

“Bus App Prototype: User Testing, Evaluation and Re-Design”

by Joe O'Brien (10126228)

CS6021 - Assignment 3

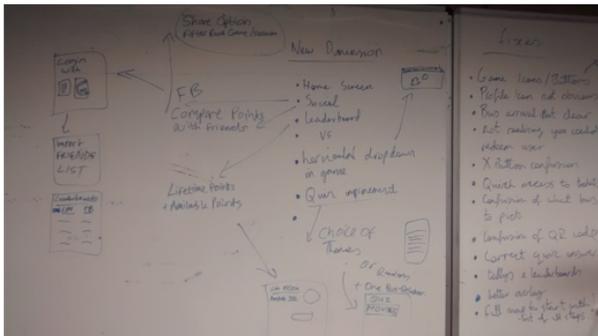


Table of Contents

1	Preparing Prototype for User Testing	3
2	Evaluation Technique	4
3	Evaluation Setting	5
	3.1 Recruiting Participants	5
	3.2 Evaluation Setting & Recording Method	5
	3.3 User Tasks and Questions	7
4	Evaluation Results	9
	4.1 Reflection on the Evaluation Sessions	9
	4.2 Description of Evaluation Results	10
5	Re-Design	12
	5.1 Chosen Path for Re-Design	12
	5.2 Final Re-Design	14
	Appendices	17

1. Preparing Prototype for User Testing

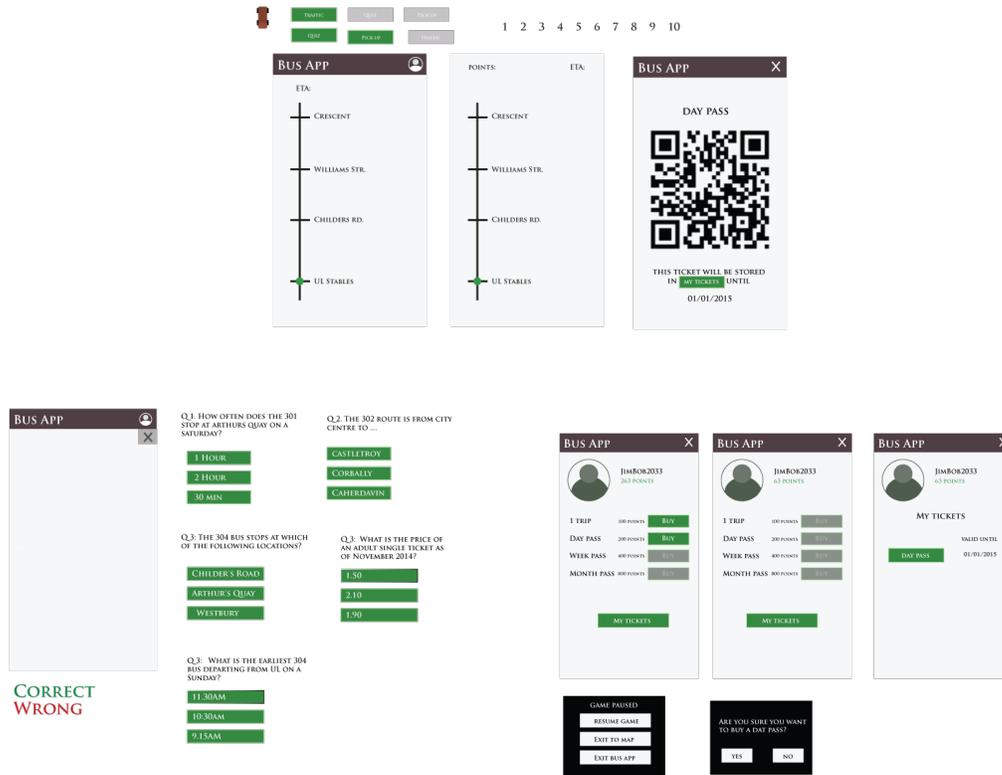
Before we could move onto the user testing stage of the design, Keith and I had to re-think some aspects of our original prototype design. We felt that although we had a good paper prototype produced and made a prototype video of it in action, some elements of the prototype would not be suitable enough for smooth interaction for testers. We particularly felt that the games themselves were not justified by using paper (other than the quiz game, which works quite well on paper). We felt that the actual game content itself is not one of the more important aspects of our design concept and so we decided to keep using paper for the quiz game, but instead outsourced a free android game called “Traffic Racer” for our “race/traffic” game. This game is very similar to what we had envisioned and designed in our original prototype, but by letting the user play this fully-formed game, alongside other aspects of our prototype on paper, it would make for a smoother and more realistic experience for the user.



