

Industry Partner Work Placement (IPWP)

Assessment No. **#3 of 5**

Assessment Title: **Flow**

IP:	Stuart Elder, Heritech
Mentor	Peter Berends

Team	IP33 - Waypoint
Mary Fahey	elodie.golden@webelevate.ie
Barry Ferguson	barry.ferguson@webelevate.ie
Dilruba Khan	dilrubakhan@webelevate.ie
Emmet Boylan	emmet.boylan@webelevate.ie
Orlagh Murphy	orlagh.murphy@webelevate.ie
Sean Regan	sean.regan@webelevate.ie
Sofia Coughlan	sofia.coughlan@webelevate.ie

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1. Deliverables

The main deliverables of our Industry Project are a User Design Document, Design Considerations, Foundation Style Guide and Mockups. While our project is research focused and we will not develop a working application, here, we outline the proposed deliverables (see Appendix A, for the project scope deliverables) which involve user interaction.

User Goals

The main goals of our primary user group are prioritised as follows:

1. To be entertained at Heritage Sites
2. To explore and move freely
3. To play with friends or family
4. To engage with Heritage Sites

Proposed Deliverables

1. Geolocation scavenger hunt game

- Map / clues
- Interactive POIs / objects
- Scoreboard

2. Game settings

- Monitoring options
- Difficulty levels
- Game save / pause
- Group play

We believe the proposed game concept and deliverables achieve these goals; entertaining users, encouraging play and exploration of the heritage sites whilst hunting for POIs and virtual rewards.

2. Critical Success Factors

Following a comprehensive review of our research material and in particular our user interview notes we distilled the following critical success factors -

Ref	Description	Priority
CSF-0001	Access game settings, view and edit settings according to player needs.	2
CSF-0002	Play game: Find POIs and explore Heritage Site.	1
CSF-0003	Save game feature to allow pause in game playing to save player progress.	3
CSF-0004	Ability to play in a group game with other nearby users	4
CSF-0005	Ability to share progress and compete on online leaderboard	5

3. Minimum Viable Product

The following requirements were deemed to meet the minimum viable product as determined by the results and findings of user research. They form the essential building blocks of the game experience.

Ref	Description	Priority
MVP-0001	Generate Points of Interest (a distributed set of GPS coordinates)	1
MVP-0002	Present clues and feedback to User	3
MVP-0003	Track when User finds Point of Interest	2
MVP-0004	Reward User (with points, site media and/or collectables)	4

4. User Flow

Our primary persona is 10 year old Denis J Coughlan (Appendix B). Understanding our persona's motivation was crucial in developing a User Flow that met the requirements and achieved his goals. We identified that Denis's primary motivation is to be entertained; avoid boredom and have fun when visiting Heritage sites. We focused on creating a flow where Denis would launch, play and complete a game session ('Play Game Flow'). The Users Flow focuses on the interactions and core app functions of launching, setting up and starting a geolocation based scavenger hunt.

Before the user plays the game, there are some configurable options:

- A safety feature where a parent or guardian's device can track a user's device
- User can join groups for competitive or cooperative play
- defining a difficulty level to account for differences in user age.

During a game session (loop), players are given hints and guidance to the location of Points of Interest (POIs). Once found the player is rewarded by points, and virtual items to be determined at a later stage. At the basic level, generic points are created around a heritage site, but the full implementation envisages a more bespoke presentation of gameplay and media elements (pictures, text and videos about site) tailored to a specific site. It is hoped that this will add interest and value to sites ranging from an unattended ruin with little more than a GPS coordinate, all the way up to Heritage Towns.

Other considerations such as technical implementation (such as communication with mapping APIs, game implementation, graphical assets etc) are left out as they are considered to be outside the scope of user flow.

