Deliverable Name

GES App Report O6: Development of the GES App

Deliverable nr.		
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Contributors (partner)	University of the West of Scotland	
Authors	Gavin Baxter (UWS) Alan Williams (UWS) Sobah A. Petersen (NTNU) Maria Iqbal (NTNU)	
Contact Person		
Task responsible	University of the West of Scotland	
EC Project Officer		
Keyword List		

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GES App Project Coordination at: University of the West of Scotland
Contact: Dr. Graham Scott graham.scott@uws.ac.uk

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Document revision log

Version	Date	Description	Author
0.1	30/09/2022	First draft sent out	Alan Williams Gavin Baxter
0.2	21/10/2022	Second draft revisions sent to Gavin Baxter.	Alan Williams
1.0	23/10/2022	Final revision draft completed and sent out.	Alan Williams Gavin Baxter

Executive Summary

The GES App is a mobile application built for mobile devices. The mobile application focuses on developing Graduate Employability Skills (GES) for many platforms, prioritising the Android mobile market. The mobile application will provide students the ability to track and record skills while following their dream job while developing their existing skills through a repository of learning resources. This will allow for students to engage and encourage them to think about their GES upon arrival at university.

Core design was carried out by Norwegian University of Science and Technology, Norway. Core development by the University of West of Scotland, Scotland. The initial designs were primarily developed using Figma and core development going forward was using the game engine, Unity with additional software such as Adobe Photoshop. The initial designs assisted in the functionality and design of the main mobile application being developed in Unity.

In the GES App, the user can record their skills, work towards their dream job, export data to clipboard for CV, enhance their skills using learning resources, and personalise their profile. The mobile application is widely considered across multiple android versions and devices allowing for seamless integration and flexibility. All the data is recorded using Google Firebase that supports the storing of data and user authentication with accounts.

The GES App includes 4 main activities that reflect the different processes that can be achieved in the mobile application by the user. Each activity is as follows:

1. Self-Reporting Global Employability Skills
2. Dream Job
3. Practice Selected Skills
4. Employment Readiness

The different activities, at most, all associate with each other. (3) Practice Selected Skills does not relate to the core functionality of the user recording information but purely for the purpose of self-reflection, practice and enhancing certain skills. (1) Self-Report Global Employability Skills, (2) Dream Job, (4) Employment Readiness, all linked together and use the recorded data to output or record where needed.

1. Accessing and Downloading the GES App

The GES app is accessible in two different formats. You can access from an Android device or via the web. It should be noted that if access the web version, data will not be collected unlike the Android version.

Important: Upon continuing the app without signing in, this will be one instance of the app. When you exit the app, the app will begin fresh again and you must start from the beginning. Creating an account will allow you to return to your previously inputted data.

Google Play Store

The first way to access and download the app is through the Google Play Store on Android only. This can be downloaded on most Android devices. There has been a public page made for the GES App on the Google Play Store. You can find it by clicking the link: https://play.google.com/store/apps/details?id=com.UniversityOfTheWestOfScotland.GESApp.

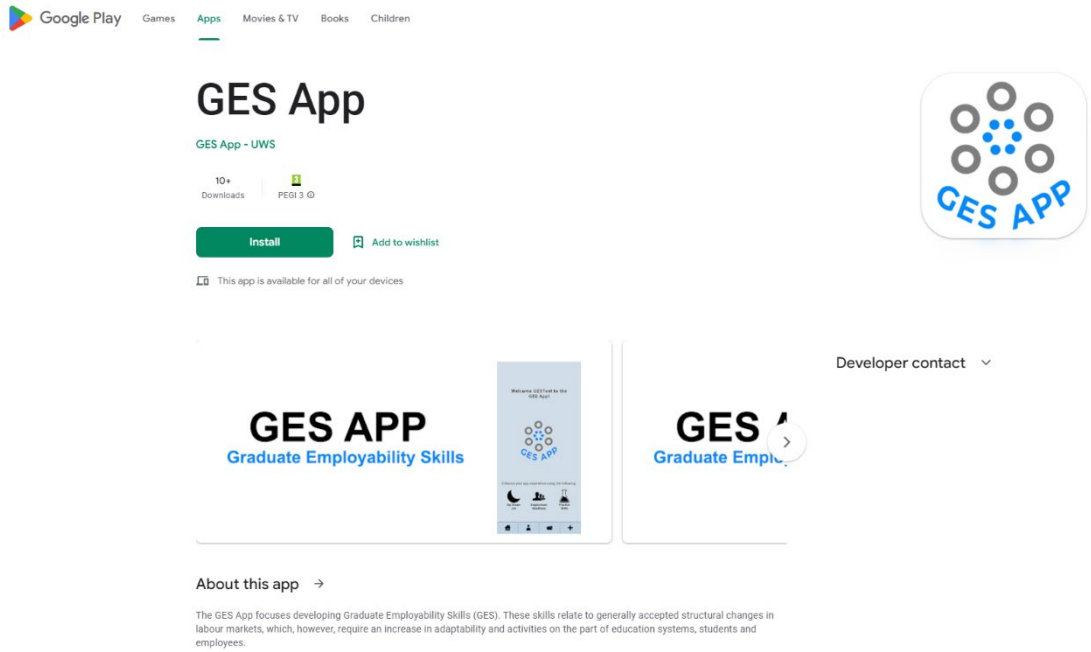

Figure 1: Google Play Store page for GES App (2022)

This version of the app offers to go through the app both with account creation and without account creation. If you create an account, data will be recorded and upon logging in or logging in from another device, you will be able to access the already existing data for that account.

Web Version (itch.io)

The other way to access the app is from the web. This can be accessed from Apple phone devices. Along with Windows PC, Linux, Mac, and any other supporting web-based products. There is no need to download this version. This can be accessed from the link: https://alanw95.itch.io/ges-app.

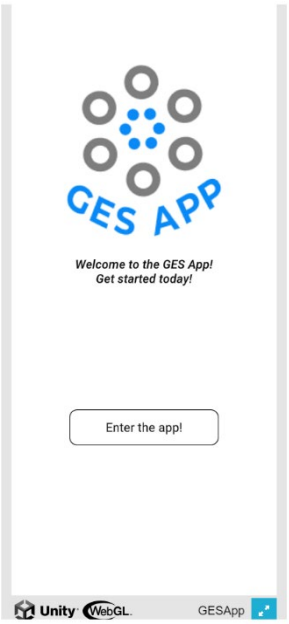

Figure 2: Screenshot of WebGL GES App (2022)

No data is stored on this version of the app. This version has been made to allow for broader platform distribution for the mobile app and easier accessibility. This app is built on one instance, leaving the app will reset data and you will have to begin again.

2. Version Control

Development projects must consider many factors to allow for safe retrieval and storing of data. In app and game development, you must consider the possibility of loss of data. This was taken into factor throughout the development of the GES App. The core development of the mobile app was done using the game engine, Unity. Unity provides a variety of optional requirements when it comes to not only game development but app development too.

Many programmers rely on version control when it comes to code-based project. GitHub repositories were created through development but in support of future development if ever to be continued. Version control allows for cloud-based back up of work to be kept on a regular basis. This is increasingly useful with the use of Unity as file sizes can grow in time.

More details will follow in 5. Future Developments giving details on access to GitHub repositories, certain accounts and more.

3. Designing and Developing the GES App

There were 5 main activities laid out in the design plans for the GES App. This gave a broadened understanding of what will be included in the desired final app. These activities were: (1) self-reporting GES, (2) dream job, (3) practice selected skill(s), (4) networking and ethics, and (5) employment readiness. Due to time and development constraints, not all activities were embedded into the final application. Activity 4: networking and ethics, never made it to the final build due to the additional work that had to be carried out in the time. All activities were designed and outlined by partner institution, Norwegian University of Science and Technology and further developed by the University of the West of Scotland. Original designs were carried out using Figma (Figma Inc., 2022) and the core development of the mobile app using Unity 2021.2.15f1 (Unity Technologies, 2022) with assisted backend server support using Google Firebase (Google, 2022).