(Screenshot of “Traffic Racer”; the game we used to simulate our “traffic” game for the user-testing. Source: play.google.com)

We also re-designed some of our paper screens for the app and made them less robust, and more flexible. In other words, we got rid of any static numbers or images of the bus’s location, and instead created cutout numbers and cutout buses which we could manipulate in real time for a more realistic run-through for the user-testing. We created new screens as

well (such as the redeeming of points for a bus ticket) for more in-depth navigation in the runthrough.



(Adjusted screens for printing. Created in Illustrator)

2. Evaluation Technique & Goals

As our prototype was in the form of a paper prototype (all but one game) for a screen-based system, we felt that an appropriate form of user-testing for us was Moderated In-Person Usability Testing and some Task Analysis. What this essentially means is recruiting users to test the paper prototype, under our supervision and moderation. We wanted to get users to test the paper prototype on their own as if they were using the application on their mobile device. The purpose of moderating these sessions is to be able to guide the users and give them specific tasks to attempt in the system. We wanted to be there in person to answer any questions that the user might have and also collaborate or “co-design” with them on any ideas they may have to improve the system. We wanted to create a relaxed environment and encourage the testers to always express their thoughts and feelings about the prototype and the entire process. We encouraged the “think aloud” method to achieve this. The goals we wanted to achieve at the end of our evaluation were as follows:

- Have any potential usability errors/bugs in the prototype identified.
- Any omitted features identified.
- Design improvement suggestions to be generated.
- Aspects of the prototype that the users like and didn't like identified.
- Learn from the evaluation sessions for future projects.
- Document our findings in an appropriate and effective way.
- Engage in a collaborative design session with the users.

3. Evaluation Preparation

3.1 Recruiting Participants

For recruiting, we knew that our prototype/design was aimed at users who commute on the Limerick City buses, and so naturally we wanted to recruit persons who are regular or semi-regular users of the bus services in the city and county. We tried to obtain as best we could a variety of user-types (eg: users who get different bus routes than others, users who get the bus everyday and users who are new to Limerick and the buses). We decided to use 5 participants to test our prototype, as Jakob Nielson claims, approximately 85% of a systems bugs can be detected by testing with 5 users. To recruit willing participants, we simply asked friends and acquaintances who we knew to fit the bill for the various types of users we wanted to test with, and we easily scrounged together 5 to help us out.

3.2 Evaluation Setting & Recording Method

We carried out the user-testing sessions over 2 consecutive days, and used the design space in CS200(whatever) (with the exception of one test which Keith carried out at home) to host these sessions, as all we really needed was a relatively quiet, comfortable environment with table and chairs and somewhere to set up recording equipment. We carried out 5 individual sessions, (1 for each participant) and they each lasted somewhere between 10 and 30 minutes in duration. To keep a record of the sessions, we set up a mobile phone on it's side to record HD video of the participant and ourselves sitting around the desk interacting with the prototype and with each other. As well as this, I took down some notes which I deemed to be of significance, and anything which I did not note could easily be jotted down or transcribed from watching the videos later on. We also took a handful of photographs of some of the sessions for our own benefit and to demonstrate the look of the setup we had.



(Setup for user-testing with paper prototype)

Before carrying out the tests, I had drawn up an Informed Consent form which describes details of the test and informs participants that they have a right to withdraw at any time and see any information we hold about them at any time. (a copy of the form attached in Appendices) All of our participants willingly signed these forms.


