HCI Design Brief

Project: eForest Application

Optus

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1 Introduction

1.1 Purpose of this document

This document will demonstrate details of the research and analysis for the eForest application project presented by Optus in partnership with Griffith University. It will determine the target audience of the project and potential problems that they may face with possible solutions and usability recommendations. It will also cover visual design solutions and an initial prototype with test results of the prototype for the proposed application.

1.2 Scope of this document

This document contains data and analysis from survey and interviews with students from Griffith University to define the potential problems. It also analyses the problems to establish the key objectives in usability and design to solve the problems. It includes design decisions and an initial prototype for the proposed eForest application.

This design brief is limited to students from Griffith University as the target audience and it does not cover other potential audience or other stakeholders of the project.

The main purpose of this design brief is to demonstrate initial designs and a non-functional prototype to be used for evaluation and testing design options. It only aims to be the stepstone to the next stage of the project.

1.3 Background

Griffith University's Gold Coast campus is surrounded by bushland areas which is home to unique plants and wildlife. The Rare and Threatened Plant" Walk in the area showcases Queensland's most endangered plants which visitors can access videos and facts about the plants through scanning QR codes. The university is looking into possibilities of utilising technology to enrich the visitor experience by partnering with Optus. The project considers developing systems such as visualisation systems and sensor networks to share information including movements and locations of the wildlife in the bushland areas with visitors.

The project aims to develop a mobile application for visitors to assist them to find a specific animal such as koala by providing them a precise location using sensor networks. Additionally, visitors will be able to identify unfamiliar plants and animals by scanning a QR code or uploading a photo of the animal through the application. These data will be stored and utilised to track the growth of plants and activities of the animals in the forest. The location information of koalas is also applied to prediction of koalas' road crossings. To deliver greater enrichment of the visitor experience, the application will be enclosed with gaming elements for the koala spotting activity which mimics a treasure hunt. Visitors will be rewarded when they spot a koala, and the next clue will be given to pursue more points throughout the day.

2 Audience

2.1 User Research - Desired

For the best design decisions for the application to enhance visitor experience, it is ideal to create an opportunity to engage with actual visitors at the site. Site visits to the Rare and Threatened Plant walk is a perfect way to observe visitors' engagements and behaviours in the environment including signage, the plants, and the wildlife. It would also provide information such as how many visitors there are, how long they take to do activities, and the demographic of the visitors. The site visits may include visiting other areas of the bushland to compare differences in usage. Additionally, conducting contextual interviews would be ideal during the site visits to discover who is visiting the bushland, and what purpose they have. It can also provide some insight into what tools or technology they currently use for their activities and problems with it. Although, it may be difficult to gather participants who have enough time to conduct an interview while they are visiting the bushland. Focus groups with a group of students at Griffith University may be alternate to contextual interviews. It can include both students who have been to the bushland and who have not been there yet. The focus groups can gather their views of the bushland and the project, opinions about technology and how the project can help them using technology.

Data from site visits can be analysed using task analysis to define what tasks there are in the bushland and how they are delivering the tasks currently. Personas analysis can be used for data from contextual interviews to model characteristics of user groups and frame their problems and goals. Card sorting activity is ideal to be conducted at focus groups to analyse cognitive model of target audience. It will help to model flows and structures of procedures and functionalities.

2.2 User Research – Actual

Due to a lockdown and restrictions regarding the COVID-19 pandemic, site visits and contextual interviews were not suited and had some risks of breaching the COVID safe measures. Instead, a survey was conducted online to avoid physical contacts all together.

Since the bushland areas are located within Griffith University, the online survey was distributed to students who are currently studying at Griffith University as potential target who would use the application when they visit the bushland areas. The survey consisted of 12 questions to gather information of technology skill levels, usages of mobile applications, interests of nature, and attitudes towards technologies like Augmented Reality (AR) and games (see Appendix A - Student Survey). 20 students from different departments responded and completed the survey through Google Forms. The results contained great insights relating to technologies, interests, and demographic. Four personas were generated using a personas technique to analyse the survey data (see Appendix B - Personas).

The young students have a more positive attitude towards AR technology than the mature students. They also have good capabilities with technology

and positive views about the project. They have less experience seeing koalas in wild than the mature students. All of responders are interested in nature and have seen koalas before. All have no issues with using map apps on mobile phones and don't play computer games often.

Online interviews with three survey participants were also conducted to gather more information using Microsoft Teams. Task analysis was used to analyse the data from the interviews and frame users' tasks and goals, their level of skills, and the influence in the environment. The results from analysis of the survey and interviews were combined and scenarios were generated to assist further understanding of who the target audience is and problems that they might face by considering how they would use the eForest app and what backgrounds and motivations they might have (see Appendix C - Scenarios). The scenarios used the personas which were generated from the survey and they were also amended using the results of the interviews and scenarios.

The following characteristic groups were identified from the analysis of the information above (see Table 1).

Characteristic	**Young Outdoorsy University Students**	**Young Indoor-type University Students**	**Mature Tech-savvy University Students**	**Mature Anti-tech University Students**
Age	18 - 25	18 - 25	Over 25	Over 25
Outdoor Activity	Regularly (weekly or daily)	Occasionally	Mix	Mix
Interests in Nature	Plants and animals	Animals mainly	Plants and animals	Plants and animals
Seen koalas in wild	A few times	A few times	More than 5 times	More than 5 times
Technology	No problems using technology.			Struggle and avoid technology
Attitude towards AR	Positive	Positive	Neutral	Negative
Ability to use mobile map apps	No difficulties using map apps			
Play computer games	Not often	Not often	Occasionally	Never
Favourite app	Social media (Instagram, Snapchat)	Messaging apps (function orientated)	Utility apps (Banking, Scheduling)	Facebook and utility apps
Attitude towards the proposed app idea	Positive. Sounds fun. Would provide a motivation to visit the forest.			Negative. Won't use it.

Table 1 Groups of University Students

This illustrates different levels of interests to the project and attitudes towards technologies. Young students who are presented as Joshua and Jessica in personas (refer Appendix B - Personas) have positive attitudes towards new technology such as Augmented Reality with some technology skills. They also have less experience seeing koalas in wild than older students. The group of mature anti-tech university students who are presented as Matt in the personas (refer Appendix B - Personas) avoid using technology and have negative views towards AR technology and this project. This indicates the target audience should have some levels of technology skills to want to use the application. In addition, AR technology will be welcomed by mainly younger students and a map functionality won't face difficulties being used by all groups. Games on the other hand are not used regularly by all groups. As persona Karren (refer Appendix B - Personas) suggests, there may be children as users of the eForest app. They are not defined as target audience in this document although, some considerations will be needed for use by children. The groups of young students expressed the desire of sharing their experience on social media as illustrated in scenarios of Joshua and Jessica (refer Appendix C - Scenarios).

2.3 Human Factors

The user research in section 2.2 exposed some key human factors that will give some guidance to the design of the eForest application. All groups showed some confidence in using map apps on their phones which indicates standard design of map can be implemented without any acceptance issues. On the other hand, all groups showed low usage of computer games which indicates the game functionality in the app needs to aim at beginner level with possible detailed instructions. In addition, the application was used while walking frequently in all scenarios which suggests bigger fonts and bigger buttons may increase legibility and readability. At the stage of testing design, the app should be tested while walking to simulate the situation in the bushland to find problems.

As scenario 3 - eForest and Family suggests that there will be children as users therefore, the design may need to cater to young children especially in the treasure hunt section of the application. It also includes the use of tablet by young children in the scenario. Big buttons may be suitable on a tablet for children to select options easily.

The mature anti-tech student group who struggle with technology and negative to this project commented that they do not want to be disturbed by technology while they are in nature enjoying being free from technology. They have great resistance to technology, and they won't use the eForest application. This indicates that the design of the app can target people who have some technology skills and have positive views towards technology. Although, for people who don't want to use the app in the bushland the application may include some features to print out information for offline use.

3 The Problem

To frame potential problems of the proposed eForest application correctly, the rose, thorn, bud method has been used to analyse data from section 2 - user research. Rose, thorn, bud each represents positives, negatives, and opportunities as below.

ROSE

- Easy to navigate in the bushland
- Information is educational
- Encourages more people to visit the bushland
- Game brings more fun and engagement
- Enhance visitor experience
- More data of plants and wildlife and better bushland management
- Improved reputation for university and

THORN

- May be difficult to operate while walking
- Some visitors may not use the app
- Can be hard to understand how to use
- Children may have difficulties
- New technology may not be accepted by some
- Can be disturbing for visitors who want quietness
- Game may not be

BUD

- The model can be applied to other forests
- Data from the project may be used for future research
- May inspire more projects to initiate
- The app may increase interests and awareness of the bushland
- May increase popularity of university

In the survey most responders reacted positively to this project (see Appendix A - Student Survey) although, there are possibilities that visitors may not use the proposed application due to difficulties of understanding how to use the app. The survey also suggests target audience has some confidence in using technology. This may be challenged when they use the app while walking in the bushland. Body movements and destructions may decrease legibility of text in the app and accuracy of locating fingers on screen to select buttons. Furthermore, their focus will be on walking, looking at surroundings, and spotting koalas thus, there will be possibilities that they may not understand or remember complex instructions, especially in a timeline which require more thinking process than simple procedures.

The young student groups in the survey have positive attitudes towards new technology such as AR. In scenario 1 and 2, personas enjoy utilising AR technology to spot koalas and take photos. Although, the mature students show less acceptance of AR technology and they may not use features utilising AR in the app due to some resistance. They may also face some difficulties using such features. In addition to new technology, the game

functionality in the app may not be easy to understand to play or not effective enough to encourage visitors to engage in activities as most responders in the survey don't play computer games often.

In the scenario 3 - eForest and Family (see Appendix C - Scenarios), children are using the app on the tablet. They may find it difficult to understand some words and instructions in the app. Also the app may look different and difficult to use on tablets if it is designed only for smartphones.

The mature anti-tech student group (refer table 1) expressed negative views to the eForest idea in the survey because they want to enjoy the nature in the bushland without disruptions from technology. This may be of concern if crowds of visitors using the eForest app become loud or the app includes some sound effects that are too disturbing and affect visitor experience of people who want quietness in the bushland. It can defeat the purpose and goal of this project of enhancing visitor experience. Additionally, it may damage reputations of providers such as Griffith University and Optus.

3.1 Problem statement

Based on the analysis in section 2 and 3, the potential problems are identified relating to the environment the app would be used in, the motivations, and goals to participate in the activities in the bushland. The following problem statements present needs and problems that have been discovered with benefits for users and the clients when the problems are solved.

People

Primary user: Joshua, persona 1 young outdoorsy university student (see Appendix B - Personas)

Primary user: Jessica, persona 2 young indoor-type university student (see Appendix B - Personas)

Secondary user: Karren, persona 3 mature tech-savvy university student (see Appendix B - Personas)

Negative: Matt, persona 4 mature anti-tech university student (see Appendix B - Personas)

Clients: Griffith University and Optus

Problem Statements

Joshua, young outdoorsy student **needs** readable text and easy to use app interface while walking **because** he wants to access information while walking to finish the activity within his spare time at university

Jessica, young indoor-type student **needs** effective encouragement **because** she wants to continue visiting the bushland with her friends as a weekly outdoor activity for well-being.

Karren, mature tech-savvy student with two kids **needs** easy and kid friendly app interface **because** she wants her kids to use the app to spot koalas to enjoy family time in the bushland.

Matt, mature anti-technology student **needs a** quiet environment in the bushland **because** he wants to enjoy nature without disruptions.

Griffith University and Optus, clients of the project **need** an easy to use popular app without causing disruptions to visitors **because** they want to enhance visitor experience and build reputation.