This User Flow is further detailed, defined and illustrated below with the following:

- Functional Module
- Written Use Case Specification
- Task Flow Diagram
- State Transition Diagram

Functional Module FM-0001 - Play Game

Ref	Desc	Cross Ref
FM001	Select Monitored/Unmonitored	CSF-0001
FM002	Select Single/Group Game	CSF-0002
FM003	Select Difficulty (related to Age)	CSF-0001
FM004	Play Game	CSF-0002
FM005	Pause Game	CSF-0003
FM006	View Site Data (If available for Site)	CSF-0004
FM007	Exit and Save	CSF-0003

5. Written Use Case Specification

Use Case ID:	UC-001		
Use Case Name:	Play Game		
Created By:	EB	Last Updated By:	SR
Date Created:	September 17th, 2018	Date Last Updated:	September 22nd, 2018

Actor:	App User
Description:	The application user wants to play a game at a Heritage site.
Preconditions:	<ol style="list-style-type: none"> 1. Application must be running 2. Mobile affordances confirmed/flagged (if sound disabled on device - flag) 3. Device has data enabled to allow for location services
Postconditions:	<ol style="list-style-type: none"> 1. Progress saved if option selected 2. Engagement timestamp recorded
Priority:	1
Frequency of Use:	Daily

'Play Game' Course of Events:

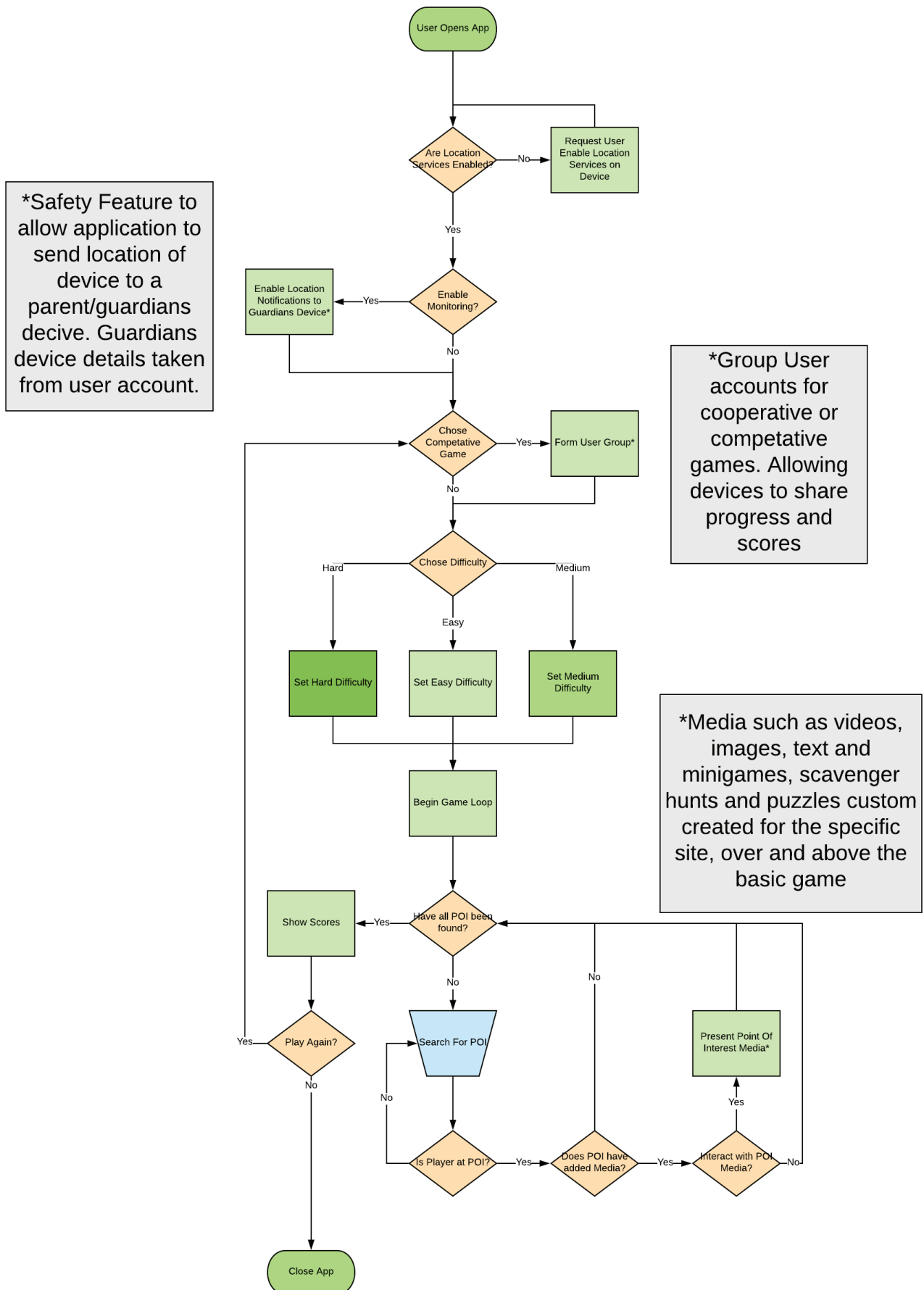
App. User	System
1. Select Play Game	2. Check for Location Services
4. Leave Default (Unmonitored)	3. Present Monitoring Option
6. Leave Default Option (Single Player)	5. Present menu of game options
8. Leave as Default (Easy Difficulty)	7. Present menu of difficulty levels
10. Find Points Of Interest	9. Present points of interest
13. Close App	11. End Game Loop
	12. Show Score, Rewards and Exit