 UNIVERSITY of LIMERICK
 COLLEGE of LIMERICK

INFORMATION AND CONSENT FORM
 User Testing for A Limerick City Bus Mobile Application

We are designing a mobile app prototype aimed at persons who commute on the Limerick city buses. We are inviting volunteer participants to test the prototype app under our supervision in the CSIS design studio room and evaluate it (comment on it orally and in writing. This is to help with future design improvements to the app.

If you would like to participate in the use testing, please sign the attached form, and return it to Joe O'Brien or Keith Dunne. You are free to withdraw from this project at any time.

This project is being carried out by Joe O'Brien and Keith Dunne as part of a postgraduate module, taught by Cristiano Stormi.

Questions or concerns regarding this project can be sent to the researchers Joe O'Brien (10126228@studentmail.ul.ie) or Keith Dunne (10487839@studentmail.ul.ie)

I, the undersigned, declare that I am willing to participate in the user-testing evaluation of mobile application prototype. The project includes playing, commenting and evaluating the app.

- I fully understand that I am free to withdraw my participation at any time without the need to explain or give a reason
- I am entitled to full confidentiality in terms of my participation and personal details

Thank you for your time and participation.

Signature: Graham Patterson
 Name: Graham Patterson
 Date: 25/11/14

(One of the signed Informed consent form)

3.3 User Tasks & Questions

Before carrying out the evaluation sessions, we had agreed that we would let the users try to navigate through our prototype as they please as a first run. We then decided that to ensure that they encounter alternate tasks that they may not have done the first time around, we drew up a number of tasks for them to do in the session. We also wrote a list of questions which we would ask the participants to get a better feel for how they perceived the prototype and facilitate suggestions from them. This set of tasks and questions is below:

❖ **Task List**

- You accidentally choose the wrong bus. How would you recover and find your bus route?
 - Is it clear that you chose the wrong bus?

- You want to go to the Crescent bus stop.
 - Is this live map what you expected?
 - Is it clear to see where the bus is and how far away it is from you?
 - Is it clear where your location on the map is?

- You want to play The Race game.
 - Is it clear when you can play the race game?
 - Is it clear how long the game will last?
 - Is the game enjoyable?
 - Is it clear why the game ended when it did?
 - Is it clear that you cannot play the Pickup game now?
 - When do you think the pickup game is available to play?

- You want to pause the Game.
 - Is it clear how to pause the game?
 - Does the pause menu have the options you expected it to?

- You want to return to the live map and play the Quiz game.
 - Is it clear when you can play the quiz game?
 - Why do you think the bus is not moving?
 - Is the quiz game enjoyable?
 - Is the quiz informative?
 - Is the point system clear to you?
 - Is it clear why the game ended when it did?

- Does the results screen make sense to you?
- You want to redeem your points for a Day pass ticket
 - Is it obvious that the profile icon is for your profile?
 - Is it obvious that you must go to your profile to redeem your points?
 - Is it obvious how many points you have and what you can & cannot afford?
 - Is it clear where to find your purchased tickets?
 - How do you think you would redeem the ticket in real life?
- You want to quit the game completely.
 - Did you know how to quit the game?
- ❖ **Loose Questions:**
 - Is it clear where you are on the map?
 - Is it clear that the bus is moving from stop to stop in real time?
 - Is it clear that the live map would be smaller and to the side of your screen during games?
 - Are the games informative?
 - Are the games fun?
 - Is the live map a helpful tool?
 - Is the bus icon or ETA a better tool? Is there need for both?
 - Is it clear that you can only play a specific game if the bus is between that particular stop?
 - Is it clear that when games are grey, you cannot play them?
 - Does the profile icon look obvious to you?
 - Would sounds/music enhance the games?
 - Any need for sound during the live bus?
 - Do you feel that you can easily pause or quit the game at any time?
 - Do you feel that you can return to the live map at any time?
 - Do you feel that you can quit the app completely at any time?
 - Does the back button take you expect?
 - Is it clear that you redeem in-game points for bus tickets? (No real money)
 - This game would only work when you have wifi/location turned on and are in the vicinity of a Limerick us stop. What do you think of this?