3.1. Initial Design and Development

When designing and developing a mobile app, you must ensure there is a form of consistency throughout your development. Consistent development will ensure a smooth process in the long run ensuring the result of all outcomes to be of good standard. Core designs for the GES App were completed by partner country at the Norwegian University of Science and Technology before continuing developing of the app at the University of the West of Scotland. Original designs were mapped out to help with the continued development and core design of the mobile app.

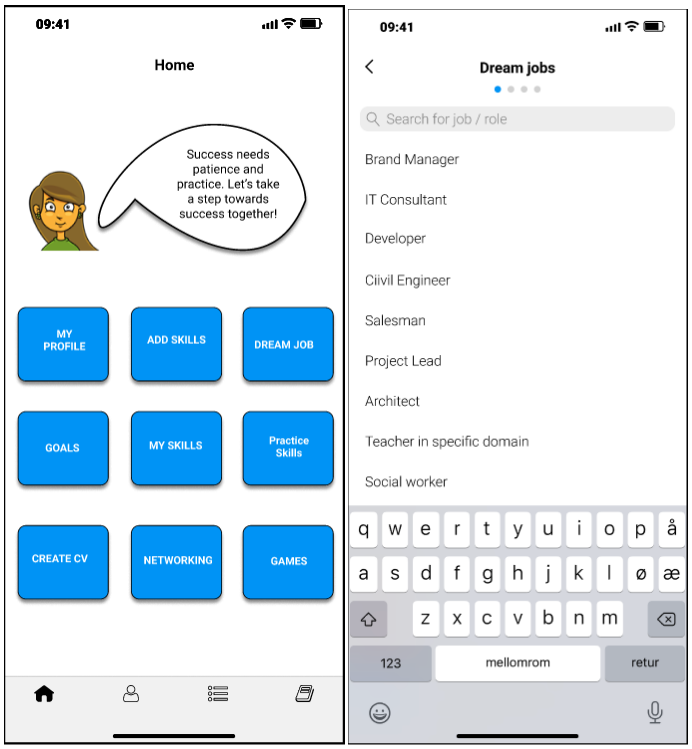

Figure 3: Figma Screenshots of Initial Design

Users are uniquely able to progress in the mobile app with a set user profile they may return to or a single instance no login approach. User profiles allow for the storing of data using Google Firebase, more to be discussed. The service allows for connected account user profiles to store and comeback to their self-inputted data: activity 1, activity 2 and activity 5. Activity 3 and activity 4 are incorporated without self-input of data needed.

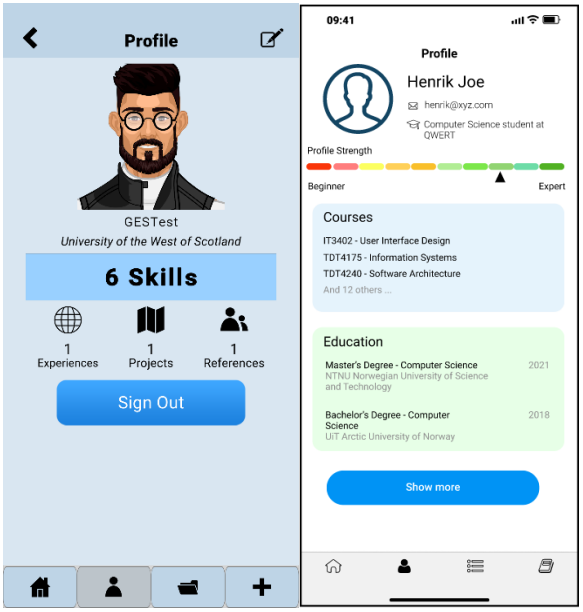

Figure 4: Initial & Final Design of User Profile | GES App

All user profile accounts must connect using a username, email, and password. Email and password are used to gain entry to the mobile app and retrieve the account connected. See more with Realtime Database. The user will have the option: sign in with an account or continue without. It is noted that continuing without a user account will result in all data being wiped and non-recoverable after closure of the app.

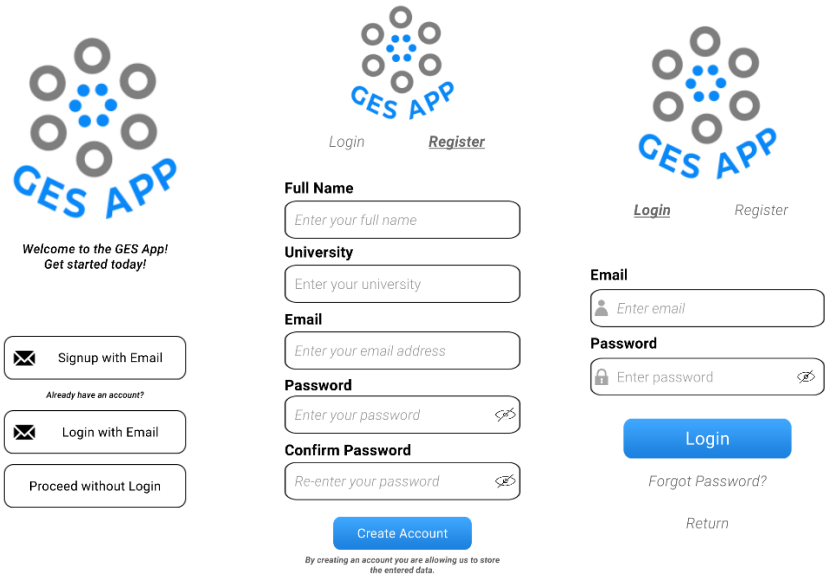

Figure 5: User Registration and Login Screens | GES App

User Interface

The user interface design was assisted with the Figma designs given prior to development. This allowed for creation of a functional and consistent, dynamic user interface being used throughout the

app. The dynamic user interface allowed for consistency across the mobile app and the many devices to which it may support and the different viewing media available.

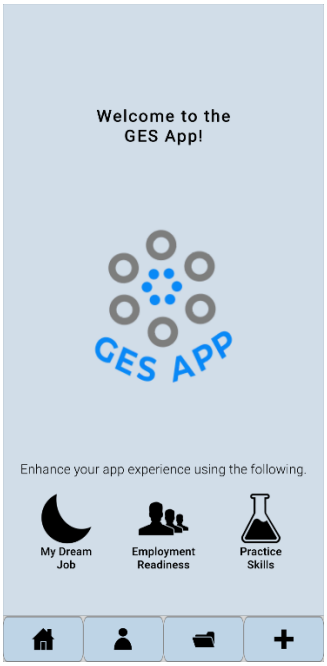

Figure 6: Home Screen | GES App

A dynamic user interface contributes to the initial development of the GES App. This allows the app development to be smooth and less problematic in further development stages. As the app progressed in development, this became apparent, and the integration of a dynamic user interface significantly cut down on development time in most areas.

3.2. Support Activity Development

The GES App consists of 5 supporting activities that help benefit the user in working towards their dream job and advancing their core skills through learning materials and the ability to practice their skills. The development of these activities varied throughout but at the core, activity 1-3, and activity 5 have been implemented to an extent, leaving activity 4 not being incorporated for the final build.

Activity 1: Self-Reporting Global Employability Skills

Activity 1 identified users in having the ability to document and assess their global employability skills while tying into the second activity based on dream jobs.