The requirements to address the above problem statements and priorities:

Requirement	Priority
High readability of text elements while walking	High
High satisfaction rate of treasure hunt game	Medium
Sound effects to be used at a minimum level	Medium
Majority of children can use the app	Medium
More than 90% of target audience can use the app	High
High satisfaction rate of the overall app experience	High
Encourage and increase repeat visit to the bushland	Medium

Table 2 Problem Needs

Detailed specific requirements are defined in section 4.3.

3.2 Proposed solution

The proposed eForest app is to enhance outdoor activities in the bushland areas, therefore it is important to assist users while they are walking and participating in activities as well as provide effective incentives to encourage them to visit the areas. A font size adjuster could improve users' readability while walking. AR technology and a pedometer could give benefits and can give more motivations to visit the areas. Multi player mode and walkie-talkie functionalities could be useful for group visitors. Kids mode is to support the needs of families who want to enjoy activities without compromising the overall look and feel of interface design catered for the target audience. In addition to above, tips, tutorials, and mute button are suggested to assist user experience in general. These features could fulfill users' needs and all together will result in success of achieving a high user satisfaction rate.

Feature	Justification
Font size adjuster	Allow users to change sizes of fonts and buttons easily. Default font size and buttons to be bigger buttons to improve usability while walking.
Tips	Provide tips for each functionality in the app to explain how to use
Tutorials	Provide tutorials at the first launch of the app to explain how functionalities work

AR technology	Utilise AR to enhance treasure hunt game experience. AR can be used to take photos with filters for a further user engagement.
Social Media	Provide an easy share on social media button to improve social engagement and user satisfaction.
Mute button	Minimise use of sound effect and provide a mute button in video player as well as setting no sound in video by default.
Multiple player modes	Provide options to play solo or as a group for treasure hunt game to cater different situations such as playing with family or friends.
Walkie-talkie	Improve communication between players when they explore the bushland separately
Kids mode	Display more illustrations and less text information with easy words for children to use easily in a fun way
Pedometer	Count and track footsteps to encourage walking in the bushland for repeated visits and add extra benefits.

Table 3 Solution Features

4 Usability

4.1 Usability Tools

Defining the usability needs for the eForest application is important to achieve the design that will work for the target audience effectively. Based on the proposed solution in section 3.2, an open card sorting activity was conducted online with four university students who also participated in the survey (refer Appendix A - Student Survey). Microsoft Teams was used for this activity. Each participant belongs to each group which were defined in section 2.2. The participants were supplied with category cards with five category names written such as Map, Plants and Wildlife, Treasure Hunt, Global Features and Info. They were given blank cards for them to write down features of the eForest app and sort them by category. They were also instructed to sort cards in order of priorities and flow. This activity helps to understand users' views and priorities of the features in the app. This also indicates what other features and elements are needed to achieve tasks. The result of the card sorting is included in Appendix D - Card Sorting.

4.2 Usability Findings

In the card sorting activity, participants sorted category cards by importance of the category and how frequent they would use. They seem to be familiar with the general layout design of mobile apps. They didn't take much time to sort cards for the map category. This may be because they are familiar with map apps as the survey shows (refer table 1). For the plants and wildlife category,

they suggested to add image and video gallery so that they can see the visual overview of the plants and wildlife in the bushland which is also convenient before visiting the bushland. The students added the history in the treasure hunt category for repeated use in mind. The AR feature was treated as a supplement feature after a discussion of how important it may be. They added features to the global features category which they want to access from any part of the app. The social media feature was considered important and they want to access it from many parts of the app. In the info category, they added cards for general information about the project and contacts.

The research has exhibited that the university students have good knowledge of the general app design and understanding of how features and elements should be laid out.

The usability findings and recommendations from the research are:

Finding	Recommendation
Students have skills and knowledge of general apps	App can use standard app design and should be accepted. App should avoid unfamiliar layouts.
Students want to access information prior to a visit	Content structure should include a consideration of use outside of the bushland.
Students are familiar with standard map apps	Maps in the app can include general features which can be seen in standard map apps and should follow the standard layout of mobile map apps. Advanced features such as photo tags which are already implemented in some map apps, can be implemented without confusing users.
Students have intention of using the app repeatedly	Include features for repeat uses such as history in the treasure hunt.
Students showed positive attitudes towards AR mostly but it is not essential	AR functionality should be implemented at a supplement level as an option.
Social media feature was considered as important	Sharing on social media button should be placed many parts in the app.
Students have different situations for playing treasure hunt	Player mode selection should be displayed at the beginning of treasure hunt game for solo mode or group mode.
Students want to access usability tools across the app	Place usability tools such as tips, font size adjuster, and kids mode where users can access from any part in the app.

4.3 Usability Objectives

The proposed eForest application will be used to enhance visitors' activities in the bushland. The application must be reliable and work efficiently while users participating other physical activities such as walking, looking for wildlife, and talking to their companions. Although the research indicated that main audience would have a good understanding of mobile apps, the app must consider children and other users outside of the target audience. For above reasons, learnability, efficiency, satisfaction, and reliability are key factors to measure the usability of the application.

The following usability objectives and measures have been acknowledged to provide the application to meet the usability goals.

Learnability and Efficiency

Aspect of solution	Usability objective	How is this measured?	Success criteria
Launching the app	Users can open the application without issues including while walking.	Time taken to recognise the app and open on a phone while walking.	90% of testers can find the app icon within 30 seconds and open within 10 seconds after finding the app.
Identifying main sections	Users can understand each main icons which represent sections such as map.	Rate of successfully identifying main icons.	90% of testers can describe what each icon represent.
Changing font size	Users can change font size by using the font size adjuster.	Time taken to find the functionality and change font size.	90% of testers can find the functionality within 20 seconds and change size within 10 seconds.
Finding Tips	Users can recognise and find tips and open it.	Time taken to find the functionality and open.	90% of testers can find the functionality within 20 seconds and

			open tips within 10 seconds.
Selecting icons	Users can select icons correctly while walking.	Rate of successfully selecting icons while walking.	90% success rate of selecting icons by testers.
Locating plants in map	Users can locate plants in map easily.	Time taken to locate a particular plant in map.	90% of testers can locate the plant within 5 minutes.
Finding plants' information	Users can find information about a plant.	Time taken to find information about a particular plant.	90% of testers can locate the plant within 3 minutes.
Start treasure hunt game	Users can start treasure hunt game without major issues. Must select player mode.	Time taken to start the treasure hunt game.	90% of testers can star the game within 3 minutes.
Using AR functionality	Users can use AR functionality in the app without major issues.	Rate of successfully operate the functionality.	70% of testers can find and use the functionality.

Satisfaction

Aspect of solution	**Usability objective**	**How is this measured?**	**Success criteria**
Satisfaction of treasure hunt game	Users are satisfied with playing the game without major troubles or unpleasant experience.	Collect users' satisfaction rate after playing the game.	Average rate score is over 3.5 out of 5.
Satisfaction of the app overall	Users are satisfied with operating the app without major troubles or unpleasant experience.	Collect users' satisfaction rate after operating the major features.	Average rate score is over 3.5 out of 5.

Reliability

Aspect of solution	Usability objective	How is this measured?	Success criteria
Keeping scores in treasure hunt game	The app can keep users' scores correctly in treasure hunt game.	Accuracy of scores and rate of score data loss.	100% accuracy of scores and less than 1% of score data loss.
Share on social media	Users can share on social media without frailer.	Accuracy in successful post to social media.	More than 99% success rate of posting on social media.
Moving between sections	Users can move between main sections. Users can go back to the state where it's left without going back to the beginning.	Accuracy in successful moving between sections without losing the state it was left.	More than 95% success rate of moving between sections.
Reliable app operation	Users can operate the app without its freezing or crushing.	Frequency of app freezing or crushing.	Less than 5% of app crushing or freezing out of total operation time.
Exiting the app	Users can exit the app without delays and crushing.	Time taken to fully exit the app and the rate of app crushing.	Over 90% rate of app exiting within 3 seconds and less than 3% of crushing.

5 Design Decisions

5.1 Visual Elements

5.1.1 Buttons, Icons and Graphics

Graphical buttons and icons should be utilised to help users intuitively understand what functionalities are available without them reading words. The list below includes icons that are commonly used in apps and websites, therefore they are easily recognisable for the main audience of eForest app who are familiar with standard apps.

ID	Element	Description/Justification	Sample
Button_1	Access to tools	Open and close tools menu. Available from most screens at the top.	
Button _2	Home section	Move to Home section. Placed in the tab navigation.	
Button _3	Guide section	Move to Guide section. Placed in the tab navigation.	
Button _4	Map section	Move to Map section. Placed in the tab navigation.	
Button _5	Adventure section	Move to Adventure section. Placed in the tab navigation.	
Button _6	Camera section	Move to Camera section. Placed in the tab navigation.	
Button_7	Button with text	Button to take an action. Rounded corners to soften the look and feel.	
Icon_1	Font size adjuster	Open font size adjuster from tools menu.	
Icon_2	Walkie-talkie	Open walkie-talkie functionality.	

Icon_3	Kids mode	Turn kids mode on. Placed in tools menu.	
Icon_4	Pedometer	Access to pedometer functionality.	
Icon_5	Tutorial	Access to tutorial contents.	
Icon_6	Settings	Move to settings section.	
Icon_7	Tip	Open tip information relating to each section. Placed at the top of most sections.	
Icon_8	Self-locator	Move the map to centre of user's location in Map section.	
Icon_9	Search	When it is in a input box, it indicates users can search by typing keywords. In Map section, it opens a search input box.	
Icon_10	Group members	Displays group members' locations on map. Only available in a group mode.	
Icon_11	AR scan	Turns AR scan mode on in Adventure section.	
Icon_12	Share	Indicates a share functionality.	
Icon_13	Player location	Indicates player's location in map.	
Graphic_1	Cropped photo image	Photo images to be cropped to circle shape to indicate the use as an icon or a selection.	

Table 4 Buttons, icons, and graphics from Icons 4 Design (http://emsoftware.com/xdplugins/icons-4-design/)

The use of these common buttons and icons for menus improves the learnability and efficiency of the app which are important to resolve the

usability objectives that are stated in section 4.3 such as identifying main sections.

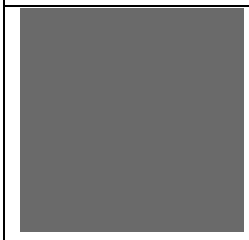
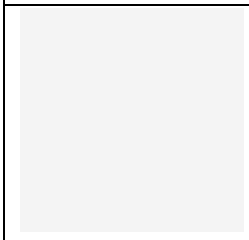
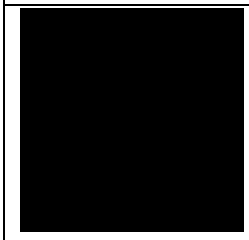
Rounded rectangles or circles are used to shape buttons and icons to create soft overall look and feel. Circle shaped icons and images are also commonly used in popular social apps such as Instagram. Use of these elements in this app design improves the engagement of the target audience as they selected popular apps as their favorite apps in the survey.

5.1.2 Text, Colours and Style

The legibility of text information is important as using the app while walking in the bushland was identified as one of the main users' environments. The font sizes should be larger to cater this use scenario.

As the main font, Tahoma sans-serif font was selected because of its high legibility (Caprette, n.d.) (University of North Carolina, 2019). The font sizes are set as 17pt for body text, 28pt for title 1, and 34pt for large title to be in line with the large settings of iOS interface guideline defined by Apple (2021).

The colour palette selected for eForest app is as below:

Colour	Use and Code (Hex code)	Description/Justification
	Feature colour: Dark_cyan (#45A0A9)	The colour is in between forest colour and sky colour. This colour is selected to harmonise with the bushland environment. It is also the corporate colour of Optus (see Figure 1).
	Text and icons: Dark_grey (#6A6A6A)	This colour is used for parts that need a moderate contrast.
	Background colour: Light_grey (#F4F4F4)	This colour is used to have a minimal contrast with a white background.
	Text and icons: Black #000000	This colour is used for elements that require maximum legibility and visibility.

