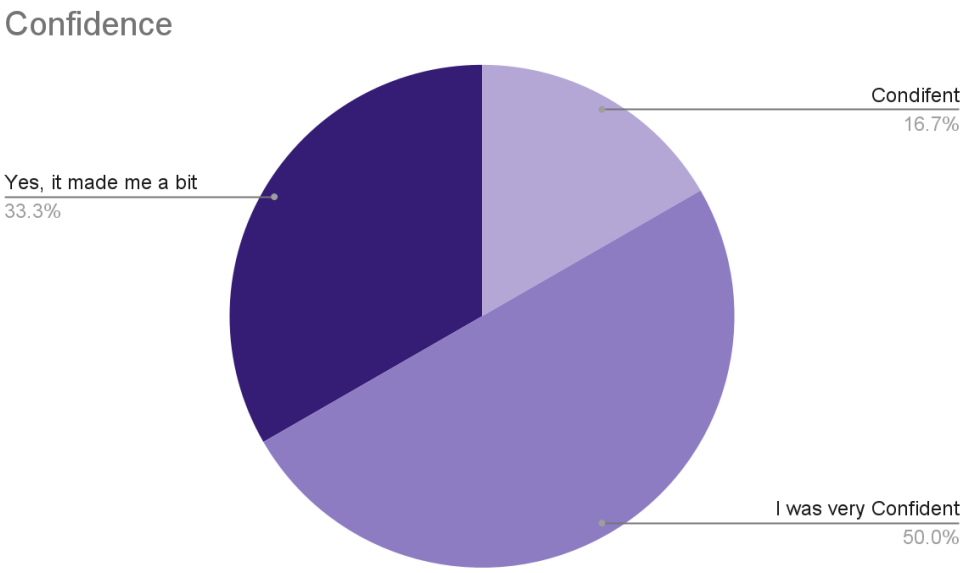
3. In your opinion, did the UI animations enhance your understanding of the steps required to book the appointment?

   All the participants commented, “Yes”.

4. How would you describe your level of engagement with the app's interface, especially in relation to the UI animations?



5. Did the presence of UI animations influence your confidence in using the app to complete the booking successfully?



6. If you've used other medical booking apps in the past, how does the Easy Med app with UI animations compare in terms of usability and user experience?

Participant 1: "Compared to other medical booking apps I've used, Easy Med is a delight to use. The UI animations make it more engaging, and I didn't have to search for anything."

Participant 1 Extra Notes: Found Easy Med to be a delightful experience with engaging UI animations and highlighted the convenience of not having to search for information.

Participant 2: "Easy Med feels more professional and well-put-together compared to other medical booking apps I've used. The UI animations add a touch of sophistication, making it a pleasure to use."

Participant 2 Extra Notes: Appreciated the professionalism and sophistication of Easy Med, particularly noting the contribution of UI animations to the overall positive experience.

Participant 3: "I found Easy Med to be very welcoming in comparison to other medical booking apps. The UI animations made the experience feel more personal, and I didn't have to search for anything."
Participant 3 Extra Notes: Noted that Easy Med felt welcoming and personal, with UI animations enhancing the experience and minimizing the need for searching.

Participant 4: "Easy Med is a pleasure to use, and it somehow feels more professional compared to other medical booking apps I've tried. The UI animations contribute to its overall appeal, and I didn't have to search for anything."
Participant 4 Extra Notes: Found Easy Med is a pleasure to use and appreciated its professionalism and the contribution of UI animations to the user experience.

Participant 5: "Easy Med is a delight to use. It feels more professional and well-organized compared to other medical booking apps I've encountered. The UI animations make it engaging, and I didn't have to search for anything."
Participant 5 Extra Notes: Enjoyed using Easy Med, highlighting its professionalism and organization, and appreciated the engaging nature of UI animations and the ease of finding information.