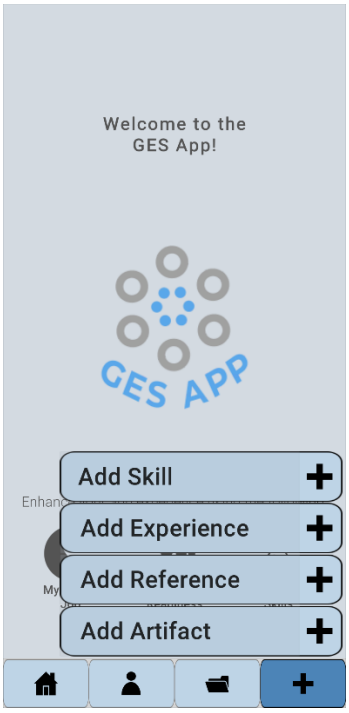

Figure 7: Sub-menu for Activity 1 | GES App

The development process of this activity allowed for users to add relevant skills, experience, artifacts, and references they desire to store in relevance to the skill(s) they may require for their target dream job. The importance in development was to showcase the self-assessment to the user, giving them freedom to store and view appropriate information in working towards their dream job.

Add a Skill

The process of adding a skill was approached in two ways. Users had the ability to add a skill from the pre-determined skills repository created by the project partners in the mobile application or by adding relevant skills that was not included, manually.

As it lies with the final development stages of the GES App, any custom skill(s) added by the user would only be made to that specific user only. This would not be available for outside users or retrievable by the pre-determined skills repository.

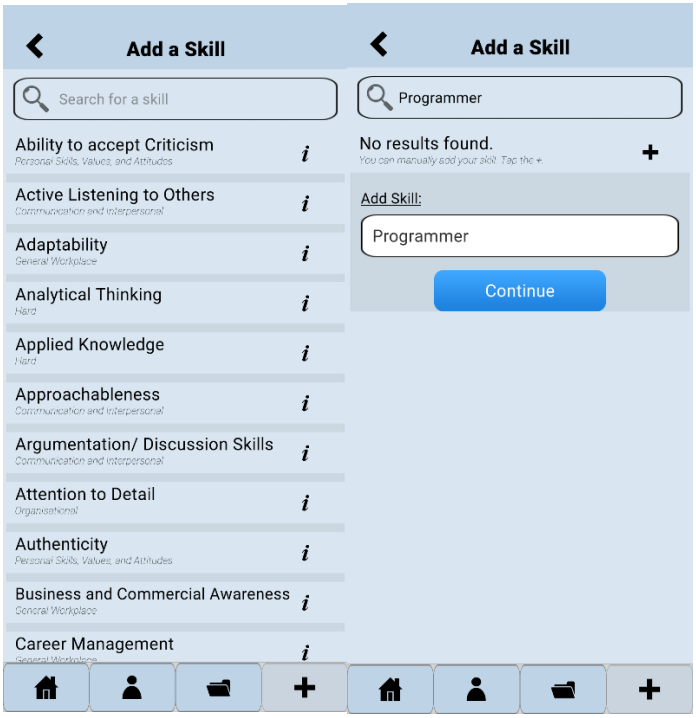

Figure 8: Adding Skill Repository and Custom | GES App

Further development has suggested this was an adequate approach in allowing users to appropriately record and document this specific data. Users are required to also record to which level their skill is, ranging from Novice to Expert. See below.

Skill Level	***Skill Level Definition***
Level 1: Novice	Little or no knowledge or experience
Level 2: Advanced Beginner	Basic knowledge or experience
Level 3: Competent	Intermediate knowledge or experience
Level 4: Proficient	Broad knowledge or experience
Level 5: Expert	Extensive knowledge of experience

Figure 9: The GES App skills levels for recording and documenting your skills

While this is shown here, we had to have an appropriate way in which this was shown to the user as well. Therefore, we gave an option of a menu that supported this. See below.

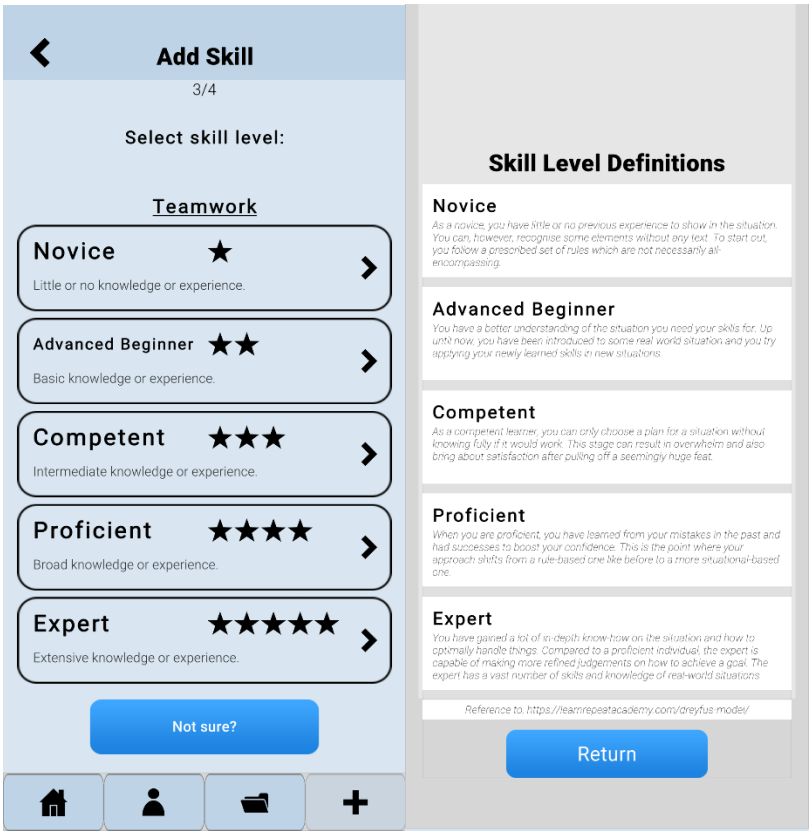

Figure 10: Skill Level and Definitions | GES App

At the beginning stages of the app, users are made aware that if they have a user account, they are storing data to this account. For security reasons, we securely announce this again for the user to make them aware that this will be done. See below.

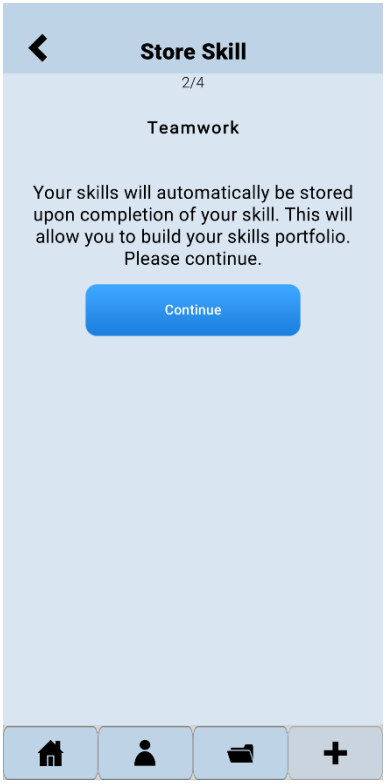

Figure 11: Storing and Sharing of Skill | GES App

At this stage, all necessary selection stages for adding a skill have been achieved by the user. They are asked to confirm their selection and then it should be successfully added to the 'Files' within the app and shared with their user connected account in Google Firebase, effectively storing in the Realtime Database and user account. See below.