4. Post-Evaluation

4.1 Reflection on the Evaluation Sessions

Overall I felt that the evaluations went quite well in terms of addressing the goals we aimed to achieve. The sessions were all enjoyable and very informative, and each session felt different from the previous which I think is a good thing. By testing with 5 different users, we managed to have interesting conversations with people who have different perspectives on our research area, and indeed on the world itself. One thing that was definitely a success from the evaluations is the sheer amount of usability errors that were discovered. When Keith and I look back upon our original design, it seems obvious now that these were easy fixes, but some issues never occurred to us at the time. It is a very rewarding feeling to have these issues pointed out to us so easily by users, and we feel that their discovery of errors and bad design/functionalities is of massive assistance to our design process.



(some photos from our user-testing sessions)

I feel that some of the participants were more vocal than others and were more open to giving suggestions, and perhaps that could be down to the personality of the individual. At the same time, I feel that Keith and I both became more comfortable after the first one or two sessions and once we were comfortable about everything, it set the users at ease as well, and this was of great benefit to everyone involved.

I feel that our prototype itself served its purpose for testing, at least for the most part. Moving from paper to a mobile phone to play the “traffic” game had positive and negative impacts, I feel. Positive, because it definitely engaged the user and it was clear that they all had fun playing it, but at the same time, moving away from the paper-developed screens and just having a live map screen alongside the phone rather than overlaid (as would be the case with the final product) wasn’t as realistic an experience as we were hoping. Still, I think that the rest of the prototype ran quite smoothly with the users. Keith and I knew the paper screens inside and out and were able to slide in the relevant screens to the user to simulate a reasonably smooth process of interaction.

4.2 Description of Evaluation Results

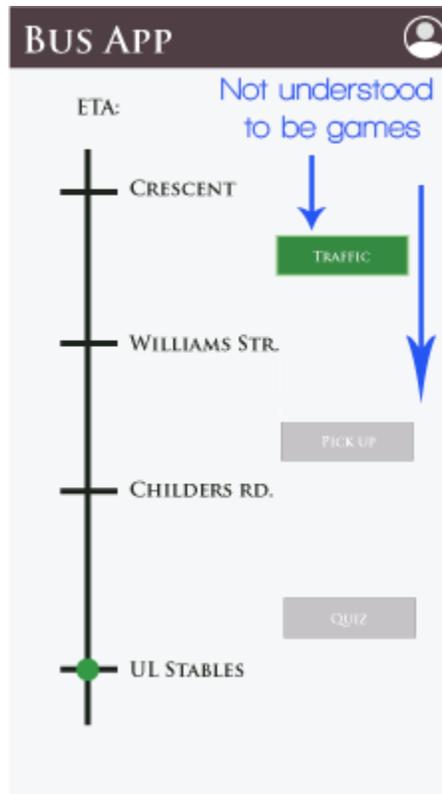
Issue	Participant #				
	1	2	3	4	5
Game icons were misunderstood to be something else	Present	Present	Present	Present	Present
Profile icon not obvious	Not present	Present	Present	Present	Not present
“Bus has arrived” not emphasised enough	Present	Not present	Present	Present	Not present
Want for a Home Page (with profile access, ticket access, live map)	Present	Not present	Present	Present	Not present
User didn’t realize points could be redeemed	Present	Present	Present	Not present	Present
‘X’ buttons caused confusion about where it would take the user	Present	Present	Not present	Present	Not present
Want for quick access to purchased tickets	Not present	Not present	Present	Not present	Present
Confusion about which bus to choose at the beginning	Not present	Not present	Present	Not present	Present
Bus-related quiz questions not favorite choice of quiz theme	Present	Not present	Not present	Present	Present
Need for more quiz topics	Present	Not present	Not present	Not present	Present
Confusion about what to do with QR code	Present	Not present	Not present	Not present	Not present
Want to choose stop on Live Map	Not present	Present	Not present	Not present	Present
Want for correct quiz answers to be highlighted when you get question wrong	Not present	Present	Present	Present	Present
Want for a total points tally & leaderboards & FB-integrated	Not present	Not present	Present	Present	Not present
Want for a horizontal drop-down live map in-game	Present	Not present	Not present	Present	Not present
Want for a display of all stops at the beginning	Present	Not present	Present	Not present	Not present
Want for an (GUI?) indicator after each game - points need to buy ‘X’	Not present	Not present	Present	Present	Not present