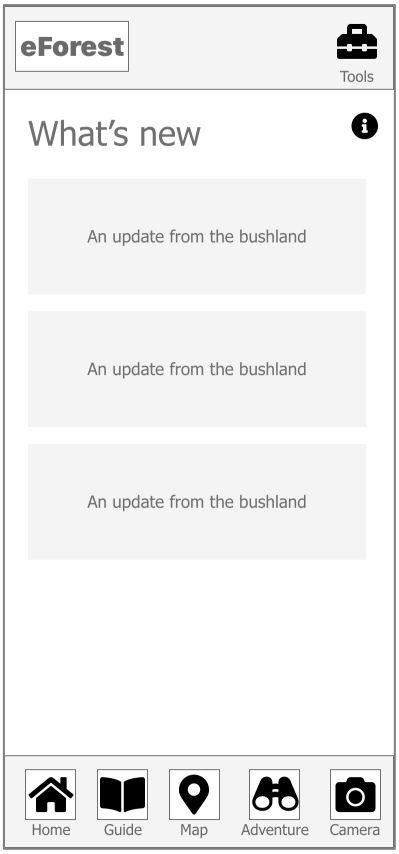
	Background and text: White #FFFFFF	This colour is used for the background of most parts. It is also used for text elements to have a high contrast with a photo as a background.

Figure 1 Optus logo (https://www.optus.com.au/about/media-centre/multimedia/logos)

Only one colour is selected other than grey tones to achieve the clean, simple, and clear look for a maximum legibility and visibility to support the environment of walking in the bushland. It is also in line with minimal look that can be seen in other apps which the main audience like.

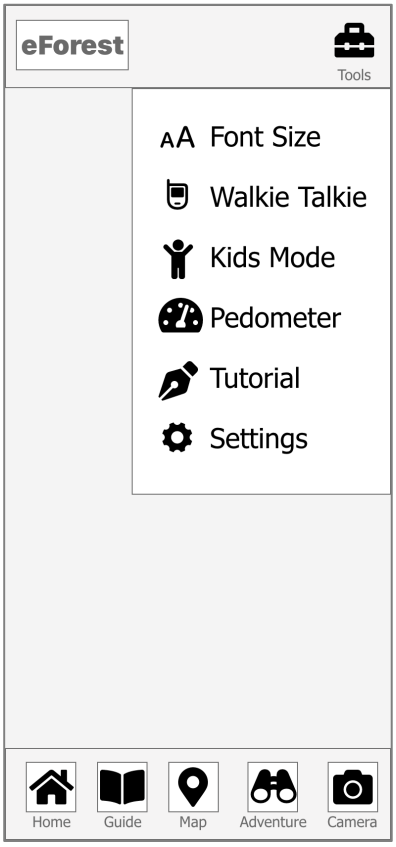
For consideration of use by people with colour blindness, using green and red together was avoided furthermore, the colours are selected to have different tones (Style.ONS, 2015).

5.2 Layout



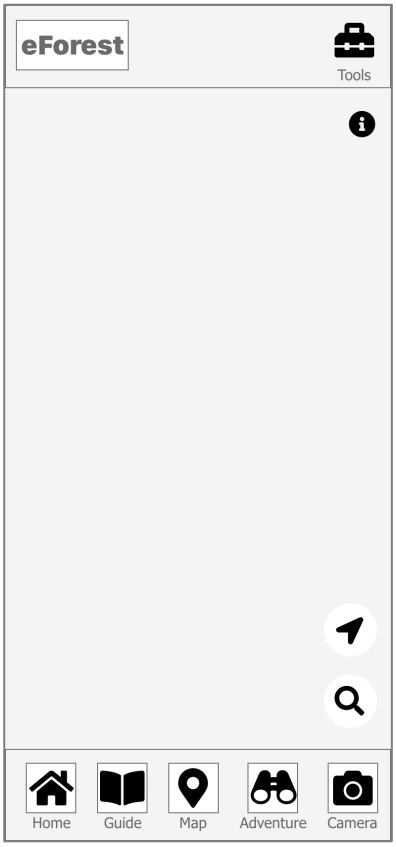
Wireframe 1 Home

Wireframe 1 above shows the typical layout of the app which follows the design convention of app layout as the research shows that the main audience is familiar with standard app layout. There is a tab navigation located at the bottom of the screen with buttons (Button_2, 3, 4, 5, and 6) of main sections of the app to allow users to navigate across the app. Button_1 at the top right corner allows users to access a selection of tools from any screens in the app. Icon_7 at the top below Button_1 will be shown to indicate that there is a tip for the section available for users to select and display.



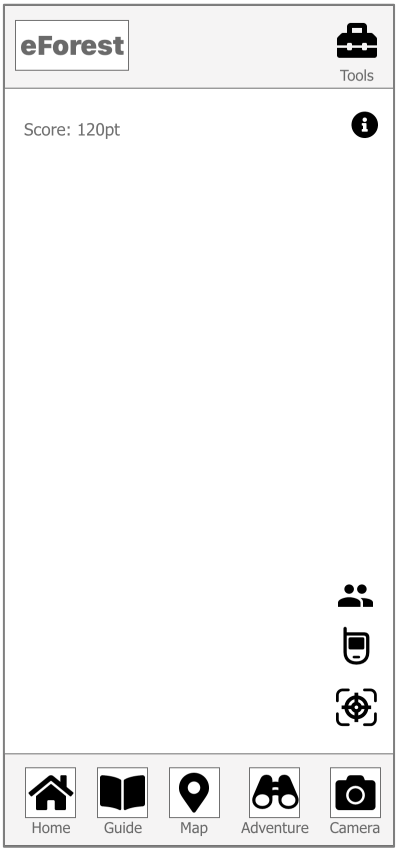
Wireframe 2 Tools

Wireframe 2 illustrates how the functionalities are listed and easily assessable by selecting Button_1. All menus are supplemented by icons (Icon_1, 2, 3, 4, 5 and 6) to improve learnability and legibility of the menu. The menu is accessible from anywhere in the app by selecting Button_1.



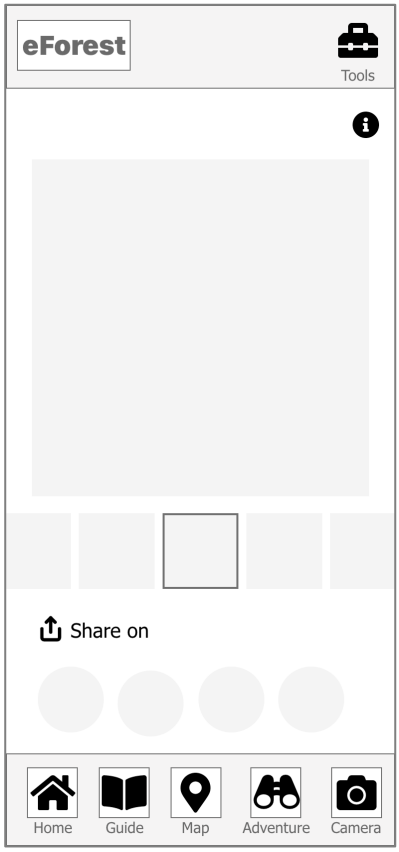
Wireframe 3 Map

Wireframe 3 shows how the map section will be displayed. Icon_8 and Icon_9 are placed over a map view to indicate a self-locator and search capability. This layout is designed to mimic the standard map app layout since the main audience is familiar with map apps' layouts as found in the user research.



Wireframe 4 Adventure

Wireframe 4 indicates how the adventure game section will be presented. User's score will be shown at the top and there are three icons at the bottom right corner. Icon_10 and Icon_2 will be shown when users are playing the adventure game in group mode to help users locate their members and communicate between members using the walkie-talkie functionality. Icon-11 let users enter the AR scan view mode.



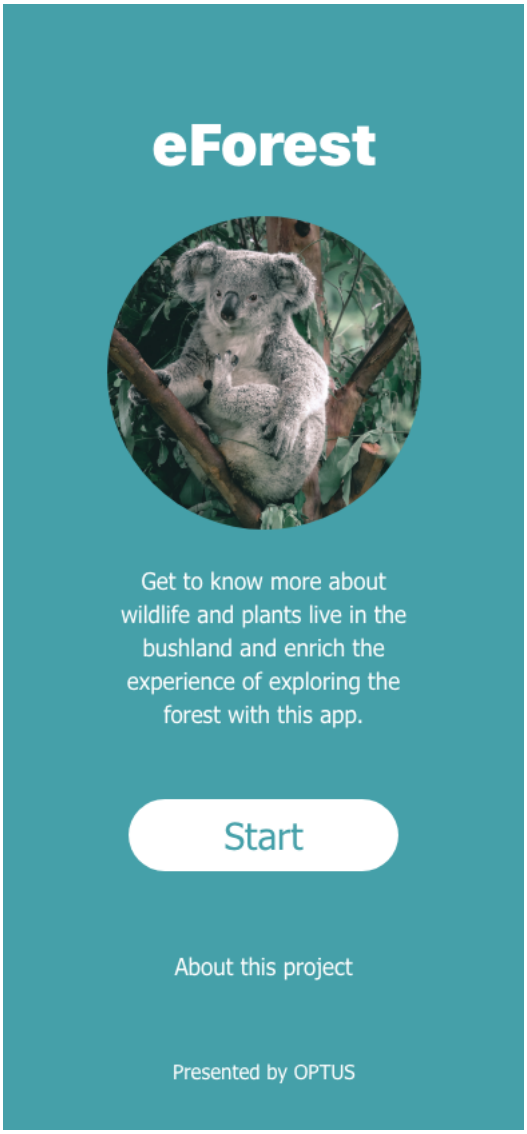
Wireframe 5 Camera

Wireframe 5 displays how users can share their photos on one of social media platforms listed. This is one scene from the camera section and users can select a photo from photos that are taken before. Icon_12 is used to supplement the share functionality title.

6 Prototype

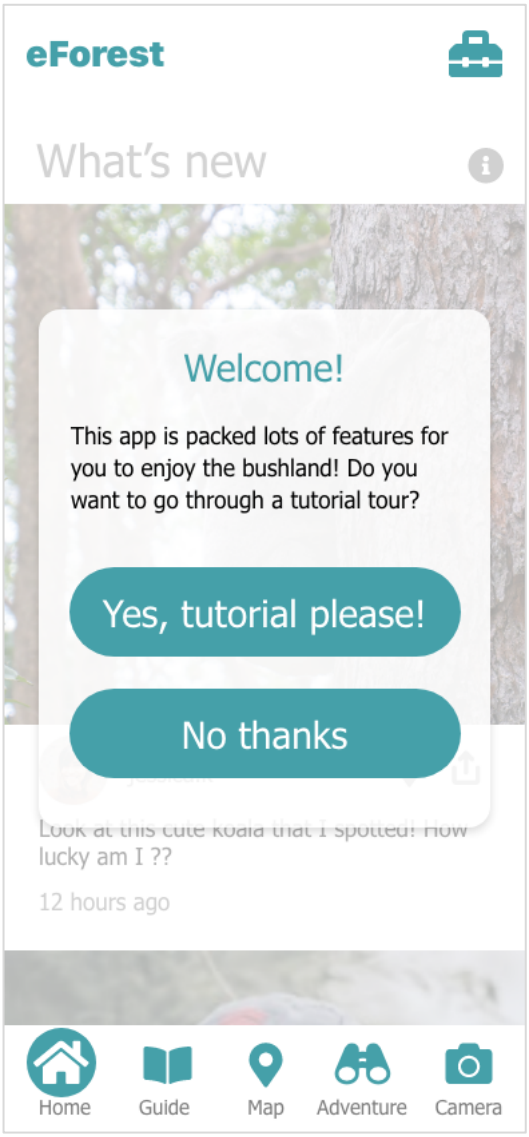
A prototype app was developed to demonstrate how the proposed eForest app work in a flow as well as how the design elements defined in section 5 can be presented to create the look and feel.