Alternative Courses:

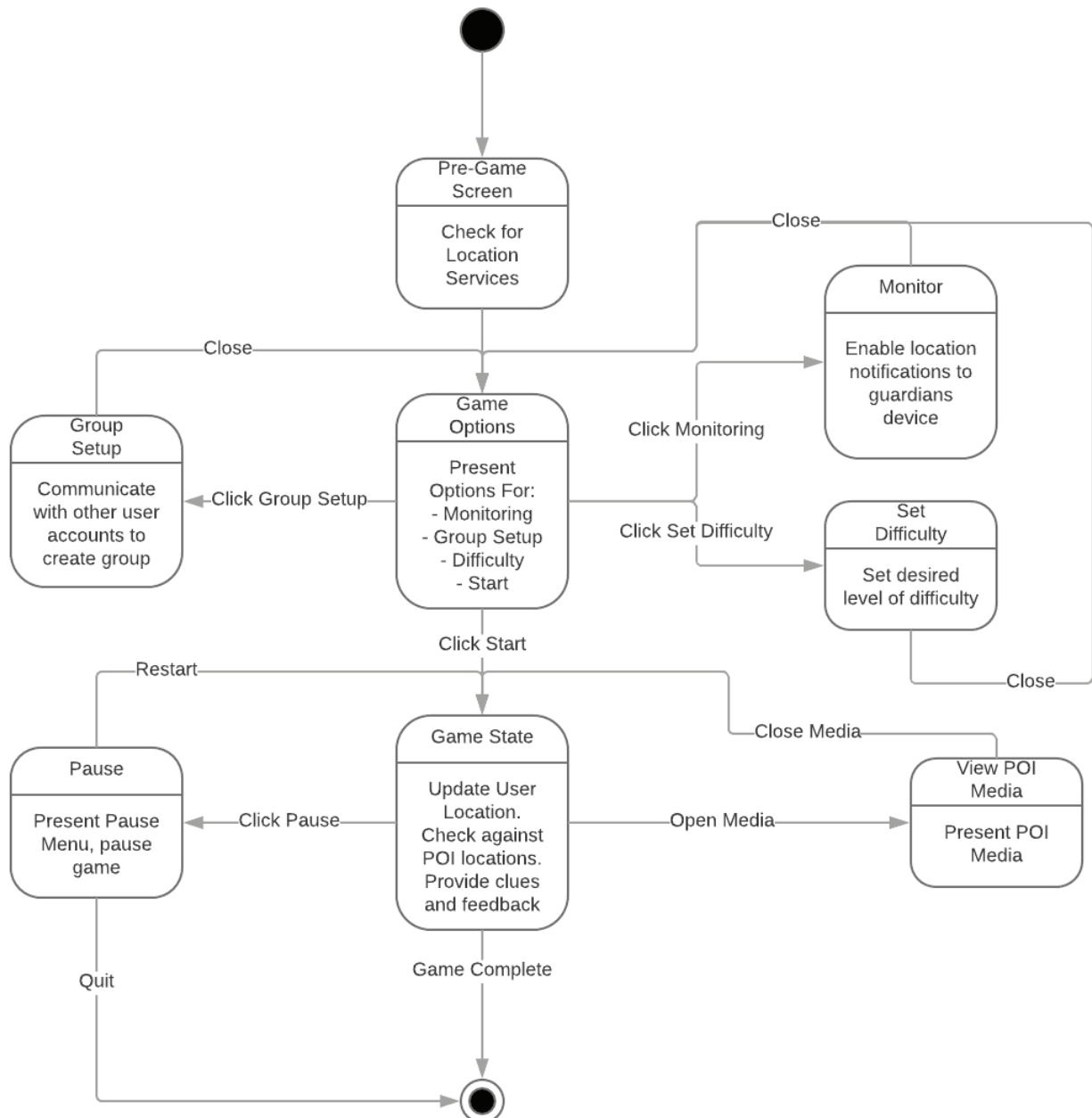
App. User	System
Interact With Site Specific POI 10b. Interact with Site Media Pause Game	10a. Load Site Media 9. Present next Point of Interest
10c. Pause game 10e. Return to Game (10)	10d. Show Pause Menu
Quit Game 10c. Pause game 10e. Quit Game	10d. Show Pause Menu
Select Group Game 6. Select Group Game 6a. Wait for Group formation	6b. Form Group of Players for competition 7. Present menu of difficulty levels
Set Difficulty 8. Select desired difficulty	8a Adjust Game Difficulty