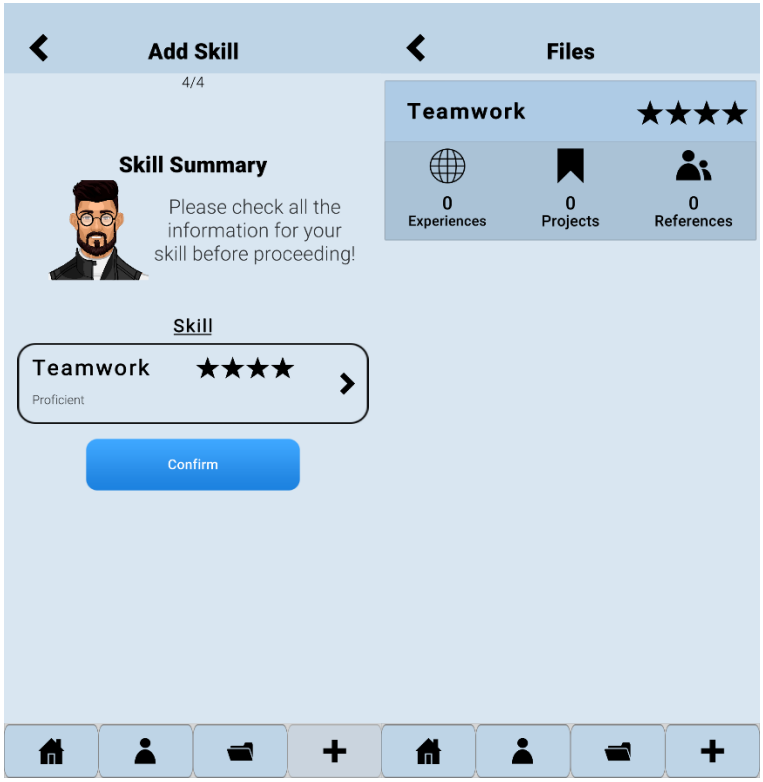

Figure 12: Skill Summary and Skill Added to Profile | GES App

Add Experience

Upon adding your first skills to the GES App, you will gain access to the other supporting self-reporting aspects. Adding an experience is a process in which you must specify appropriate details on roles, dates, and general information towards experience you have gained in reference and support of specific skills. The development of this shaped fairly like the '**Add Skills**' making use of the appropriate dynamic user interface created. This allowed for simple layout of pages and a process being recorded to the Realtime Database using Google Firebase.

The process of adding an experience is as follows:

1. Primary Role/ Job Title.
2. Time taken place.
3. Select skill(s) connected to experience.
4. Specifying if experience is Academic or Practical.
5. Give brief description.
6. 5 scale metrics ranging from 'Not at all' to 'Very good', answering 8 questions.
7. Additional comments.
8. Final checks and submission of experience.

These were implemented using varied dynamic page interfaces accompanied by buttons, text and specifically checkboxes to allow for selection of the user skill(s). See below.

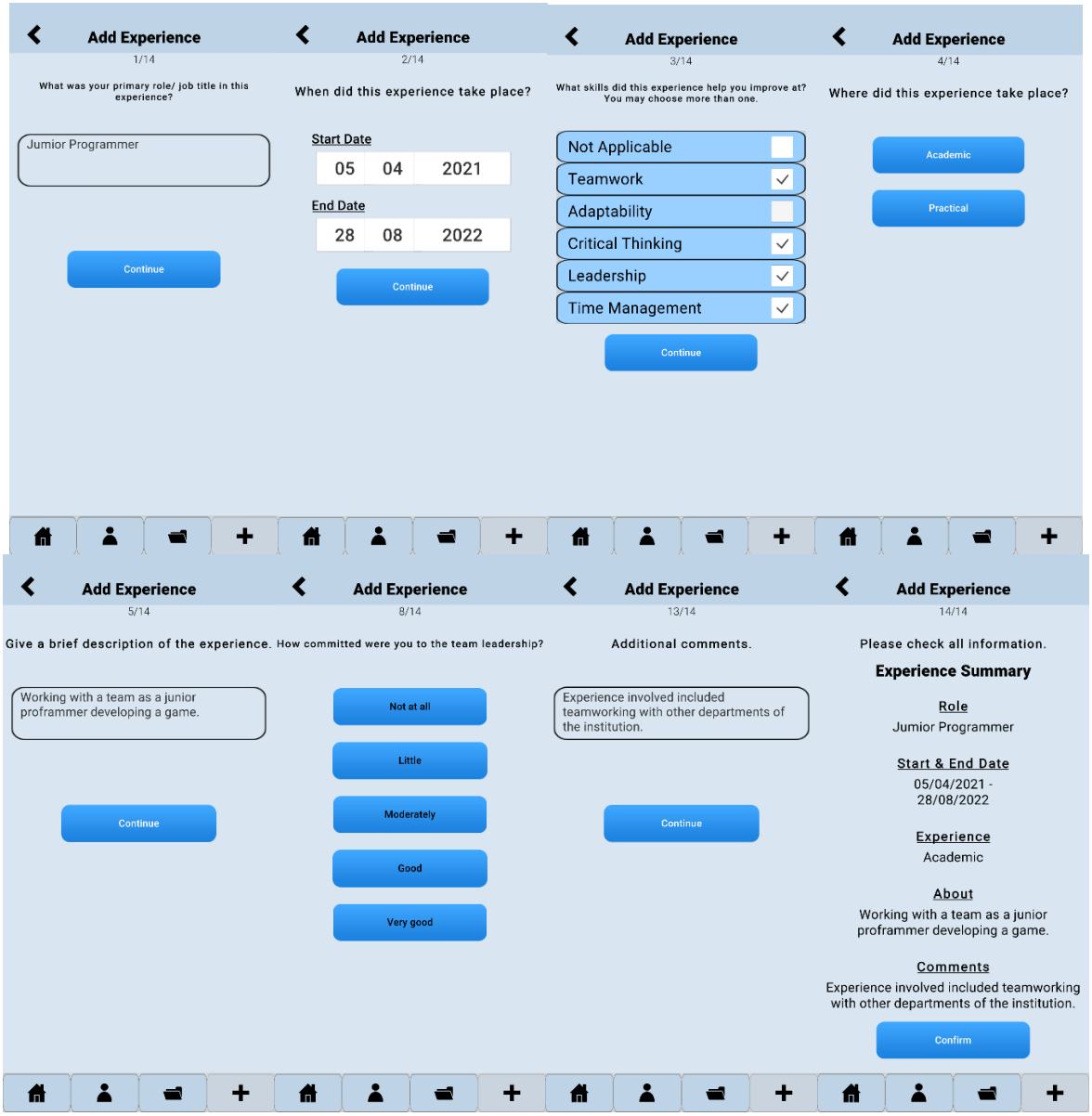

Figure 13: 'Add Experience' Process | GES App

All relevant information needed, was then added to the user account, allowing for this to be displaying upon return for future access.