Prototype link: https://xd.adobe.com/view/d67b9284-a983-4b6f-ba1e-0aeb76d61390-8328/?fullscreen



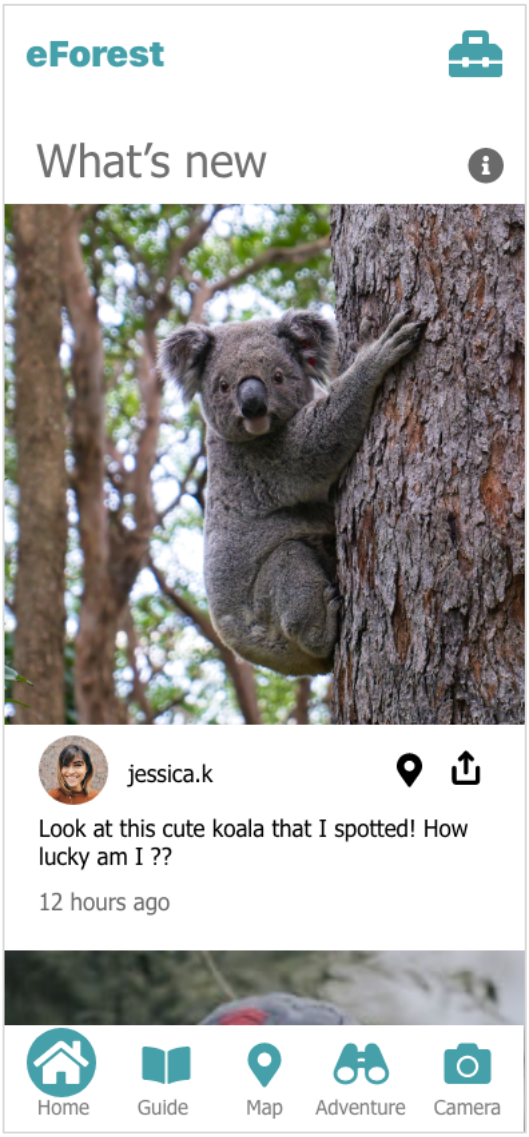
Prototype Screen 1 Landing-page - Stock image from Unsplash https://unsplash.com

Prototype Screen 1 displays how the landing-page navigate users to the start button with the brief description of the app and a minimum use of elements. The koala image indicates what the app is about and build a right expectation to enter the app. By cropping the image in a circle, it set up the soft feeling that app's design esthetic will bring to users in the next screen. The feature colour, Dark-cyan was used for the background to introduce the colour to the user.



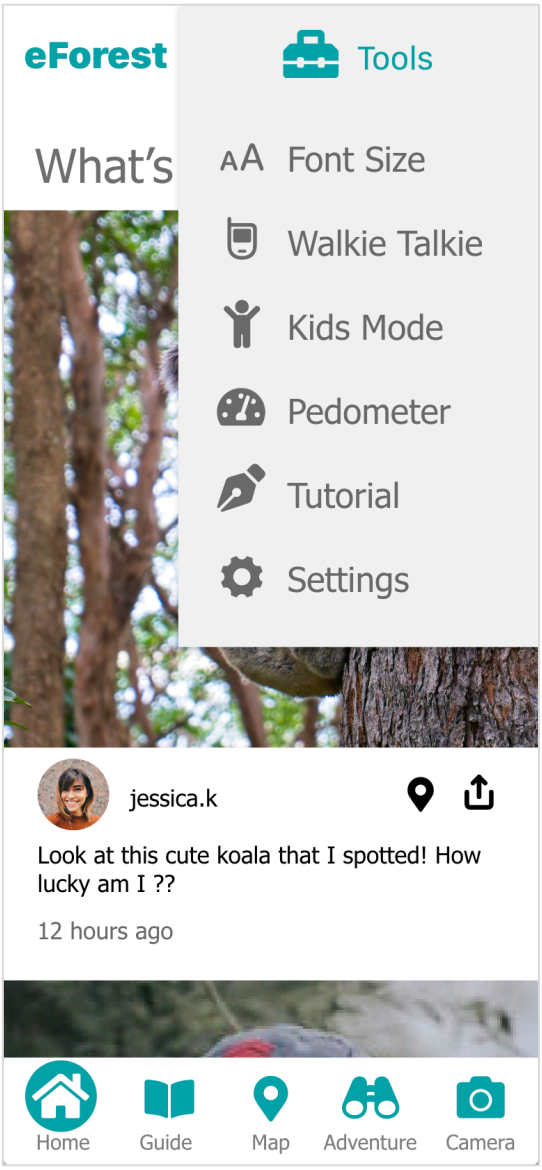
Prototype Screen 2 First Launch- Stock images from Unsplash https://unsplash.com

Prototype Screen 2 demonstrates how the welcome message with a button to a tutorial tour on a first launch is shown. The text elements in the buttons indicate what users need to do clearly and the background opacity is adjusted to draw users' attention to the pop-up message. This message is only shown for a initial launch.



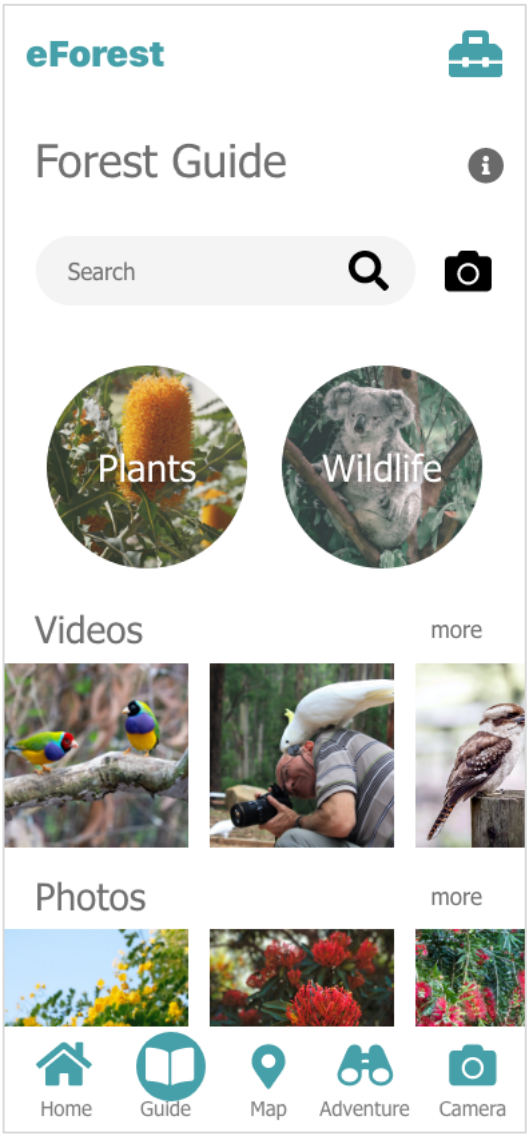
Prototype Screen 3 Home - Stock images from Unsplash https://unsplash.com

Prototype Screen 3 displays how the home screen mimics the social media format to capture users' attentions and attempt to build a strong engagement with users. In the user research, social media apps were favored by the target audience. The home section curates photos and updates posted by users and users can see other users' activities as well as locations of their findings. As of other sections, Icon_7 at the top next to the large title indicates that there is a tip information available for the section and users can access by selecting the icon. Button_2 is highlighted with a circle in the tab navigation bar to indicate that which section the user is in the app. This style applies to all other menus in the tab navigation bar across the app.



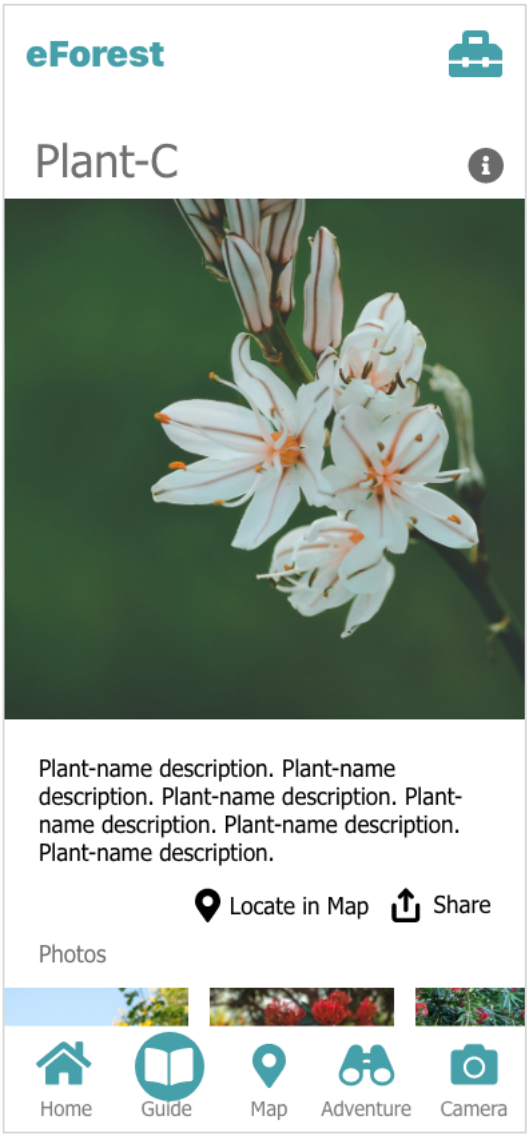
Prototype Screen 4 Tools - Stock images from Unsplash https://unsplash.com

Prototype Screen 4 shows the layout of the tools menu and how it is overlayed in the app. The functionalities listed in the menu are easily assessable by selecting Button_1 from any sections within the app. Light_grey background colour helps it to be identified as an overlay object against the white background.



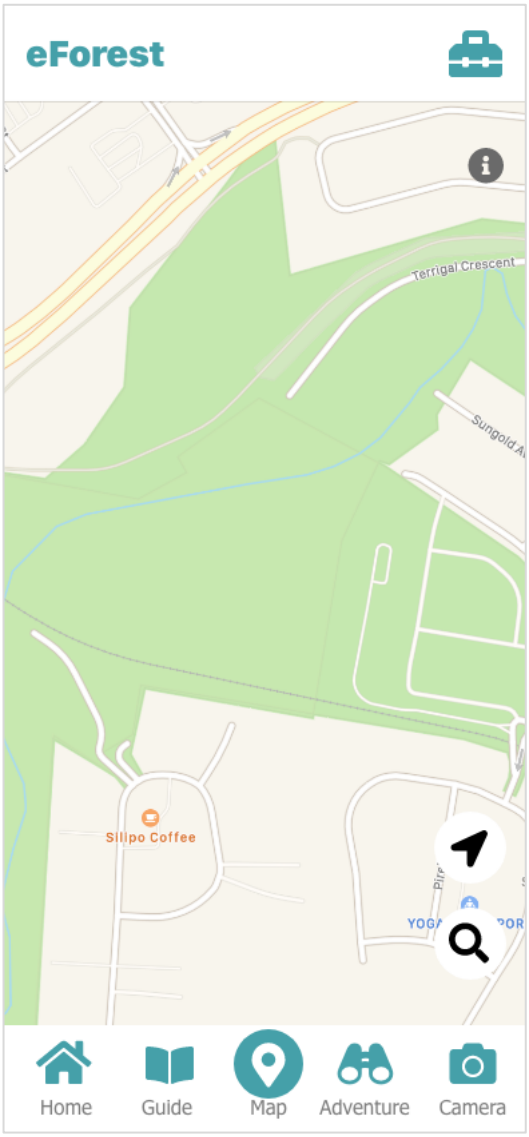
Prototype Screen 5 Guide - Stock images from Unsplash https://unsplash.com

Prototype Screen 5 demonstrates how the guide section is presented with a search box and graphic icons. In this section, users can look up to get detailed information of plants and wildlife that live in the bushland. Icon_9 serves as an indication that user can search with keywords using the input box and Button_6 suggests that users can search with an image. Two graphic icons are placed under the search box for users to browse through information by categories. These icons cropped in a circle to match with other rounded shapes in the app. White is used for text elements that are over photo images to give a contrast with a drop shadow effect. Videos and phots from the guide library are listed to cater for people who are more attracted to visuals.