Exceptions:	On error & return to Select Play Game menu
Includes:	NA
Special Requirements:	Audio inclusion and splash screen on successful conclusion Mobile Data required for Location Services
Assumptions:	<ul style="list-style-type: none"> Application forms sub component of larger HeriTech 'Explorer' app User has an existing profile User has read and accepted safety notification
Notes and Issues:	

6. Task Flow Diagram



7. State Transition Diagram



8. Pain Points, CTAs and Signposts

Pain Points	Proposed Solutions
Will the users be aware of the existence of the in-app game before downloading the app.	The download point will feature a call to action to view the game's full details.
How will users be made aware of the in-app game when downloading the app?	An email introducing the apps features will be sent to the users email address after installation.
Will the app suffer from connectivity issues at the sites?	<p>To avoid the risk of poor data connectivity The game level could be downloaded to the device prior to visiting the Heritage Site.</p> <p>In addition for sites with poor connectivity there is a plan to equip those sites with small bluetooth devices, based on IP's previous experience with bluetooth.</p>
The player may not have prior experience of this type of game and they may feel lost when they first start playing.	The user could be shown how to play the game in an in-game tutorial when they play the game for the first time. They would be actively interacting with our onboarding method while immersed in the gameplay.
How will the player know they are in the vicinity of the Point of Interest other than the Hot/Cold notification. Will they feel in control of the game?	Animated Map Markers and/or audio prompts could act as virtual signposts to guide the user in the correct direction.
Will the users have a better experience of this game on a larger device?	The game will be optimised for all devices sizes and screen resolutions.
How will the user be reminded to use the app at the Heritage Sites ?	The user will receive an (optional) push notification call to action when in vicinity of a supported heritage site.
How will the user use this app-feature when not at Heritage Sites , will that have an effect on the app retention? ¹	<ul style="list-style-type: none"> Randomly generated content, which can be collected anywhere as a player moves. There may be a site revision feature added, where you take a quiz on sites you have previously visited to gain rewards. This could be updated with new questions at set intervals to encourage users to return.
Will the user be given feedback when they complete a task or a set of tasks?	The user can have the option to review their progress through the recently completed site.

9. Tracking Tools

In-app tracking is required in order to collect, enrich and format vital data for analysis, which will provide important insights into user behaviours, user flows and the overall success of the app over time. Having appraised and reviewed a number of options (Appendix C) the team propose that the IP choose Firebase Analytics as the proposed tracking platform.

Firestore Analytics

Firestore Analytics from Google is a free app measurement solution specifically focused on mobile apps not webapps. It makes game development much easier and cheaper to implement and maintain, since it analyses all of the data and not just a sample. **Google Analytics** for Firestore offers all the the main services and tools with unlimited reporting, audience segmentation and valuable insights on app usage and user engagement².

Event Tracking

Firestore SDK automatically collects basic app usage data, without any intervention. **Default event tracking** will allow the IP understand interactions and metrics, such as how many times the app was launched, how and when the app crashes, how often in-app purchases were made and how many users are active within a period of time.

Custom event tracking monitors how users interact with important features or flows in the app. This is more specific than analysing which screens the users visit. With event tracking the real actions users take with the app can be analysed, enabling the measurement flow and specific goal conversions. An example of an event could be reaching a certain point in the game. The events that the IP tracks need to correlate with project goals.