Add Artifact

Adding an artifact to the GES App consists of many factors. How this was executed in the GES was straightforward using input fields allowing users to effectively add evidence towards their profile. The importance of the dynamic interface implemented was the ability to easily create variables that carried information leading through the app especially in these stages. For adding an artifact in the final development, the user has the option of adding six different artifacts. These are artifacts are as follows:

- Document
- Image
- Link
- Repository

- Video
- Note

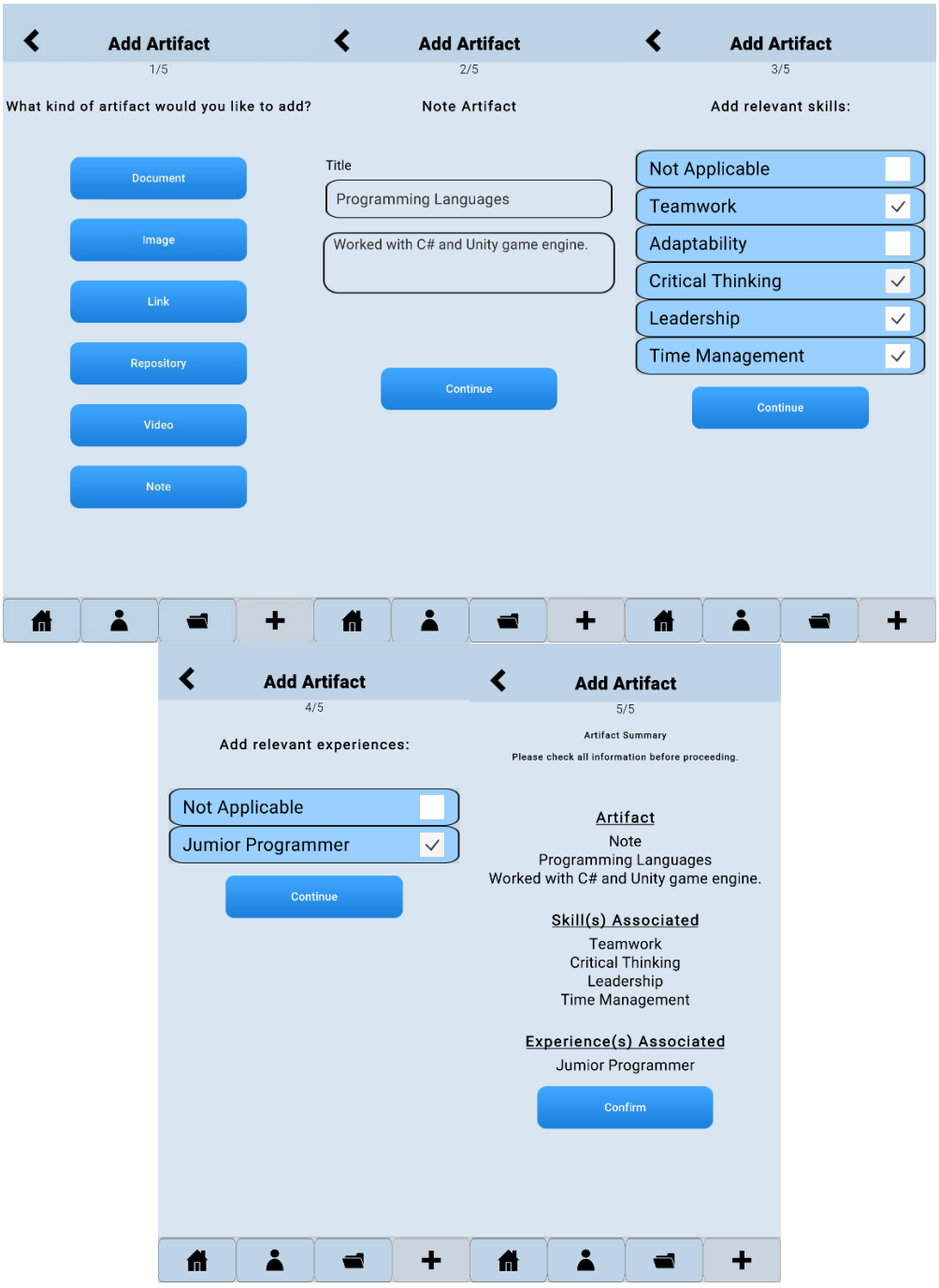

Figure 14: 'Add Artifact' Process | GES App

With these artifacts there are limitations to certain ones the user can add to their profile. As saw with other outputs of activities some areas did not fully get implemented to a full extent, but it is there. Example of this is shown through the 'Image' artifact for example. Future development plans for this would have included being able to achieve more for the user. Allowing users to attempt the uploading of represented camera rolls images or any images stored on their gallery.

Add Reference

The ability to add a reference in the GES App allows for the contact person to be able to vouch and verify the skill or skill set for individuals. Adding a reference allows user to have evidence of the references:

- Name
- Position
- Email
- Skill associated with the reference you have.

Once the reference has been created this is added to your files and stored to your account.

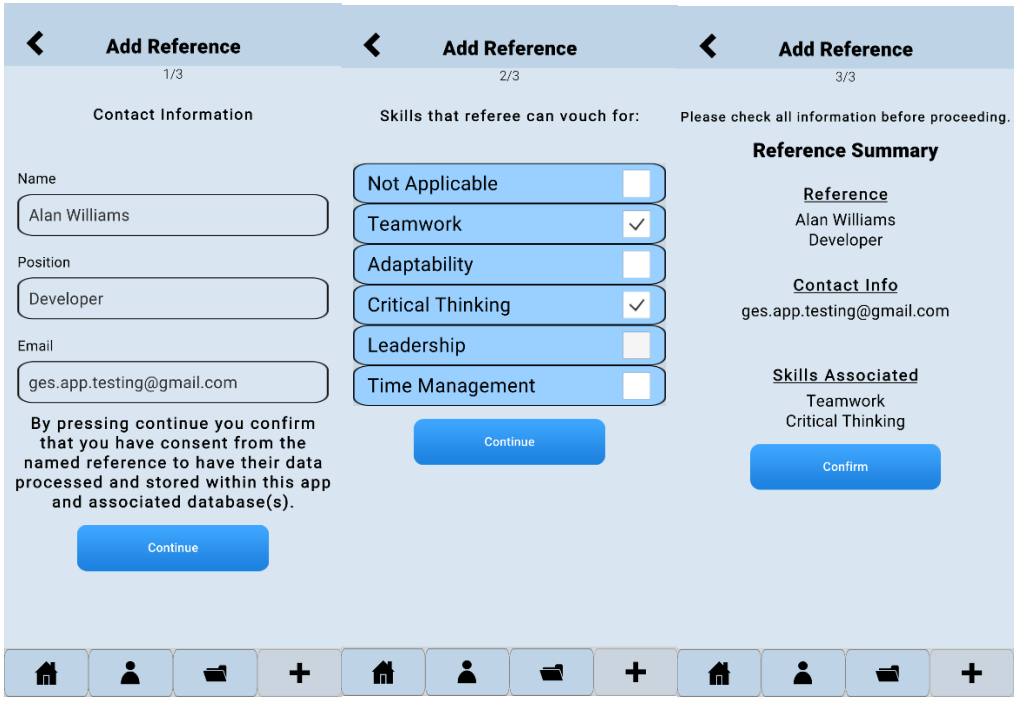

Figure 15: 'Add Reference' Process | GES App

Activity 2: Dream Job

Activity 2 identifies users having the ability to define their dream job and work towards improving or gaining skills based on that specific dream job. This activity relies on being connected to activity 1, to an extent. The development of this activity ties in and incorporates with activity 1. Activity 1 was the documentation, gathering of evidence and assessment of their global employability skills, while activity 2 took these skills to then further progress to check if they were meeting the criteria for their dream job.

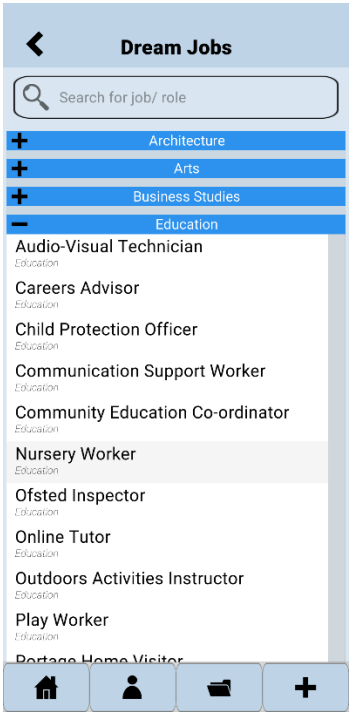

Figure 16: Adding Dream Job | GES App

The core development of this depends on the dream job you select while connecting and telling the user what matching, gained skills they may already have. The design uses checkboxes that allow the user to have self-control over which ones they decide they have met fully. If they feel they have some more work on a matching skill, they can unclear the check, work on this and come back to this.