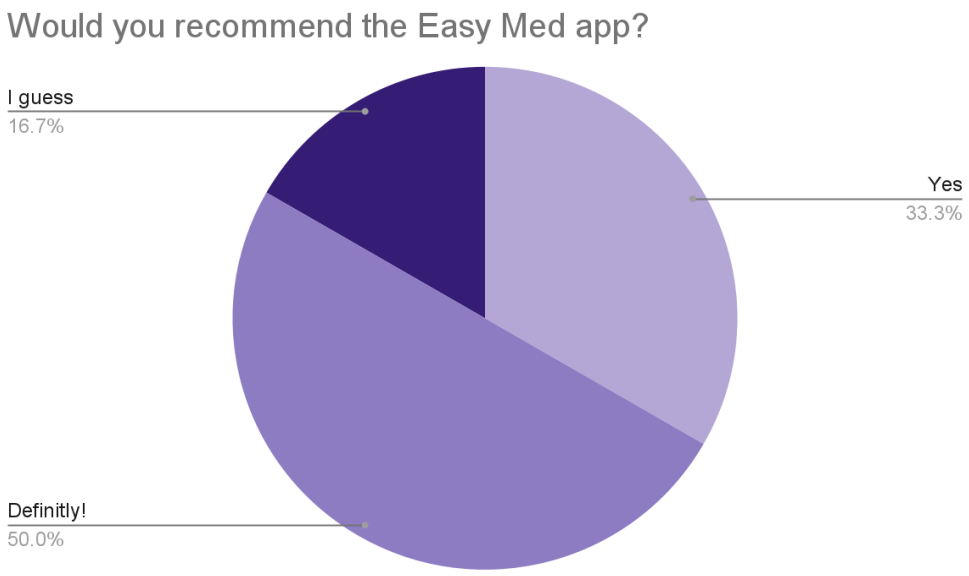
Participant 6: "Easy Med stands out as a very welcoming app. It feels more personal and professional than other medical booking apps I've tried. The UI animations make it a delight to use, and I didn't have to search for anything. Also, having a video of the doctor on the detailed page made me trust the service more."
Participant 6 Extra Notes: Found Easy Med welcoming, personal, and professional, and appreciated the delight of using the app along with the trust-building effect of the doctor's video on the detailed page.

7. Is there anything specific about the UI animations or the booking process that you think could be improved?

Participant 2: "I would just suggest taking away the selection animation where you need to select a time."

The rest of the participants did not have much to add.

8. Would you recommend the Easy Med app to others for booking medical appointments? Why or why not?

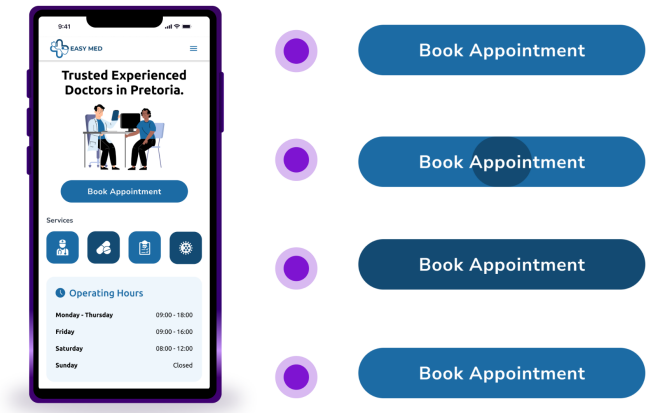


This concludes the end of the user testing session. If you have any follow-up questions or concerns afterwards you are more than welcome to contact me. I greatly appreciate that you participated in the user testing for my study.

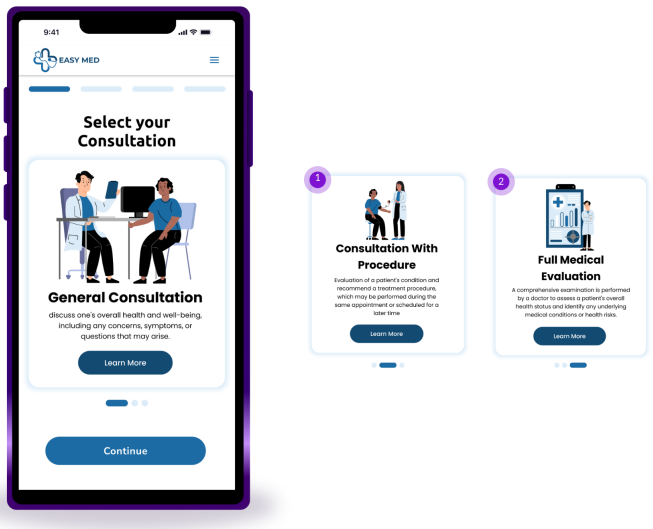
Thank the participants for taking the time to complete the user testing.