Funnels + Conversion Events

Crucial to **tracking user flows** is Funnels and Conversion Events, which can be utilised to capture and measure the series of steps taken by a user within the app. Funnels show the sequence of user steps in a flow; from acquisition to conversion. By tracking users through this funnel model, we can measure if users are successfully completing flows and how many steps a user must take to reach a conversion point. This method also provides insight into how many users are **dropping off before converting** and at what stage, which in turn helps quickly identify pain points.

Measuring 'Play Game' Flow

Using Funnels we can track each step of the 'Play Game' flow, which will enable us to identify conversions such as: game progress, players finding and interacting with POIs, repeat game sessions and distance covered.

Marketing Goals

This Scavenger App is a small subset of a larger Heritech Explorer App in which we are not involved. With the agreement of the IP, we determined that a marketing strategy / path for the Scavenger App was "Out of Scope". Our scope document did however commit to "**Market Research**" for the proposed Scavenger App summary details of which are shown in Appendix D – Market Research.

10. KPIs

Metrics¹

Goal 1: Entertainment

Entertainment is the overarching app objective and primary goal. Metrics that define engaged and happy users will be tracked and analysed carefully. For example, performance and usability pain points are areas that greatly affect positive user experiences. We have identified the following relevant KPIs and metrics to be tracked and measured in Firebase Analytics using default and custom Event Tracking:

Game Engagement

- **App Open Rate (AOR)**
 - Percentage of users with parent 'Explorer' app² installed, that launch the game feature during a given period of time
 - *Equation: $\text{Open Rate} = \text{No. of users that launch game} / \text{No. of users with parent app installed}$*
- **POI Interactions**
 - Number of POIs a user has collected / interacted with in a session or period of time
 - Proportion of users finding more than 1 POIs
 - Proportion of users finding more than 10 POIs
- **Progression metrics³**
 - Number times a player launches, plays for a period of time but fails to complete the game
 - Number times a player launches, plays and completes the game

Performance

- **Crash Reports**
 - Number of crashed sessions during a given period of time; daily, weekly, monthly.
- **Load time + App latency**
 - Measuring content load time from startup and/or specific user actions
 - Delay for app to request and receive a response from an APIs
- **Killed Sessions**
 - Number of game sessions killed by user and on which tasks / screens
- **Post-issue User Actions**
 - What actions did users take following the issue / crash

User Acquisition

- **New Users**
 - The number of new users launching the game during a given period of time
- **Daily Active Users (DAU) + Monthly Active Users (MAU)**
 - The number of active users who use the game on a daily / monthly basis

1 Compiled from various sources (Bowers, 2018; Friberg, 2017; Grennan, 2016; McCalmont, 2015; Perro, 2018; Tolub, 2016; Zenn, 2017)

2 The game app is a sub component (feature) of the larger HeriTech 'Explorer' app.

Retention + Engagement

- Retention Rate
 - Measuring retention rate to help attribute losses or gains on specific campaigns, known issues or other potential causes.
 - *Equation: Retention Rate = $((U_E - U_N) / U_S) \times 100$*
 - U_E = number of users at end of period
 - U_N = number of new users acquired during period
 - U_S = number of users at start of period
- User Growth Rate
 - *Equation: $((\text{Present} - \text{Past}) / (\text{Past})) \times 100$*
- App Stickiness (loyalty + long-term mobile app health)
 - *Equation: Stickiness = DAU/MAU*
- Sessions Length + Intervals
 - The amount of time users spend in the game per session and the intervals between these sessions
- App Event Tracking
 - Monitoring interactions with important features and users flows to conversion points

Goal 2: Exploration + Movement

In line with user goals and requirements, the scavenger game aims to encourage users to explore and move freely around Heritage sites. In order to gauge the success of this goal, we aim to measure the following:

Geolocation Data

- Distance
 - Measure the distance and speed travelled by a user during active game sessions
- Locations
 - Number of unique locations cached during active game sessions

11. References

Bowers, M. (2018). *Creating Perfect User Flows for Smooth UX*. [online] Studio by UXPin. Available at: <https://www.uxpin.com/studio/blog/creating-perfect-user-flows-for-smooth-ux/> [Accessed 5 Sep. 2018].