Figure 17: Recording Dream Job | GES App

This leads on to activity 3.

Activity 3: Practice Selected Skills

Activity 3 was developed in mind for users to use this as a core area to improve on specific skills stored in the pre-created and developed repository. The main development focuses on users taking the ability to select a skill and select various available resources. This includes:

- Videos/ Audio
- Papers/ Articles/ Blogs
- Free Courses/ Self-Assessment
- Mini Games

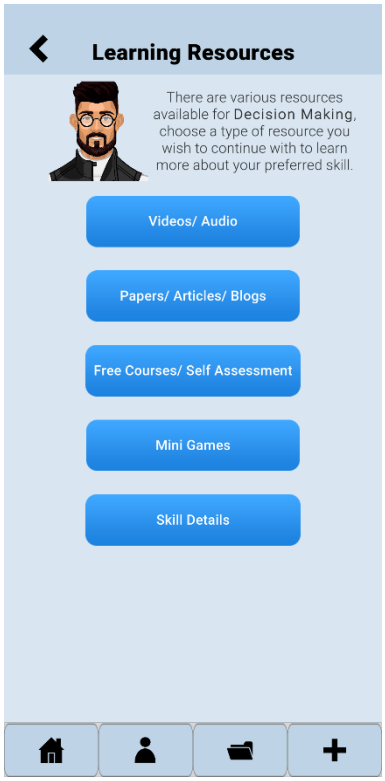

Figure 18: Practice Selected Skills Options | GES App

If the user has forgotten details about the specific and would like to remind them about the definition. Users can click 'Skill Details' to remind or find out if they are not aware. By selecting these various options to help assist in practicing skills, the user can select one and will externally be brought to a support resource through their default browser.

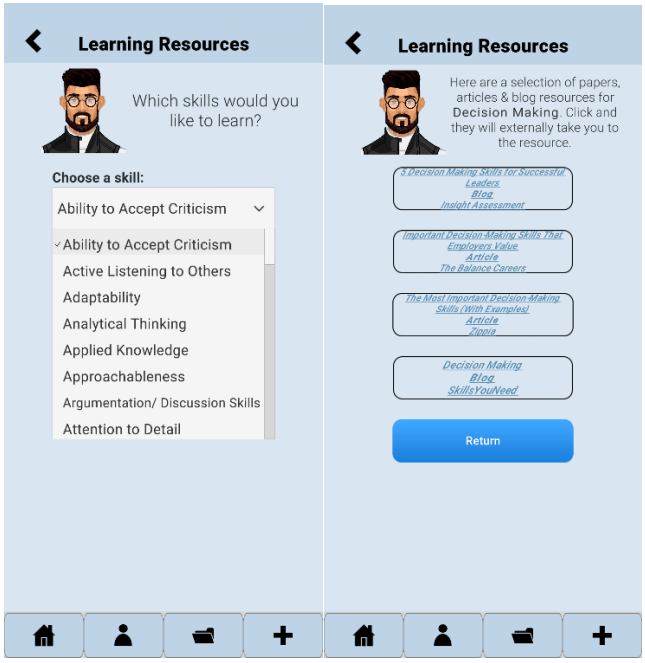

Figure 19: Selecting Learning Resources | GES App

The most viable and feasible way for users to access these resources was externally outside the mobile app. This would be the most accessible in the long run due to constraints and development time. Creating internal supported viewers for some links would have taken unnecessary development time away from the core development.

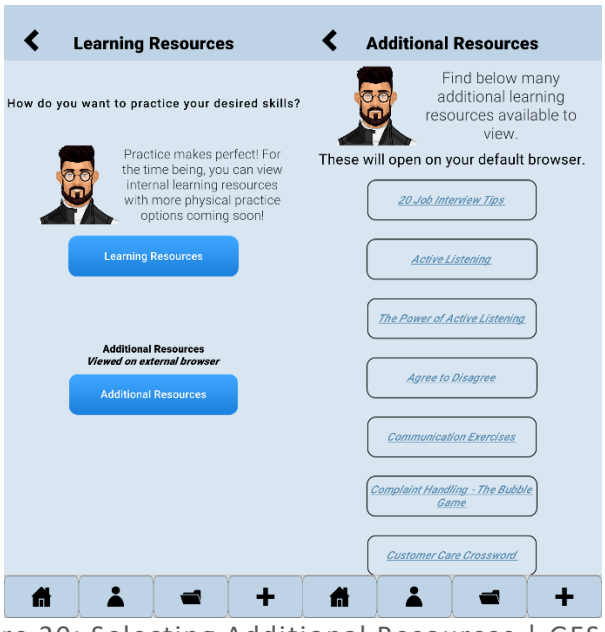

Figure 20: Selecting Additional Resources | GES App

Additional resources were made available to users as extra resources to support a wide range of varied topics or skills. These were added in as external browser links linked to uploaded resources viewable from Google Drive. These have been stored on the Google Drive of the email account made in association with the development of the mobile

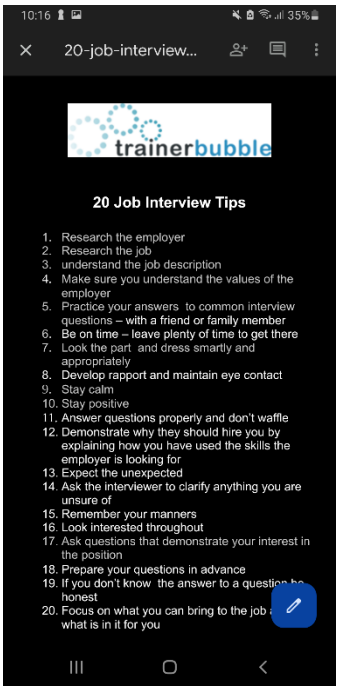

Figure 21: Preview of Additional Resource | GES App

Activity 4: Networking and Ethics

Activity 4 relied heavily on the development and support of many Firebase products on top of the incorporation already involved. Due to time constraints and development choices, there was a delay on the development of activity 4. Activity 4 has been considered as a focus if further development was to be portrayed when it comes to the GES App.

The activity relied heavily on the 'Networking & Ethics' in relation to the user. The initial design plan for this was to allow networking to be at the forefront offering discussion, sharing of LinkedIn profiles, and sharing any skills or learning resources with other users. Going forward this activity would rely heavily on the integration of Google Firebase; especially the cloud services they have available.

Even though the activity never made the final build of the GES App, this was a heavily well thought and designed and prepared for development, but time constraints and development timeline did not accommodate room to have this developed in time for the final build.

Activity 5: Employment Readiness

Activity 5 was designed and developed with the final stages and preparing the user for employment. The development focussed on the user having the ability to take all their recorded evidence and taking it from the app as a help sheet towards building their final app.

The initial design detailed the following to be included:

- Create CV
- CV Templates
- Practice Job Interview

Elements made it somehow into the final app build, but some did not, to an extent. The development has allowed to give the creation of a digital listing of all recorded data by the user. This allows users to select all their data, copy to clipboard, making available for use in an outside programme.