Additional Notes and Observations

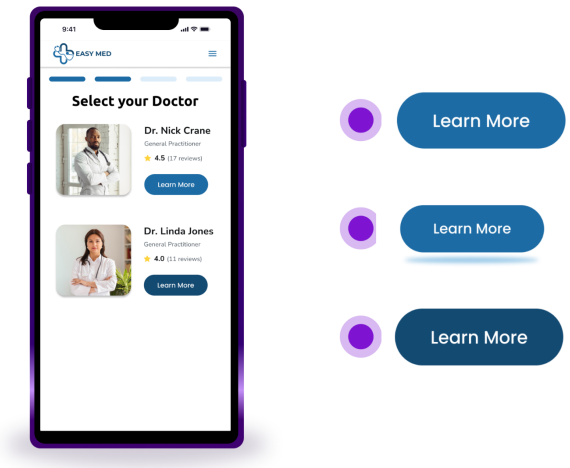
UI Animation guided users' attention to interactive elements making them more discoverable. Using subtle motion and highlighting effects on the button made the important feature stand out. In this case, it was to make a booking with a doctor.



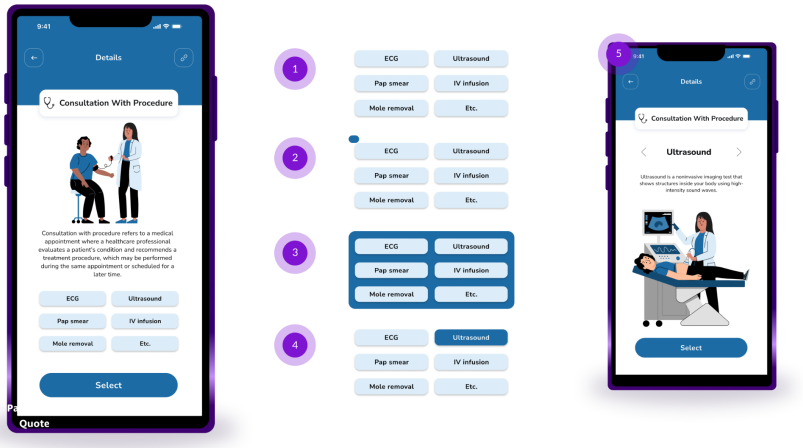
Animations like fade-ins or sliding motions gradually revealed hidden content, ensuring users were aware of new information without overwhelming them. This is showcased through the different consultation options that the user could select.



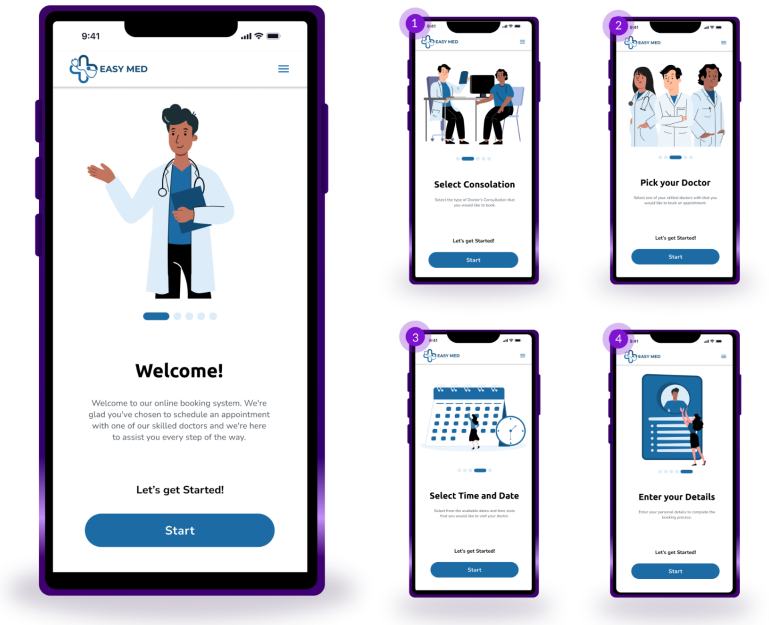
Animations provided instant feedback for the user’s actions, confirming that an interaction had been successful. The users recognized that their actions had been registered more clearly and eliminated any hesitation.