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² **Google Firebase** (2018) *Google Analytics for Firebase* [online] firebase.google.com Available at: <https://firebase.google.com/docs/analytics>. Accessed 24 Sep. 2018.

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³ **McCalmont, T.** (2015) *15 Metrics All Game Developers Should Know by Heart* [online] GameAnalytics.com Available at: <https://gameanalytics.com/blog/metrics-all-game-developers-should-know.html>. [Accessed 24 Sep. 2018]

¹ **Perro, J.** (2018). *Mobile Apps: What's A Good Retention Rate?* [online] localytics.com Available at: <http://info.localytics.com/blog/mobile-apps-whats-a-good-retention-rate> [Accessed 15 Sep. 2018].

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⁴ **Zenn, J.** (2017). *50+ KPIs to Measure Your Mobile Game or App*. [online] GameAnalytics.com Available at: <https://gameanalytics.com/blog/50-kpi-measure-mobile-game-app.html> [Accessed 2 Sep. 2018].

12. Appendices

Appendix A - Deliverables

User Design Document

General / Market Research: To analyse (a) what Tourist Boards and Heritage Sites are offering visitors in the way of engaging information and (b) to identify a suitable site (safe and enjoyable) for the App. This is shown as an infographic of our primary and secondary market research and our target markets for the App.

Competitor Analysis: Evaluating usability and gameplay of competitor apps by conducting heuristics analysis to gain a deeper understanding of successful features and functions. The results of the evaluation will help inform requirements.

User Research: The goal of our User Research is to identify attributes and goals of potential user groups, in order to better understand their motivations and perceptions on topics relating to the project: Irish Heritage Sites, mobile gaming and device usage.

Personas: Developing one main persona to represent the primary user group, to provide tangible insights into the behaviour of a real user, which will in turn help the team to make key design and development decisions.

User Requirements: Identify and developing a clear set of user requirements to inform solutions and features during the design and development stages.

Design & Development Considerations (UX/UI)

Structure Map: To define the structure of the application, allowing us to see that the path the user will take through the application matches with our users requirements.

Task Flows: To define our user path through our application on a specific task and how they interact with the functions at each stage of their journey

Wireframes: To conceptualise the main elements and functional stages of the app and to visualise proposed content and structure.

Technology Roadmap: The technology roadmaps goal is to examine the optimum way to develop the Scavenger Hunt feature following handover of deliverables to the IP.

Visual Design

Foundation Style Guide: To establish a basic visual identity for the app feature and to guide the IP in presenting a cohesive and professional Proof of Concept to investors and potential users.

Product Mockups: The goal of the product mockups is to present an example of the visual feel of the app feature and to enable further ideation of the design.

Appendix B - Persona

Denis J Coughlan



Facts & Demographics

- 10 years old from Terenure, Dublin
- Lives with his Mum and Dad, sister Sienna (9) and their pet labrador
- Attends the local primary school
- Travels outside Dublin regularly with his family and family friends who also have children of a similar age

"I don't really like museums but I really like running around old ruins. In museums, I have to be very quiet and I can't touch anything. I prefer learning from real life!" - Denis (10)

Personality: Extroverted. Social. Conscientious. Adventurous. Denis is social, he has lots of friends and is popular at school. He's extroverted and confident, always exploring and looking for adventure. Denis likes history and English at school, he has a vivid imagination and enjoys hearing stories about people of the past and they lived. He's a member of a local scouts group and he loves treasure hunts.

Behaviors

- Finds structured learning boring at times, yet he is a very curious boy and loves exploring.
- Sometimes he tries to be like the grown ups when visiting heritage sites, but ends up losing focus and feeling bored and frustrated.
- On occasions when he would like to engage with the exhibits, he's told off for being loud or as he is told behaving inappropriately.
- He doesn't know where he is allowed to go and where he isn't so sometimes he doesn't bother exploring.
- His parents are busy exploring and they do not have time to engage with him and explain in a way that is easily understood. Sometimes they try to at home, but he has already forgotten what the exhibits were about.
- He'd rather just play games on his phone, but he's not allowed.
- Ends up running around the heritage sites most of the time with his sister and/or friends, occasionally getting lost.
- When they are back home, he doesn't feel like he's learned anything, or even been anywhere new.
- He has very little recollection of the places visited, but he remembers all the fun games they played with his friends.
- When asked about his weekend in school, there is very little he can tell his classmates about.