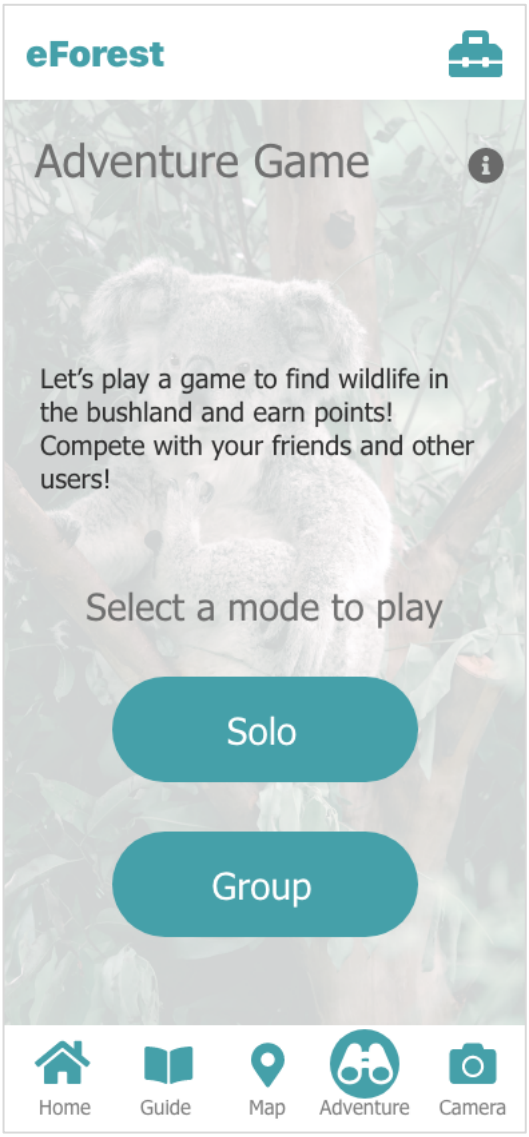
Prototype Screen 6 Guide Details - Stock images from Unsplash https://unsplash.com

Prototype Screen 6 shoes how information of a plant can be displayed. Users can read about the plant and share on social medias by selecting Icon_12 or locate the plant in the map section by selecting Button_4. Black is used for the text element to achieve the maximum legibility.



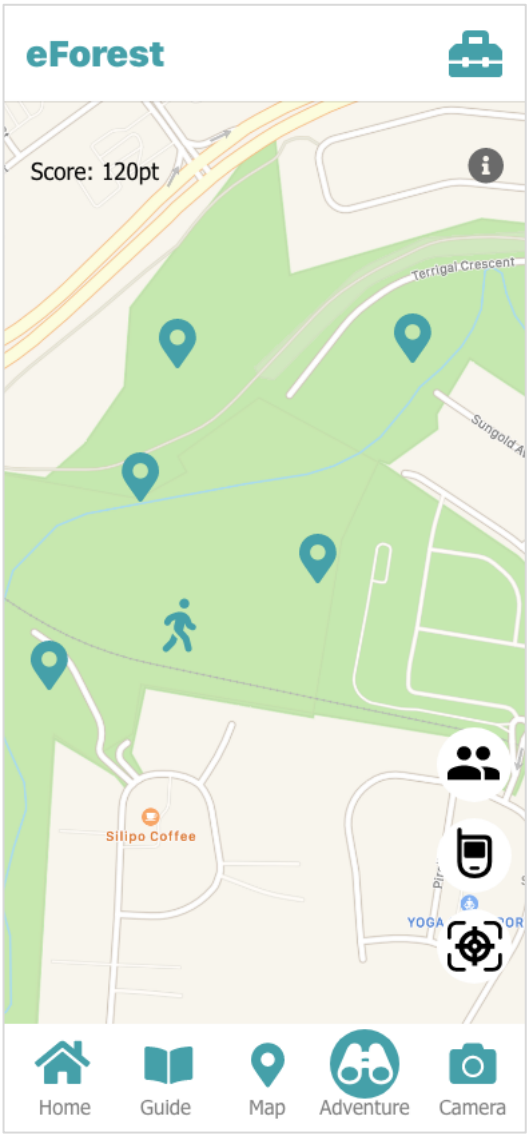
Prototype Screen 7 Map - Map screenshot from Apple Maps https://www.apple.com/au/maps/

Prototype Screen 7 shows how the map section is displayed with two icons. Icon_8 indicates that users can locate themselves in the map by selecting the icon. Icon_9 suggests that users can search locations. This layout is designed to have similarities with standard map apps to be intuitive since the survey revealed that the target audience is familiar with map apps.



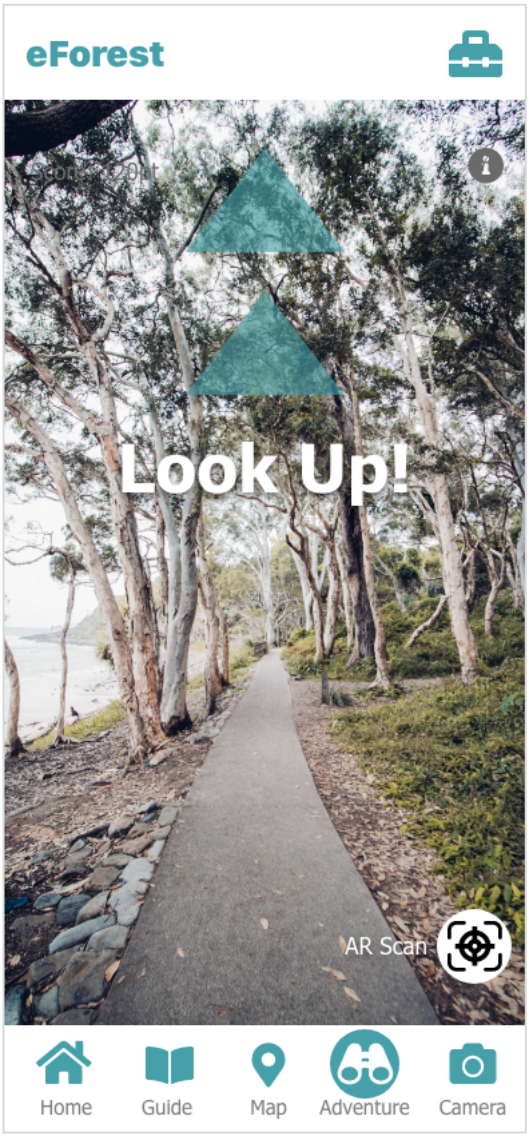
Prototype Screen 8 Adventure - Stock image from Unsplash https://unsplash.com

Prototype Screen 8 illustrates the layout of the initial screen in the adventure game section. Users are given choices to play the game as a solo or a group. Button_7 style is used for the selections. While the background image indicates what users can expect from the section, it is faded to provide other elements a good visibility.



Prototype Screen 9 Adventure Map View - Map screenshot from Apple Maps https://www.apple.com/au/maps/

Prototype Screen 9 shows how users plays the adventure game in a map view. User's score is shown at the top and there are three icons at the bottom right corner. Icon_10 and Icon_2 will be shown when users are playing the adventure game in group mode to help users locate their members and communicate between members using the walkie-talkie functionality. Icon-11 let users enter the AR scan view mode. Button_4 in the map indicates locations of targets and Icon_13 indicates the player's location.

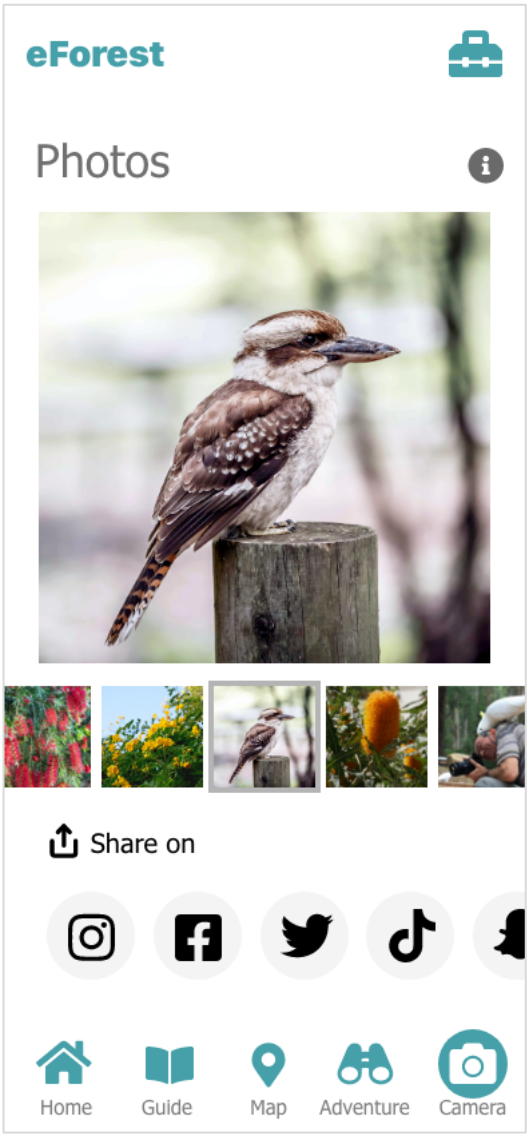


Prototype Screen 10 Adventure AR view - Stock image from Unsplash https://unsplash.com

Prototype Screen 10 demonstrates how the AR scan view is displayed in the adventure game section of the app. Dark_cyan coloured triangle shapes are used to instruct users which direction to look to spot wildlife such as koalas with a white text element.

Prototype Screen 11 Camera - Stock image from Unsplash https://unsplash.com

Prototype Screen 11 illustrates how visual elements are used in the camera section. Users can access information of a plant or wildlife by facing the camera to plants or wildlife. A white square shows up when the app detects and match a plant or wildlife. Information of the object is displayed in a semitransparent white box with a link to open more details in the guide section.



Prototype Screen 12 Photo Share - Stock images from Unsplash https://unsplash.com

Prototype Screen 12 shows how visual elements are placed in the share functionality. Users can share their photos that are taken in the app on a selection of social medias. Light_grey circles are used to wrap the social media icons to indicate that they are the options.

7 Testing

7.1 Test Plan

7.1.1 Testing Purpose

The purpose of the test is to validate the needs that were identified in the user research and that the product will be providing solutions to solve the needs as intended in effective ways.

The testing attempts to verify the followings:

- How easy to understand the main functionalities in the app at first time use.
- Effectiveness and efficiency of the visual elements in the app.
- Effectiveness of the navigation in the app. How easy to navigate through the app.
- legibility of the content. How easy to recognise words and read text information.
- How well the app appropriately works for a use while walking. Can they identify and select icons? Can they read text information?
- How well the colour palette is chosen for the purpose of the app and for the target audience. Is any colour destructing?
- Effectiveness of the tools menu. Is it in a right place for an easy access? Are items in the menu appropriate?

7.1.2 Participant Characteristics

Desired test participants would fit into the following characteristic groups that were identified in the user research in section 2.2 (refer Table 1) to test against similar attributes to ones of the target audience of the app and validate the needs and the solutions which the prototype demonstrates.