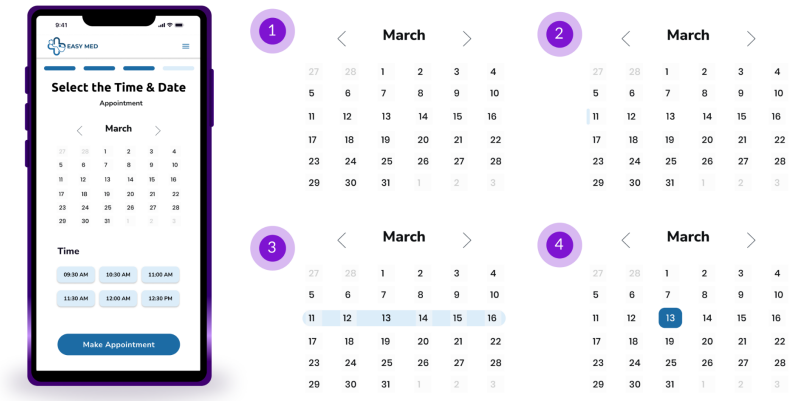
Animating guided tours directed the users' attention to various interface elements, helping them discover new features or functionalities step by step. In this case, the user was shown what option they could select to discover the different procedures and gave them a clear overview.



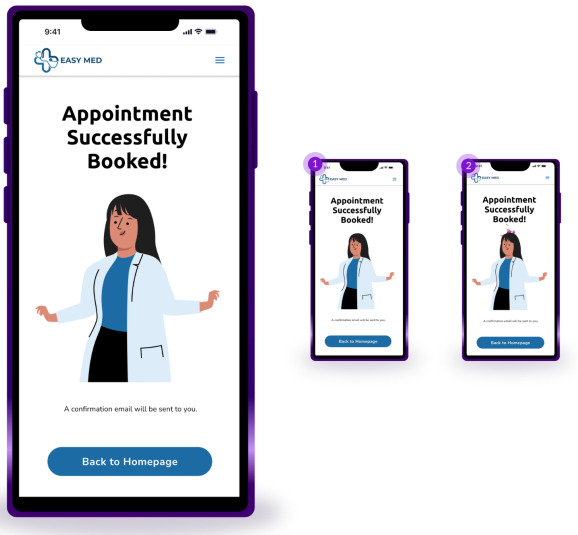
Using animation during onboarding introduced the users to core interactions, making it easier for them to engage with the interface. The users appreciated the boarding screen as it helped them visualise what would be expected of them during the process of booking a doctor's appointment.



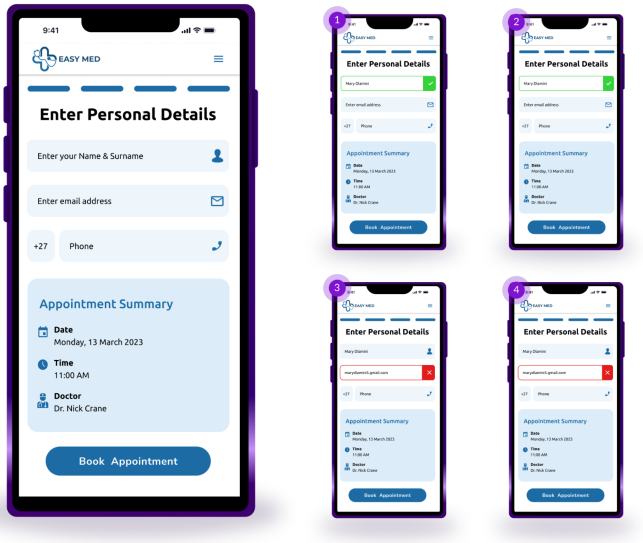
Animated interface elements showed the possible outcomes of user interactions, clarifying the affordance associated with those actions. This was shown by the highlighting of dates that the user can select. This gave the users a sense of clarity and that they could book their appointment now in the following week.



Animations were used to provide feedback when users engaged with an element, reinforcing the idea that it was responsive and interactive.



Animations were used to validate form input in real-time, helping users correct errors as they typed. This was done through the user entering their personal details and being notified if the information was correct or incorrect.


9:41
EASY MED
Enter Personal Details
Enter your Name & Surname
Enter email address
+27
Phone
Appointment Summary
Date
Monday, 13 March 2023
Time
11:00 AM
Doctor
Dr. Nick Crane
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