Needs & Goals

- Denis hates being bored and would like to have something fun to do when on day trips to heritage site with his family.
- He would love to explore and feel free as he wanders about.
- Denis would like to be more grown up and be able to discuss with his Mum and Dad what he has learned.
- He'd like to be able to tell his friends all the fun facts and even include some in his school report.
- Denis's parents would like to channel his energy and enthusiasm into a more meaningful experience that will be guided appropriately and enable him to learn while having fun.

Appendix C - Tracking Research

Tracking user behavior will help to see how users are interacting with the app and to better optimize the app for its users. There are many analytic platforms available to give answers about how users engage with the app, so that they can be re-engaged in the future with more targeted information.

To this end, we searched high and low for the best tools to help to do just that, once the app goes live. Here is a shortlist of the ones we liked, that we have appraised and reviewed for their specific benefits and best fit for our IP.

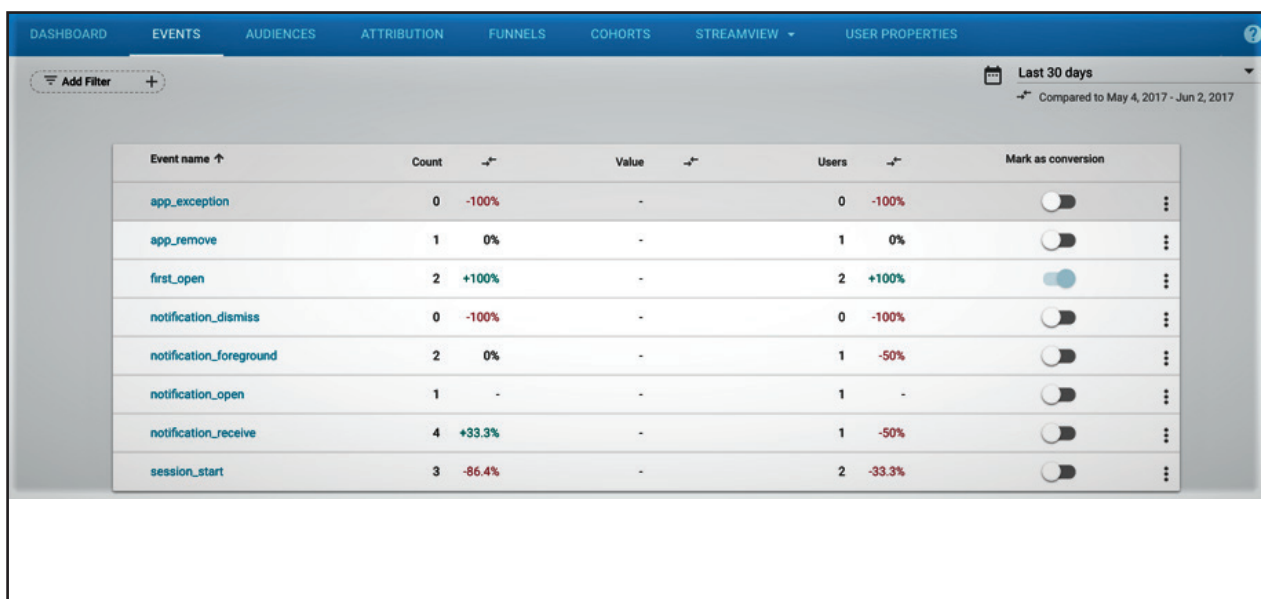
Google Analytics Mobile App: To measure and optimize user acquisition, engagement and outcomes with the app, the developer could use Google Analytics. It provides a free tool to help build a complete picture, to understand the site and app users (Google Developers, 2018).

Google Analytics evaluates the performance of marketing, content, products, and more features from a better and deeper level. It makes it easy to understand how app, site and user are engaging with the content, so that the IP can justify what is working and what is not. It integrates with the android app seamlessly and has updated documentation for implementation guidance for the developer.

Data Analysis: is very quick using the easy-to-use interface provided by Google Analytics. It also provides the facility to share reports. The mobile app reports work with the Firebase SDK to capture unlimited app reports for 500 distinct events and user properties.