- Young Outdoorsy University Students
- Young Indoor- type University Students
- Mature Tech-savvy University Students
- Mature Anti-tech University Students

Due to the conflicting timing with the end of trimester at Griffith University, most students committed their time to assignments and exam preparations. Hence, there were difficulties to find students who could contribute their limited time to participate in the test. The actual participants are five family members form one family. Two of them are under 25 year-old young full-time workers, the rest are over 40 year-old. There are two females and three males. All are interested in animals or plants and they all showed positive attitudes towards the proposed eForest app. Although there are no young university students, two young participants are expected to show similar reactions in the testing to the target audience defined from the research because of the similarities in characteristics such as age and technology ability.

The characteristics of the actual participants are:

Characteristic	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
Age	20	22	42	46	56
Sex	Female	Male	Male	Female	Male
Job	Child carer	Retailer	Uni Student	Teacher	Tradie

Outdoor Activity	Occasionally	Occasionally	Regularly	Occasionally	Occasionally
Interests in Nature	Animals	Animals	Plants and animals	Plants and animals	Plants and animals
Seen koalas in wild	A few times	A few times	More than 5 times	More than 5 times	More than 5 times
Technology	No problems using technology.				
Attitude towards AR	Positive	Positive	Negative	Neutral	Positive
Ability to use mobile map apps	No difficulties using map apps				
Play computer games	Often	Often	Never	Never	Often
Favourite app	Snapchat	YouTube	iMessage	Facebook	Game apps
Attitude towards the proposed app idea	Positive. Sounds fun. Would provide a motivation to visit the forest.				

Table 5 Participants Characteristics

7.1.3 Method

The testing sessions were conducted by following the method as below. Talk-aloud method was used to help observe thinking process of the participants and interviews were conducted to ask questions at the end of the sessions. Each session was proceeded with one participant at a time. Both quantitative and qualitative data are expected to be collected from the testing.

Environment: Private home setting

Equipment: iPhone smartphone, pens, a desk, and chairs

1. A test participant is asked questions to identify characteristics of the participant and verify that they are right candidates for the test.
2. The participant is provided with an explanation of the project and the objectives of the app.
3. The consent form is given to the participant with an explanation of the form and notified there will be a photo taken to be attached to this design brief document.
4. The participant sign the form and they receive a copy of the form.
5. A smartphone that is loaded with the prototype of eForest app is given to the participant and they receive the task list defined in section 7.1.4 to complete the tasks. They are also instructed to talk loudly what they are seeing, thinking, and doing to practice the talk-loud method.

6. At the completion of all tasks, the participant is asked questions as below:
    a. Was the app easy to use?
    b. How was the navigation in the app?
    c. Were icons easy to understand what they meant?
    d. Did you like the colour palette in the app?
    e. Was it easy to read?
    f. What aspects of the app did you like?
    g. What aspects of the app did you dislike?
    h. Was there anything lacking from the app?
7. At the end of all testing, the participant is notified that the session has completed with the great appreciation from the team member.

7.1.4 Task List

1. Follow the landing-page screen to start the app.
   - Measure time to complete selecting start button.
2. Select an option to see tutorial.
   - Measure time to complete selecting yes button with a false rate.
3. Move to Guide section and select Plants in the screen.
   - Measure time to complete selecting Plants with a false rate.
4. Find a tool to change the font size.
   - Measure time to complete opening Tools with a false rate.
5. Move to Map section.
   - Measure time to complete selecting Map with a false rate.
6. Move to Adventure section and select Group.
   - Measure time to complete selecting Group with a false rate.
7. Select AR view icon.
   - Measure time to complete selecting AR view icon with a false rate.
8. Move to Camera section.
   - Measure time to complete selecting Camera with a false rate.
9. Click any part of the screen.
   - No measurement.
10. Find the tools menu.
    - Measure time to complete selecting Tools icon with a false rate.
11. Start walking and select Home.
    - Measure time to complete selecting Home with a false rate.
12. Read text information in the screen while walking.
    - Measure accuracy of the reading.

7.2 Test Results and Analysis

The results and analysis of the testing are as followings. Participants consent forms (see Appendix E) and photos from testing (see Appendix F) can be found in appendixes.

7.2.1 Results

The table below shows results from testing with tasks. Task 1 to 11 show time (seconds) to complete each task with failures in a bracket and accuracies (percentage) are shown for task 12 in the above table.

Task	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
1. Landing-page	1	1	4	5	2
2. Select tutorial	1	2	1	2	4
3. Guide	1	2	2	5	6
4. Font size	32	3	10	13 (1 fail)	70 (3 fail)
5. Map	2	2	5	2	2
6. Adventure	2	2	2	4	4
7. AR	2	5	40 (3 fail)	14	25 (1 fail)
8. Camera	1	3	3	1	5
10. Tools	1	2	1	20 (1 fail)	2
11. Walking and select Home	1	2	1	2	2
12. Walking and reading	100%	100%	100%	100%	100%

Table 6 Task Completion Times

The following table shows participants' responses to questions in the interviews.

Question	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
a. Was it easy?	Yes	Yes	Yes	Yes	Yes
b. How was the navigation?	Easy to understand	Worked well	Easy to navigate	Straight forward	Good
c. Were icons easy to understand?	Yes	Yes	Yes	Yes	Yes
d. Did you like the	Yes	Yes	Yes	Yes	Yes

colour palette?					
e. Easy to read?	Yes	Yes	Yes	Yes	Yes
f. What did you like?	Easy to access tab navigation at the bottom. Walkie-talkie tool is a good idea. AR view.	Social media sharing. Leaning contents. Pedometer. Tab navigation was clear and useful.	Harmonious colours. Font size adjuster. Tools.	Easy to use tab navigation. Text and icons are big with good spacing. Social media looking content in Home section.	Informative contents and features.
g. What did you dislike?	None	Name of the app	None	None	Tools icon was hard to find. Grey would have been a better colour.
h. Anything lacking?	Picnic locations would be good to see in Map.	Pinning or tagging a point of interest in Map to share with friends and others.	None	None	None
Comment			Initially I didn't expect the tools to be at the top but after finding I like it. Tutorial would have shown it anyway.	I thought the icon for tools at the top was for settings like other apps so didn't look there. After knowing what it is I like it.	

Table 7 Participants Responses

7.2.2 Analysis

The testing has brought valuable quantitative and qualitative data to be used for an analysis.

Overall, participants had little trouble finding sections and navigate through the app thanks to the design convention the app design followed. All participants had a good understanding of how apps should work and where items should be placed in apps which confirms the research findings. The tab navigation at the bottom was accepted as easy and useful to navigate between sections in the app. They commented that buttons in the tab navigation are easily understood by their meanings. Participants didn't have any issues understanding other icons and buttons used in the app.

The colour palette was liked by all participants. Participant 3 selected the colour palette as one of aspects that he liked and commented it was harmonious. Others also commented that they liked the combination of grey tones and Dark_cyan as it looked clean. This validates the intention of choosing the colour palette.

The font sizes, font colours and the font chosen contributed the excellent results in the testing to check the legibility of text elements in the app. All participants successfully read the text information even while walking with the 100% accuracy. Participant 4 selected the font size and spacing as one of the aspects that she liked.

All participants except Participant 2 struggle to find the font size adjuster in the tools menu with Button_1. They took more than 10 seconds and Participant 5 spent 70 seconds with 3 failures. As some comments in Table 7 suggest, participants assumed Button_1 was a cog icon to access settings that can be seen in standard apps. It highlighted that following the design convention did not reach to this placement of the button. Nevertheless, some participants shared their understanding that this could be resolved by a tutorial tour which was not available in the limited prototype.

Despite of the struggled results to find one of the items in the tools menu, the participants showed how easy to access the tools menu after finding and understanding Button_1. Most participants expressed that they liked the placement of Button_1 once they found out. They also commented that the design and layout of elements inside were easy to understand and effective. The actual tools inside the tools also received positive feedback from participants.

Older participants had difficulties accessing the AR view functionality indicated by Icon_11. They spent more than 10 seconds and Participant 3 took 40 seconds with four attempts. They struggled to understand the concept of AR as they were not familiar with the use of AR and the technology itself. Young participants were familiar with the technology through apps such as Snapchat and gaming apps.

The social media sharing functionality was welcomed by most participants. Moreover, the home section which was designed to look like social media received positive reactions from two young participants and Participant 4. This validates the intended effect to engage with the target audience.

7.3 Findings and Recommendations

The following findings and recommendations are generated based on the test results and analysis.

Finding	Recommendation
Tab navigation was effective and the buttons were easy to understand their meanings.	No change required.
Font, font size, and font colours were adequate for the legibility including while walking.	No change required.
Visual elements such as icons, images and buttons were effectively presented and easy to understand.	No change required.
Colour palette produced the harmonious feeling as intended and received positive impressions.	No change required.
Button_1 was not recognised as a menu to find a tool. After being found, it received positive feedback of its icon choice and the placement as well as the design of menu inside.	To distinguish from the logo nearby, Button_1 should have different colour such as Dark_grey. A text label under the icon may be effective. The tutorial tour should include an introduction of the tools menu and its placement.
Icon_11 for AR view in Adventure wasn't easy to understand for older participants.	It was recognised by young participants thus rather than changing the icon, adding a text label "AR" should be sufficient to support users who are not familiar with the technology.
Social media share functionality received positive feedback.	No change required.
Home section which designed like social media feeds was welcomed by the target audience.	No change required.

Table 8 Findings and Recommendations

The followings are screens of the prototype with changes based on the recommendations.

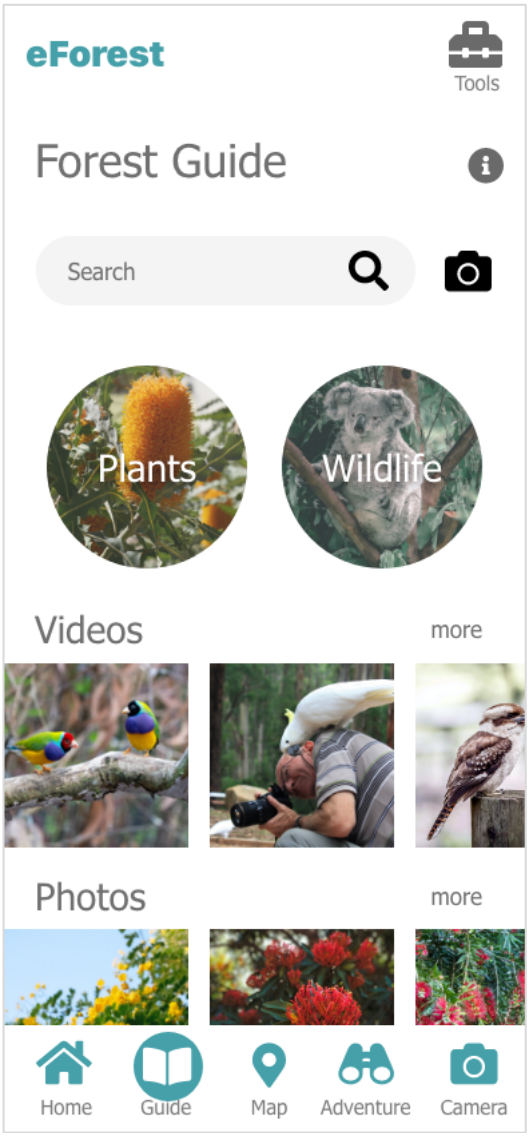


Figure 2 Revised Tools Button

Figure 2 shows that the colour of Button_1 had been changed to Dark_grey to differentiate against the logo and the text label "Tools" was added to support understanding of the button.