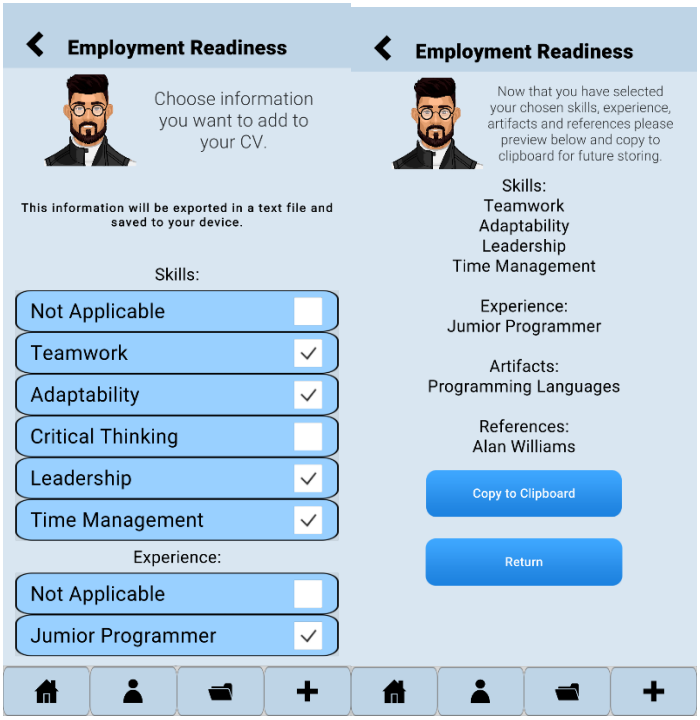

Figure 22: 'Employment Readiness' process | GES App

In extension to the creation of a CV, there had to be some limitations with how this was outputted. Reasoning behind the final development discussed before. Being able to create a full CV and provide templates would have been considered if more development time were available. There were the drawbacks that the idea could have been too adventurous as there are sole apps on the market that support CV creation alone. Templates would be even beyond this.

3.2. Google Firebase Support on the GES App

The integration of Google Firebase was considered at an early stage in the development process of the GES App. Many factors had to be considered in support with design ideas presented such as user authentication and user accounts. Choosing Google Firebase was an option that allowed for many supporting services in the mobile application to help with the continuing focus on the user as well as integration with the chosen development game engine, Unity, and the generalisation of how simple the steps were to set up. Due to the nature of the GES App and the focus on storing sets of data and user information, it was important to have this integrated and an integral part of the development early on, allowing was a steady and sequential approach further down the line.

The initial designs of the GES App focussed on allowing users to have authentication and user accounts, to register or login, both as new and returning users. If you choose to register an account on Android and return via another platform by logging in, all your data should still be visible and valid.

Google Firebase Authentication

Authentication services are important to the GES App. This allows for a secured service being used for user authentication. Google Firebase offers a wide range of services. For the app, we had the options of offering a handful of these services. Firebase documentation does not concentrate on Unity integration as being the focus, this is further adapted and later involvement, added to the continued documentation. It started more with focus on iOS+, Android, and Web. The app was developed with

both iOS and Android in mind, but constraints led to final deliverable being Android only. As of early Q1 2022, Firebase Unity SDK supports a well-rounded number of Firebase products (Google, 2022).

Firebase Product	*Unity Package*
AdMob	Distributed separately in the AdMob Unity Plugin.
Analytics	FirebaseAnalytics.unitypackage
Authentication	FirebaseAuth.unitypackage
Cloud Firestore	FirebaseFirestore.unitypackage
Cloud Functions	FirebaseFunctions.unitypackage
Cloud Messaging	FirebaseMessaging.unitypackage (*recommended*) FirebaseAnalytics.unitypackage
Cloud Storage	FirebaseStorage.unitypackage
Crashlytics	FirebaseCrashlytics.unitypackage (*recommended*) FirebaseAnalytics.unitypackage
Dynamic Links	FirebaseDynamicLinks.unitypackage (*recommended*) FirebaseAnalytics.unitypackage
Realtime Database	FirebaseDatabase.unitypackage
Remote Config	FirebaseRemoteConfig.unitypackage (*recommended*) FirebaseAnalytics.unitypackage

Figure 23: Adapted from 'Add Firebase to your Unity Project', Google (2022).

As picked up from O5 deliverable, user authentication was a must to be included in the final design and development of the app. Through Firebase it offers authentication services, helping provide an account creation service, not only through email and password authentication but in accompaniment of using identity providers to help support and speed up the process for the user at login. As previously distinguished, there were some development constraints to allow scheduled delivery time. The only authentication services available on the final mobile application were of logging in and registering using an email and password service. Additional services with identity providers were not pursued due to these delays. If implementation of these went ahead, sign-ins could have included integration of the following external identity providers (Google, 2022).

- Google
- Facebook
- Twitter
- GitHub
- Microsoft
- Yahoo
- Apple

Below shows a mock-up initial design of the GES App's initial splash screen, prior to final development.

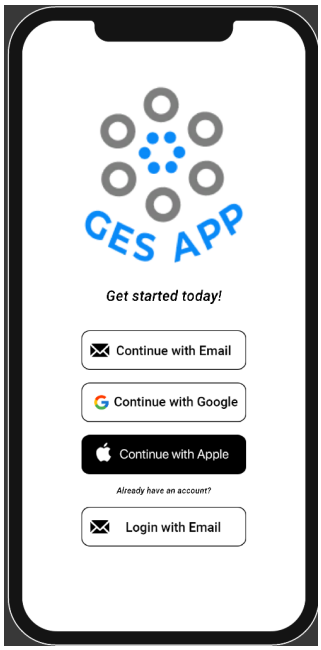

Figure 24: Unity Screenshot of GES App Initial Splash Screen (2022)

The initial design and development plan was to implement the popular parties; Google and Apple as further authentication for the user, helping speed the process of user registration. For the GES App, this would have allowed for further extension in asking for details on name, profession, university etc.

Realtime Database

User authentication only adds a chunk of what must be done to keep with account creation and storing of data. To advance these stages, a database of sorts must be used to store all data created and stored by the user to then come back to later. The task for the GES App was to initially store any inputted details from Activity 1 and Activity 2 and be able to return to this data upon closing and returning with their details at a late date.

To secure this, we adapted from the services available in Google Firebase, Realtime Database. Using a database allows for the secured storing and retrieval of any user account data. Before creating an account, the user is made aware upon creation, data will be stored. All data stored will not be shared to any third-party services and only those involved in the design and development of the GES App. Shown below is a general structure of how the database stores the data for the app.

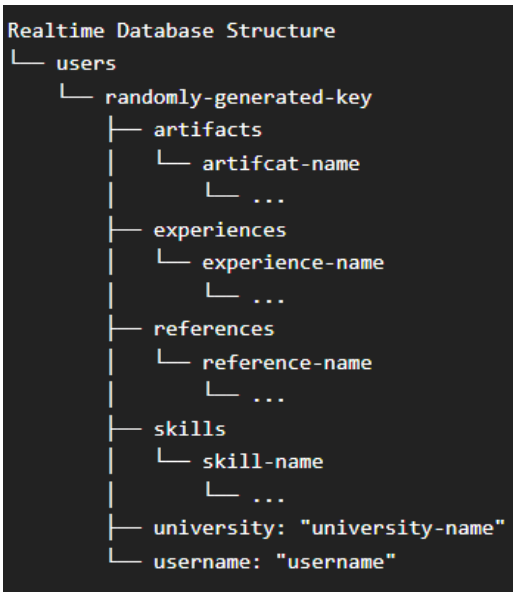

Figure 25: ASCII Tree Diagram highlighting Realtime Database Structure (2022)

4. App Development Changes

The GES App development timeline consisted of three stages of evaluation, leading into the final build of the mobile application. Each stage offered advancements in development as well as critical changes that occurred from user feedback. See table below representing the differences between each evaluation through the development of the mobile application.