Key:

Present	Not present
---------	-------------

The above table notes the majority of the interesting findings from the five evaluation sessions. On the left is a description of different issues/problems/suggestions that were

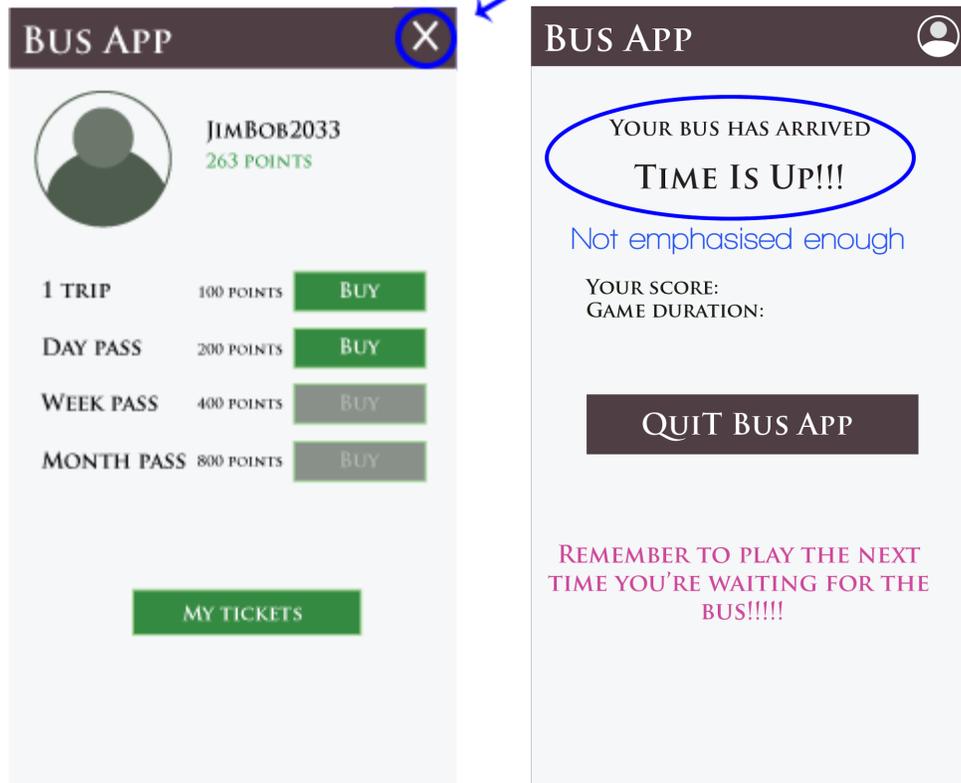
encountered or mentioned by the participants, and on the right is a box for each of the five participants. A green box indicates that this particular point is applicable to that participant and clear means that it is not. It is clear that certain patterns started to emerge among the participants. Some very common issues were discovered, such as the confusion about the game icons. Users misunderstood the buttons for “pickup” and “traffic” not to be titles of games but instead information icons relevant to the bus they are waiting for. On reflection, it seems like such an obviously bad design choice by Keith and I, but it is something we didn’t notice when we first designed the screen.



(Game icons were not clear to users)

Other common issues included certain icons not being clear enough (profile icon, bus has arrived not emphasized enough), confusion about being able to redeem points for tickets and confusion about ‘X’ buttons purpose on certain pages.

Users not sure if 'X' quits app completely or where it returns to



(Users confused about 'X' and bus arrival not emphasised)

Users also discussed with us a number of features which they would like to see incorporated in the final product. These include a want for a comprehensive “Home” page (with profile access, ticket access, live map), want for quick access to purchased tickets, a want for a more social dimension (leaderboards, Facebook-integration) and many more.