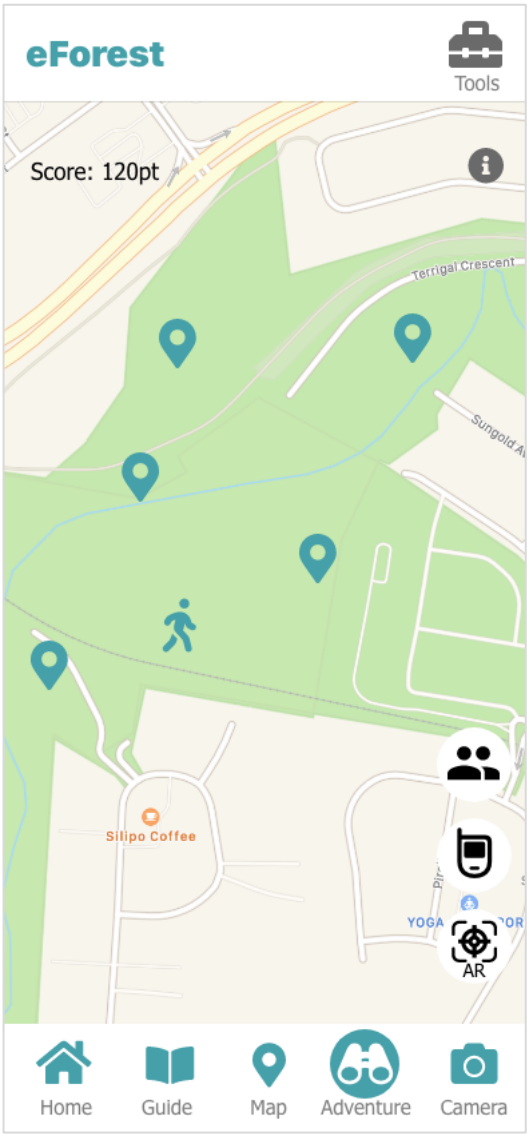


Figure 3 Revised AR Icon

Figure 3 displays that text "AR" was added underneath Icon_11 within the circle to support users who are not familiar with AR technology and have no understanding of the icon graphic.

8 References

Apple. (2021). *Human Interface Guidelines*. https://developer.apple.com/design/human-interface-guidelines/ios/visual-design/typography/

Caprette, H. (n.d.). *Best practices in accessible online design*. Pressbooks @ MSL. https://pressbooks.ulib.csuohio.edu/accessibility/chapter/chapter-2-4-formatting-font-for-readability/

Style.ONS. (2015, June 5). *Accessibility and colours*. https://style.ons.gov.uk/data-visualisation/using-colours/accessibility-and-colours/

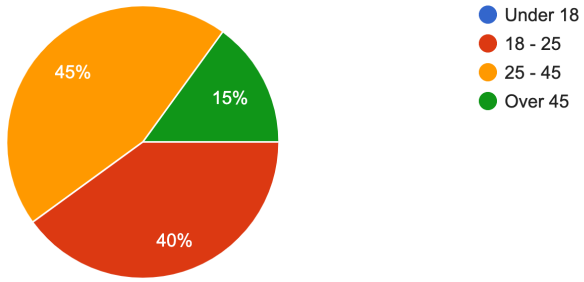
University of North Carolina. (2019). *Accessibility resources at UNCG*. https://accessibility.uncg.edu/getting-started-with-accessibility/accessible-design/

9 Appendix A - Student Survey

9.1 Survey response summary

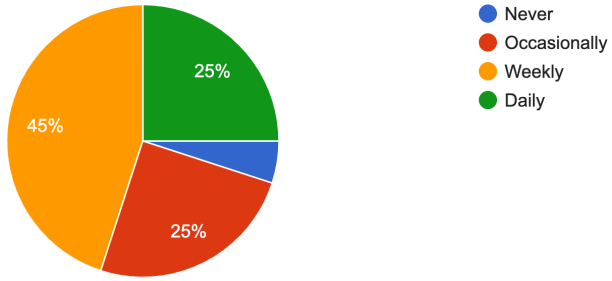
How old are you?

20 responses



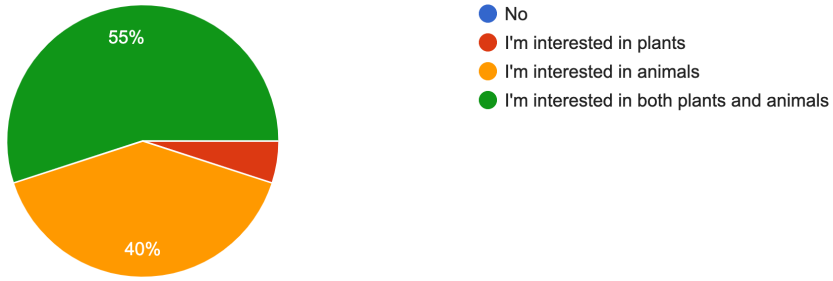
How often do you participate in outdoor activities? (Walking, exercise, sport etc.)

20 responses



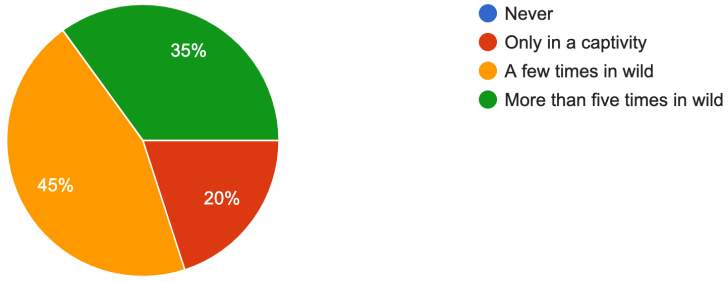
Are you interests in nature?

20 responses



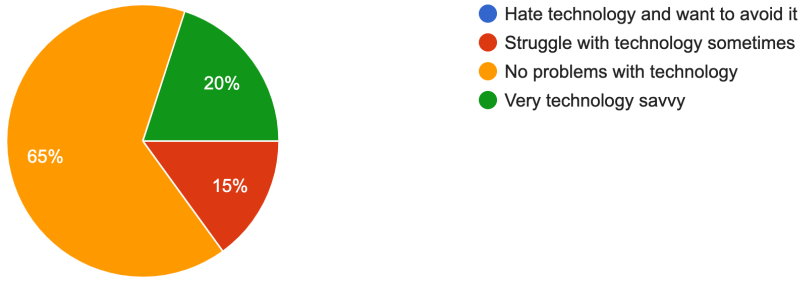
Have you seen koalas before?

20 responses



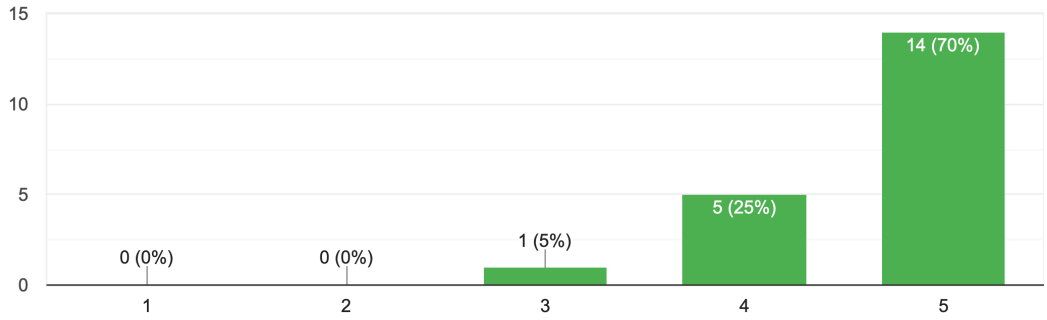
How technology savvy are you?

20 responses



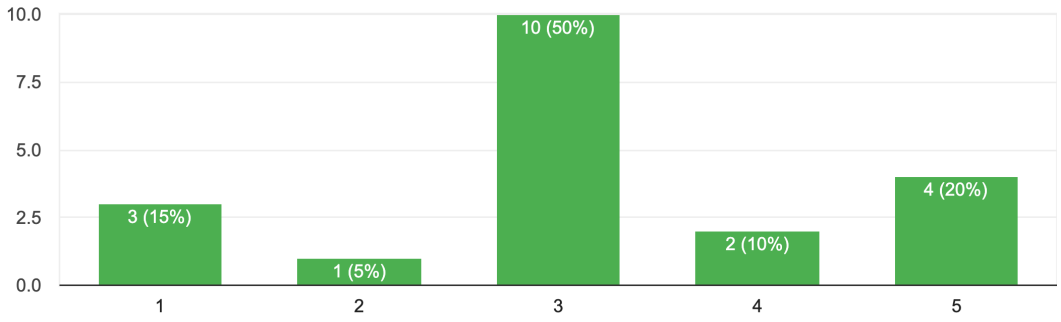
How easily do you understand maps on smartphones on a scale of 1 (Struggle to understand) - 5 (Understand with no issues)?

20 responses



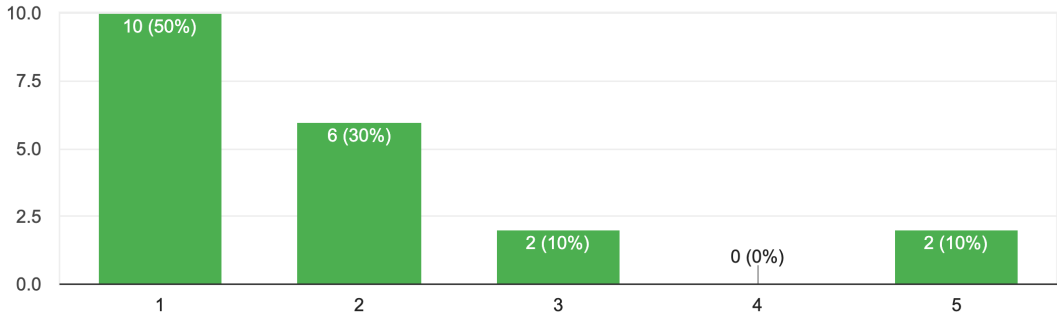
How much do you like Augmented Reality (AR) technology on a scale of 1- 5? (Pokemon GO, Snapchat, Google Lens etc.)

20 responses



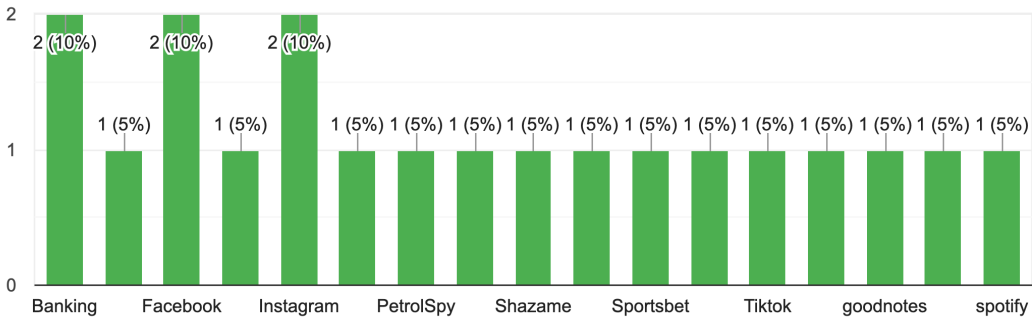
How often do you play computer games? (PC/Smartphone/Console)

20 responses



What is your favourite smartphone app in terms of usability?

20 responses



Please write reasons for the above answer.