The drawback of Google Analytics is it analyzes *a sample of data* not all the data therefore they don't have an Audience tool. To export the user data from Google Analytics the IP would have to buy the whole Analytics 360 suite. Without spending \$100k per year, it is not possible to get information on a user level.

Because of this drawback, we propose that our IP choose **Firebase Analytics** over **Google Analytics** as the app development platform and use **Firebase SDK** instead of Google Analytics Services SDK for Android during implementation of the app.



Event name ↑	Count	Value	Users	Mark as conversion
app_exception	0 -100%	-	0 -100%	<input type="checkbox"/>
app_remove	1 0%	-	1 0%	<input type="checkbox"/>
first_open	2 +100%	-	2 +100%	<input checked="" type="checkbox"/>
notification_dismiss	0 -100%	-	0 -100%	<input type="checkbox"/>
notification_foreground	2 0%	-	1 -50%	<input type="checkbox"/>
notification_open	1 -	-	1 -	<input type="checkbox"/>
notification_receive	4 +33.3%	-	1 -50%	<input type="checkbox"/>
session_start	3 -86.4%	-	2 -33.3%	<input type="checkbox"/>

This picture represents Firebase dashboard indicating all the events screen lists with default and custom events that have been triggered by the app in the designated date range.

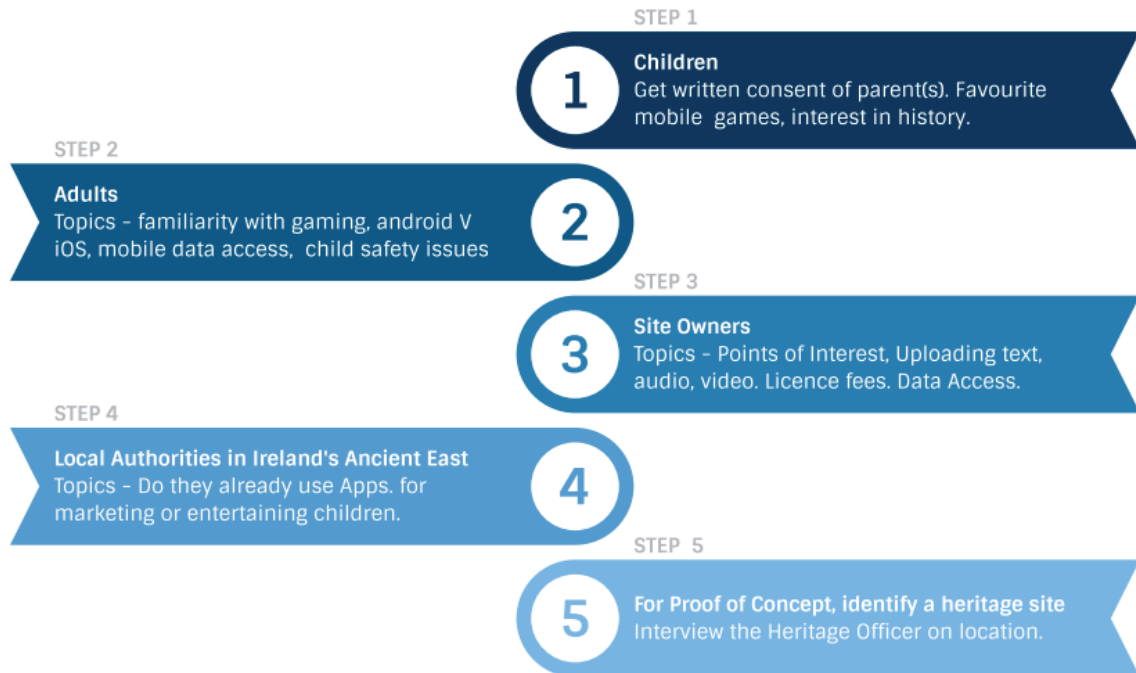
Firebase provide the following free products:

- A/B Testing, Analytics
- App Indexing
- Authentication (except Phone Auth)
- Cloud Messaging (FCM)
- Crashlytics
- Dynamic Links
- Invites
- Performance Monitoring
- Predictions
- Remote Config

Appendix D - Marketing Research

Market Research - Primary Data

User Interviews



Market Research - Secondary Data

Academic Research



We suggest 4 target markets



We envisage multiple entry points to the App. / website