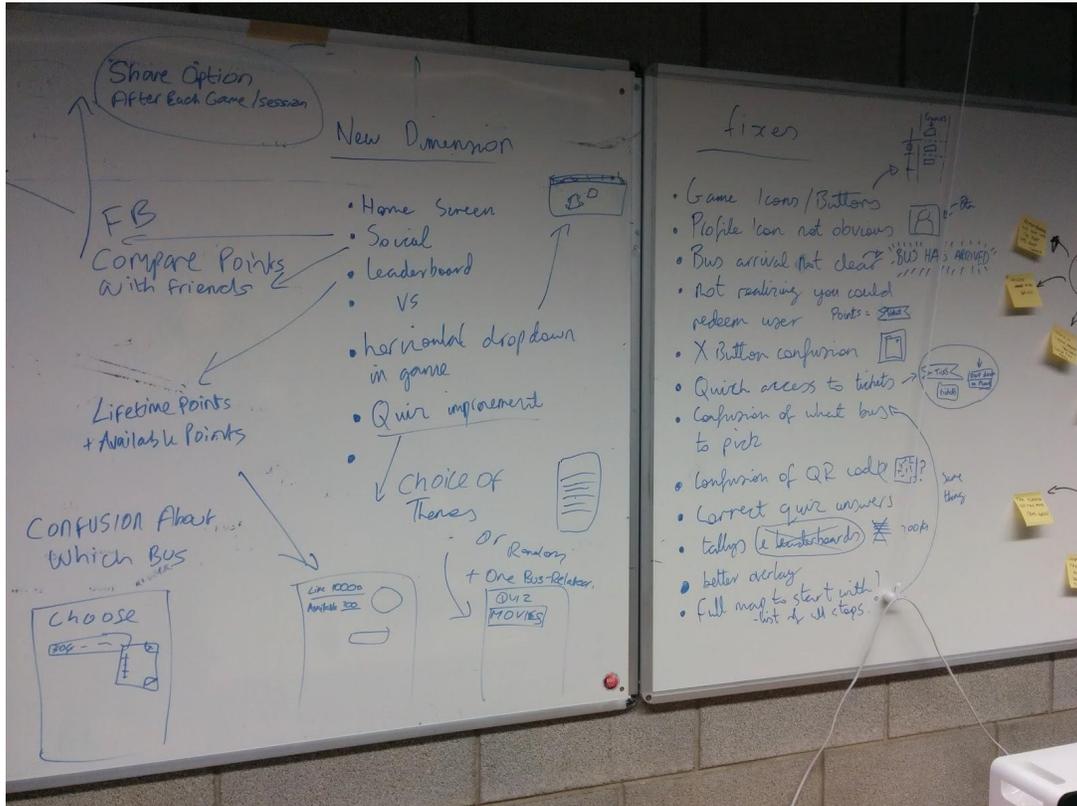
5. Re-Design

5.1 Chosen Path for Re-Design

After analysing our evaluation results, Keith and I began thinking of how to split up the re-design tasks. After some deliberation, we decided that because there were so many simple-enough “fixes” to be made to our design, that one of us could make these changes and up the fidelity of the prototype to a computer-aided prototype. Keith decided he would like to do this, and I decided that I would instead take a step back and try to add some new dimensions or functionalities to the entire concept. What I decided to do was add a social element to the app, incorporating suggestions made by some of the users and ideas we

generated ourselves based on the evaluations.

Keith and I moved back to the drawing board for a brainstorming sessions and between us managed to come up with some ideas for each of our re-designs. I feel it was a good idea to do this with two minds instead of just one, but at the same time, we did focus most of our energy ultimately on our own chosen path.