Stage 1 (March 2022)	Stage 2 (April 2022)	Stage 3 (May 2022)
Individual Interviews	App Prototyping	Full App Prototype
Participants: 3 individuals from each partner institution (Undergraduate, Postgraduate, Staff Member)	**Participants:** Data collection from control groups prototyping the app and/ or watching video recording of an app walkthrough with the completion of a questionnaire.	**Participants:** Data collection from control groups on prototype demo of the app supported by paper and pencil questionnaires.
Activity 1: Self-Reporting GES	Activity 1: Self-Reporting GES Activity 2: Dream Jobs	All activities except Activity 4: Networking & Ethics

Figure 26: Stages of Evaluation & Testing of the GES App (2022)

Core changes to the mobile application were completed between each stage of the evaluation and finally leading from Stage 3 to the final release version.

Between Stage 1 & Stage 2

Stage 1 evaluation concentrated on the development of activity 1 in the GES App. Stage 2 concentrated on the refinements of activity 1 with continued development onto activity 2. The app progressively improved with concentration on the integration of front-end services, core fundamentals and a robust system that allowed users to evidence and document their skills and chosen dream jobs while using user comments to continue developments. Through these development stages, the vast changes concentrated on involved functionality, aesthetics, inclusion of

resolutions and different viewing media issues. See table below of core factors that were considered and prioritised in the development between stage 1 and stage 2.

Critical Development Changes	Comment
Improvement of app aesthetics on the graphical interface and layout.	• The graphics and user interface were briefly improved in places for Stage 2. • UI was kept as a monochromatic colour scheme for the first initial stages of evaluation. • Layout of app was expanded and attention to allowing display on more viewing media and user friendly. • Layout was improved in UI aspects; text, graphics, and additional needs for visibility.
Additional Functions	• Progression in functionality. • Previous functionality was adhered to and fixed. • Activity development was increased, and new features and activity occurred.
Multiple mobile application version	• APK (Android) version was provided for evaluation. • WebGL (Web-Based) version was provided for evaluation.
Coach role had to be clarified	• No changes during Stage 1 and Stage 2 evaluation. • Concentration was taken away until further development.
Google Firebase Implementation	• Firebase Authentication was implemented to the mobile application. • Firebase Realtime Database was implemented to the mobile application.

Figure 27: Critical Development Changes between Stage 1 & 2 of Evaluation

Between Stage 2 & Stage 3

Stage 3 evaluation was more development intensive as this included more concentration on the development of the activities, attempting to adhere to them all being added for final development and evaluation. Stage 2 evaluation included activities 1, 2, 3, and 5. Development continued in conjunction with feedback provided from the previous stage. Core functionality was the main concentration and design flaws and navigation issues that cropped up. See table below of core factors that were considered and prioritised in the development between stage 2 and stage 3.

Critical Development Changes	Comment
User Interface Improvements	• Not a high priority. • Navigation was concentrated on. • Improvements in functionality and fluidity of the mobile application.
Graphics Improvements	• Not a high priority. • Small graphical changes were made. • Activity design was improved slightly for better visibility.
Dream Jobs and Skills Connection	• Implementation of linking activity 1 skills with the selected dream jobs.

	• Users' skills in dream job were ticked off as added.
App Functionality	• General mobile application functionality was improved with further development of activities was done. • Core functionality of Dream Job was improved. • "Custom" Dream Job was removed to save implementation time and getting the app out for final build. • Scrolling on PC/ Web version was commented as being sluggish. This was tested multiple times and no problem was found. Tested on multiple devices and by other people.
Coach	• The coach was completed removed and not considered for future development.
Mobile vs Desktop	• Final app pushes were going to be made for mobile Android market only. • Web-based version was not considered at this stage due to viability of Google Firebase.

Figure 28: Critical Development Changes between Stage 2 & 3 of Evaluation

Final Release Development

Leading from Stage 3 evaluation, we had to considered critical development changes that must be taken for the final release in development. Many elements were considered for this. See table below of core factors that were considered and prioritised in the development between stage 3 evaluation leading up to the final release version of the mobile application.

Critical Development Changes	Comment
Coach Selection	• This was removed completely from the final app. • It was decided that there was not enough fluidity.
Activity 4: Networking & Ethics	• Activity never made development. • Activity focused heavily on Google Firebase implementation and due to design ideas and nature of development timeline. It would have never made the final developed time due to constraints.
Activity 2: Dream Job – adding in the custom dream job	• The addition of a custom dream job was considered but not implemented into the final version of the mobile application. • It was too complex and due to time constraints; it was decided not to take this further.
User Interface	• Elements of UI were improved over short basis of time. • Colour elements were improved. • Changes to navigation were given. • Operations of areas in the app were improved.
Languages	• Language localisation didn't make the final build. • It was expected to have partner languages and beyond but fell through due to time and development constraints.

Further Authentication	• Final build used **only** email and password for authenticating users. • Consideration of third-party services such as Google, Apple etc. were considered. • Time constraints and development constraints didn't allow for this.
Final Mobile Application Build	• The final mobile application was decided to launch on Android only. • A WebGL version was made available without the use of user authentication and storing data.

Figure 29: Critical Development Changes between Stage 3 Evaluation & Final App Release

5. Limitations

The development timeline of the app lead to some limitations to incorporating the full initial proposed design for the GES App. Certain elements of activities had to be cut back due to certain limitations and some core activities did not make the final development cut. Activity 4 was a core activity that looked at the networking and ethics of the mobile app. Due to the development timeline and focus of other areas of implementation, this was left out for the final development mostly down to time constraints.

Most limitations were not crucial to core development of the app. Certain safety nets or alternative routes were thought of in preparation, so most elements were covered to some extent with the exemption of activity 4 mostly.

6. Future Development

Core and final development of the mobile app, GES App has been completed and final releases have been launched. See section 1. The future of the development leads to the completion of core activity: activity 4 among elements of different activities that may have not saw their full functionality as desired in the initial design proposal for the GES App.

6.1. Download Source Code

Future developments may occur with further developer(s), so it is important to have the original source code of the previously developed mobile application. The developer, Alan Williams, has made their GitHub repository public access. This is available to anyone but more precisely through the link below.

https://github.com/AlanW95/GES_App

This can be accessed, downloaded, and used for any future development that may possibly occur.

Any future developers that need to source this code for development of the GES App may have some issues with this certain version of the GES App due to integration with Firebase. Below is another download link that has been created without the activation of Firebase. This may allow for ease of access in the future. This has been uploaded to the Google Drive from the 5.2. Development Email Access detailed.

https://drive.google.com/file/d/1o_br9w5cxRVqItQRRIVIuRFPVdOqk6qX/view?usp=sharing

Any issues relating to source code, can be forwarded from the current project leader to the original developer.

6.2. Development Email Access

The GES App development team created a Google email account for the purpose of setting up necessary requirements for the development and launch of the mobile app. Below is the email and password created:

Email: ges.app.testing@gmail.com
Password: gesAPPprototyping21

This email and password get access to Gmail and Google Drive. Google Drive has stored access of learning resources, previous app builds and other necessary content. All relevant information has been stored here. **This should only be shared with internal representatives.**

Google Play Console
The mobile app was only released on the Android market. Using the Google account, you can access the Google Play Developer Console for any future development changes in the mobile app.

https://play.google.com/console/about/

By clicking the link above and selecting 'Go to Play Console', you can use the email and password provided to gain access to this. It is worth noting for any future developments there may be important information that is not available to you that you need for this. These important details will be left on the Google Drive storage available for any future developers.

7. References

Figma, Inc. (2022). *Figma: the collaborative interface design tool.* Available at: https://www.figma.com/ (Accessed: 28 September 2022).

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