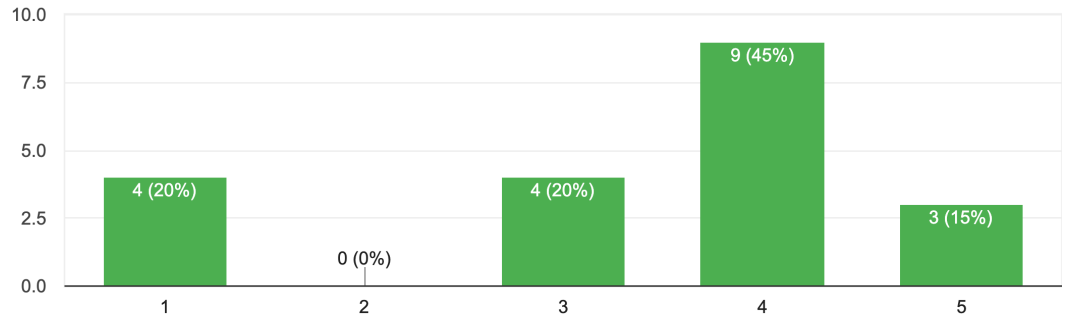
I wouldn't say it is my favourite app in general, but in terms of usability, it is good that I can message on it, it has an easy feed function to find more things you like, the story part is easy and chill, as well as that posting space to be more artistic.

searching for cheap fuel

I have never thought about my favourite before. I'm enjoying reddit at the moment because I get to read news, find funny thing and get to see people's thinking. I also appreciate the anonymity.
it organises files well and is intuitive to use
Social media
So many functions it's easy to reply in numerous ways
Easy to reply, save messages without deleting (like social media apps do), can view without showing the person
To contact others
Easy to use so regularly used, get reminders (linked to email), connects me to others through invites, connects me to maps so I can find my way physically, can add notes
Great access to everything espically multi for footy 👏
Menu
Simple to use
- Clear, concise and logical layout. - Simple nav bar.
Use as a social platform to help form more personal connection with people
Easy to use
Does what I cannot do (orienting around)
I like listening to songs when driving and podcasts doing a road trip
I just like the app a lot and it's really simple and straightforward
Simple and intuitive interface

If there was a treasure hunt game app to assist your physical (not virtual) adventure in a real forest, would you use it?

20 responses



Please write reasons for the above answer.

Sounds cool
Yes, I would. I really want to be more active and involved in nature, because I feel much happier when I do. However, I struggle with motivation sometimes with making that effort, so I think something that helps with that initial step of getting out into nature would be really helpful and something I would engage in.
I'm just not interested in this kind of things. Maybe I'm a bit older (35), and I'm already super busy in my life.
Sounds fun. I could do it with other friends and family
I dont use technology much. especially for things that hep me disconnect from the human world

I like treasure hunts and nature
It would certainly be fun to use and see how it goes, but would probably be something I'd only do once or twice
Don't really play games
If I went to a forest then yes I'd use it, but forest walking isn't a regular activity of mine
Sounds fun
No interest
It sounds interesting and it gives more purpose to explore a forest.
Depending on the gameplay style. If it had multiple modes; capture the flag, team treasure hunts, timed options for collecting multiple locations, etc. Or if it was a stand-alone adventure game with digital collectable items of varying rarity. (e.g. Pokemon Go). It would depend on the format of the app.
Really enjoy treasure hunts and going on quests. Like being out in the sun and around nature
Sounds like fun
It would be something new and interesting to try . Could be a fun activity with kids too , enabling them to experience adventure while exploring.
I wouldn't normally like to use my phone or any technology when I'm hiking in the forest. I like to be in the forest to take in the peacefulness and slow living and take a pause from technology/fast living.
I'd be worried about hackers and stuff
I'd try it since I like novelty, but probably wouldn't use it much as I don't really use my phone when in nature.

10 Appendix B - Personas

10.1 Joshua Jackson - Young Outdoorsy University Student

Joshua is a 20-year-old male university student who lives in Gold Coast with his parents and two siblings. He studies law at Griffith University and it's his second year.

He likes to exercise. He jogs every day and plays soccer with his friends on weekends. He also likes bushwalking and visits national parks a few times a year.

At university he likes to walk around outside between classes to clear his mind.

He is technology savvy and he has no issues with using most technology applications. Particularly he likes AR technology and he grew up using Snapchat and Instagram mobile app. He sends and receive selfie photos through these apps daily. Some of his friends like computer games but he doesn't play games often instead he watches funny videos and sport on his phone.

Key Characteristics:

- 20 years old
- Participates outdoor activities daily
- Interests in plants and animals
- Seen koalas in wild a few times
- Technology savvy
- Likes AR technology
- Doesn't play computer games
- Enjoys Snapchat app

20 years old

Male

Southport, Gold Coast

Full-time university student

Persona Type: Primary

Motivations:

- Exercise on or near campus
- Clearing mind between classes
- Walking amongst trees
- Looking at interesting plants

Goals:

- Needs information to navigate the bushland.
- Wants to access to information of plants and wildlife through AR.
- Wants to watch videos of wildlife.
- Wants to share photos

10.2 Jessica Robinson - Young Indoor-type University Student

Jessica is a 23-year-old female university student who lives in Gold Coast with two other students around her age. She studies science at Griffith University and it's her third year.

She likes reading books mainly fiction novels. She wants to go for a walk in a park but tends to stay home reading or watching documentary on Netflix.

She is quite busy studying and doesn't have time to do other activities.

Her technology level is above average, and she has no issues with technology. She likes Instagram and TikTok. She exchanges messages on these apps with her friends.

She only plays computer games occasionally. She used to play Pokemon Go a while ago.

Key Characteristics:

- 23 years old
- Participates outdoor activities occasionally
- Interests in animals
- Seen koalas in wild a few times
- Technology savvy
- Likes AR technology
- Doesn't play computer games
- Enjoys Instagram and TikTok app

23 years old

Female

Upper Coomera, Gold Coast

Full-time university student

Persona Type: Primary

Motivations:

- Getting outside more
- Walking on or around campus
- Spotting wildlife

Goals:

- Needs information to navigate the bushland.
- Wants a Pokemon Go style game as a motivation
- Wants to watch videos of wildlife.
- Wants to share photos easily on Instagram.

10.3 Karren Williams - Mature Tech-savvy University Student

Karren is a 34-year-old female university student who lives in Gold Coast with her husband and two young kids who are three-year-old and five-year-old. She studies psychology at Griffith University to become a counsellor and it's her second year.

She likes cooking and enjoy time with kids when she is not studying. She goes to beaches with her family on weekends. She wants to join yoga classes, but she hasn't found spare time for it.

Her technology level is average and above. She sometimes uses social media apps but banking apps and calendar are the main apps that she uses regularly.

She plays Nintendo Switch games occasionally with her kids. She doesn't play game apps.

Key Characteristics:

- 34 years old
- Participates outdoor activities weekly
- Interests in plants and animals
- Seen koalas in wild more than five times
- Technology savvy
- Doesn't mind AR technology
- Play computer games occasionally
- Uses Banking and Calendar app

34 years old

Female

Ashmore, Gold Coast

Part-time university student

Persona Type: Secondary

Motivations:

- Taking kids to the bushland
- Walking in the bushland
- Spotting wildlife
- Playing the treasure hunt

Goals:

- Wants to participate with kids.
- Fun game to play with kids.
- Wants to know information about plants and wildlife to explain to kids.
- Wants to watch videos with kids.
- Wants to access information quickly and stay connected while looking after kids

10.4 Matt Johnson - Mature Anti-tech University Student

Matt is a 41-year-old male university student who lives in Gold Coast with his wife. He studies business at Griffith University and it's his third year.

He likes fishing and goes to the Spitt for fishing on weekends. He also likes cooking and his specialty is in wood-fire pizza. He goes out for a camping trip with his wife a few times a year.

His technology skill is not great, and especially he struggles using small screens like smartphones. He doesn't like new technologies and he dislike AR. When he has an option, he chooses a print format and avoid digital formats.

He doesn't play computer games at all. While he enjoys outdoor activities, he doesn't check his phone nor respond to calls and messages.

Key Characteristics:

- 41 years old
- Participates outdoor activities weekly
- Interests in plants and animals
- Seen koalas in wild more than five times
- Struggle with technology and avoid all technology
- Dislike AR technology
- Doesn't play computer games
- Only uses utility apps (weather, banking) and phone usage is minimum

41 years old

Male

Nerang, Gold Coast

Full-time university student

Persona Type: Negative

Motivations:

- Enjoy forest and looking at plants
- Spotting wildlife
- Clearing his mind
- Likes quietness in nature

Goals:

- Wants to access information before visiting the forest
- Wants to avoid using technology
- Wants to access information of plants and wildlife through an analogue format
- Wants quietness in the forest

11 Appendix C - Scenarios

11.1 Scenario 1: eForest and Social Media

User Group: Young Outdoorsy University Students

Personas: Joshua Jackson

Title: eForest and Social Media

Background:

Joshua is a 20-year-old male university student who studies law at Griffith University. He has one hour to a few hours between classes three days a week. He likes to use these spare hours to study but he needs to have a break from study sometimes. He likes to exercise but he won't have enough time to do it between classes.

Objective:

Joshua wants to visit the bushland areas on campus and enjoy walking in nature to clear his mind in his spare time on campus. He needs to see a map to get to areas in the bushland. When he sees interesting plants, he wants to take photos and share them on Instagram. He wants to see koalas in the bushland but he is not good at spotting them. He wants information of koalas' locations and how to spot them.

Narrative:

Joshua uses the proposed eForest application on his phone to navigate in the bushland. Map in the app tells him locations of wildlife and plants. He also watches videos of the destination on the way. He finds interesting plants and take photos of them. Then he posts the photos to Instagram from a share functionality of the eForest app. He also inserted the name of the plant and description into his Instagram post by looking at information in the eForest app. When he reaches the location to spot a koala, he uses AR functionality of the app to search through the mobile screen. After spotting the koala, he posts a photo and earned a point. He shares the score with his friends via Snapchat app. He also received a free Snapchat filter from the points he earned for the day.

11.2 Scenario 2: eForest and Friends

User Group: Young Indoor-type University Students

Personas: Jessica Robinson

Title: eForest and Friends

Background:

Jessica is a 23-year-old female university student who study science. She wants to go outside more but struggle to get a motivation to participate in outdoor activities. She is busy studying so she doesn't want to commit to any university clubs for exercise or activities. She has friends who are similar and share similar situations.

Objective:

Jessica and her three university friends decided to walk together in the bushland on campus as an outdoor activity. They have interests in plants and want to know names and information of plants they see in the walk. They also want to compete to spot most koalas in the bushland as a motivation to walk more. They want to track their activities to monitor over weeks as they want to make this a weekly activity.

Narrative:

Jessica and her friends use the proposed eForest app on each mobile phone to navigate themselves in the bushland. They use their camera to access information of plants that they see. They take selfies using AR filters that insert plants' names into photos which is a functionality built into the eForest app. They start the treasure hunt game in the app which also records footsteps to monitor the walking activity. Jessica uses app's AR functionality to spot koalas while checking other's scores and their locations. They finish the game and compare each other's score and footstep count. They try to walk more next time.

11.3 Scenario 3: eForest and Family

User Group: Mature Tech-savvy University Students

Personas: Karren Williams

Title: eForest and Family

Background:

Karren is a 32-year-old female university student who study psychology part-time. She has two young kids and always look out for activities to enjoy with her kids. Her husband finishes work early on Thursdays and he look after their kids while she goes to two classes on campus. Her husband and her kids pick her up after her classes.

Objective:

Karren wants to take her kids to the bushland after her Thursday classes when they come to pick her up as a family outdoor activity. Kids want to know where they can see koalas and Karren and her husband want to spot them for their kids. Kids see unusual plants they have never seen and want to know the names. Karren wants to know information about the plants to explain to her kids. Kids want to play a game to compete who spots koalas the most.

Narrative:

Karren uses the proposed eForest app on her kids' tablet to navigate and show information to her kids and husband. Karren finds details of plants on the app to explain to kids as they discover in the bushland. She also shows her kids videos and pictures from the app. Her kids use AR functionality to navigate themselves and trying to spot a koala through the tablet's screen. The husband helps kids to post photos of koalas and register scores to the game provided in the app for each kid. Kids enjoy their scores of the day and badges they have earned from their scores. They look forward to going back again to get higher scores and collect different badges.

12 Appendix D - Card Sorting