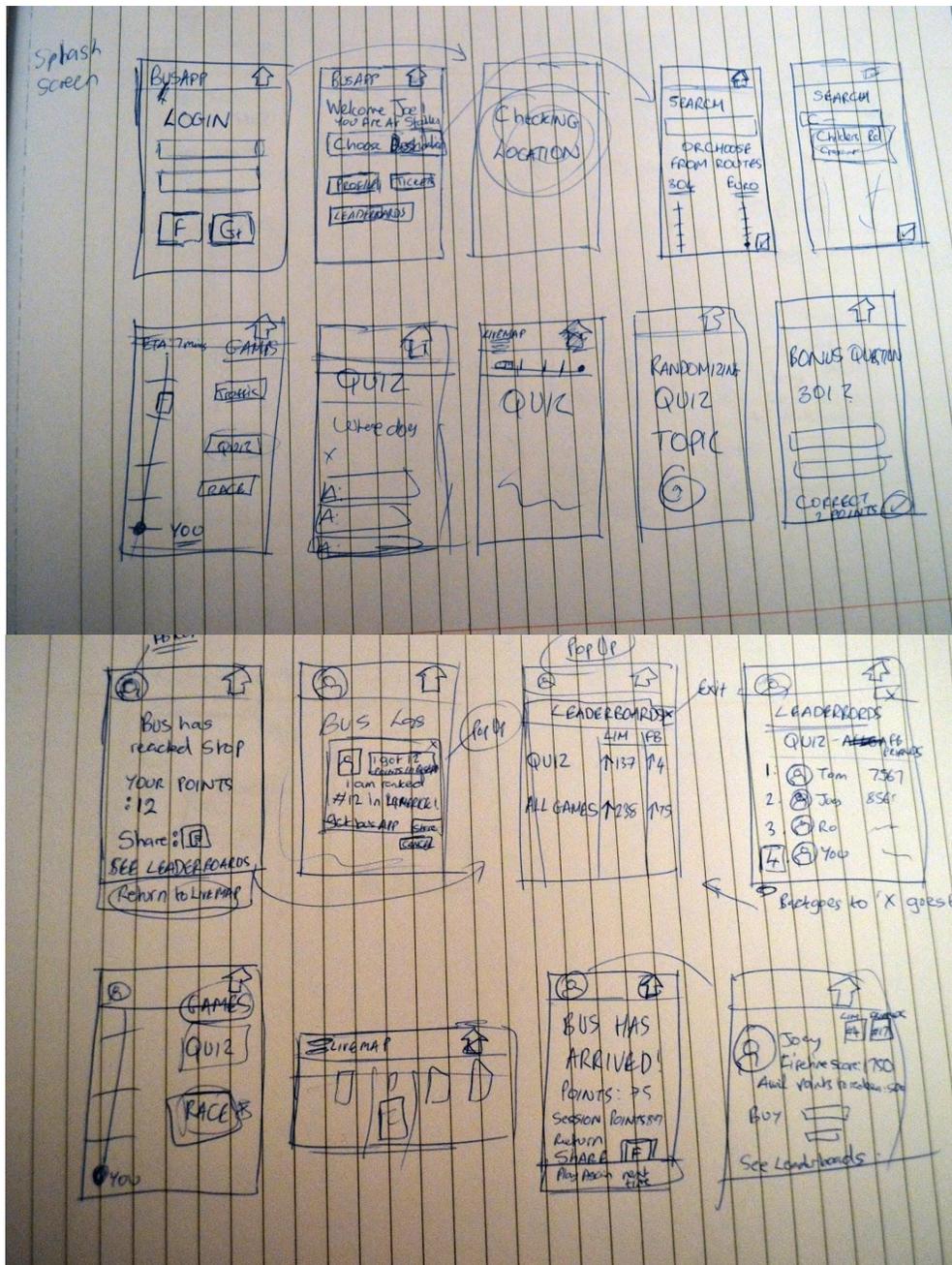


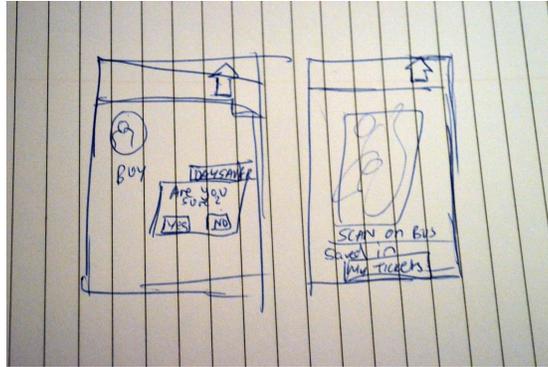
(Brainstorming and mind-map session for Re-design process)

For my re-design route, ideas were decided upon such as leaderboards, social media-integration and a couple of other user suggestions to enhance the entertainment and functionality of the app. These include improving the Quiz game to include a greater amount of themes and a drop-down live map in the games themselves.

5.2 Final Re-Design

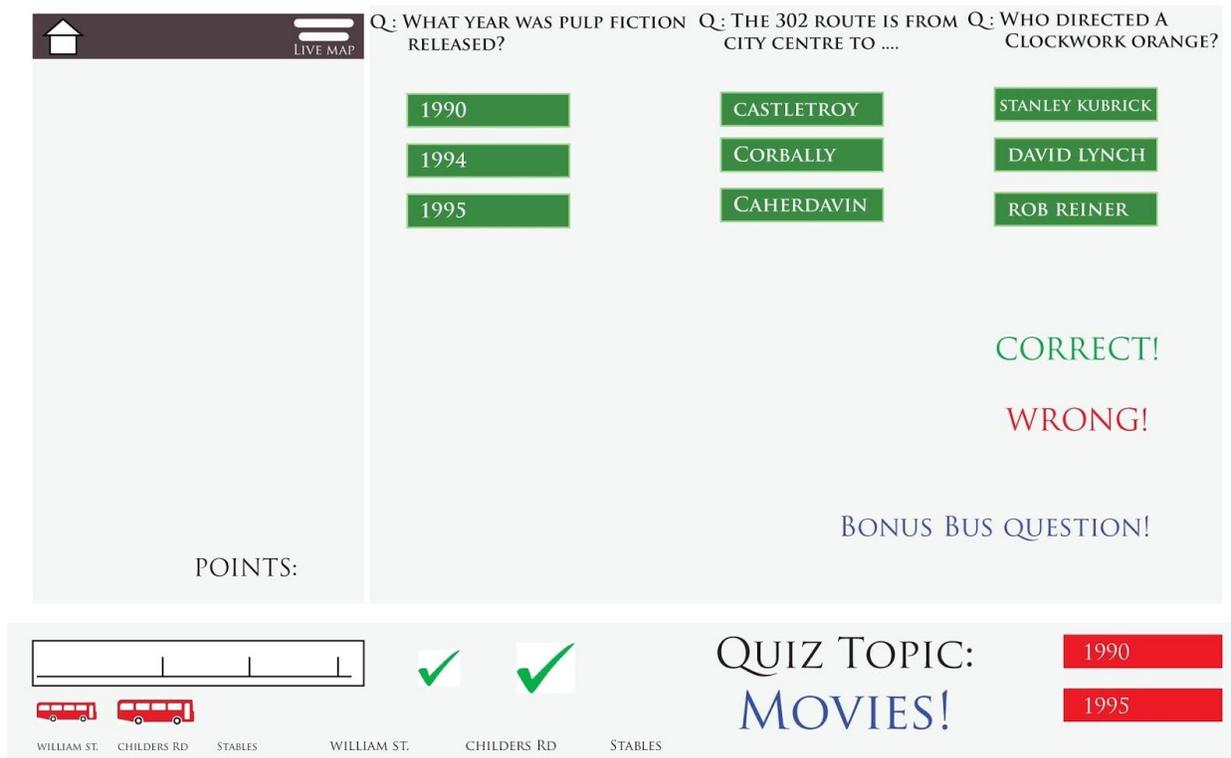
The first thing I did after our brainstorming session was to begin thinking of all the screens I would need, both modified versions of existing screens and new screens entirely. So, before I went into drawing out the screens in Illustrator, I drew rough versions on paper to make sure that I thought of everything before wasting valuable time creating the real thing.





(Drawing screen mockups)

From here I set out on creating these same screens, but using Adobe Illustrator to do so. I designed a number of screens and cutouts (pop up screens, icons etc).



(some of the screens designed in Illustrator)

I then printed them out in colour and cut them out one by one. The final prototype comes in the form of a paper prototype and I subsequently recorded and edited a video (using Adobe Premiere Pro) simulating the interaction of the application.

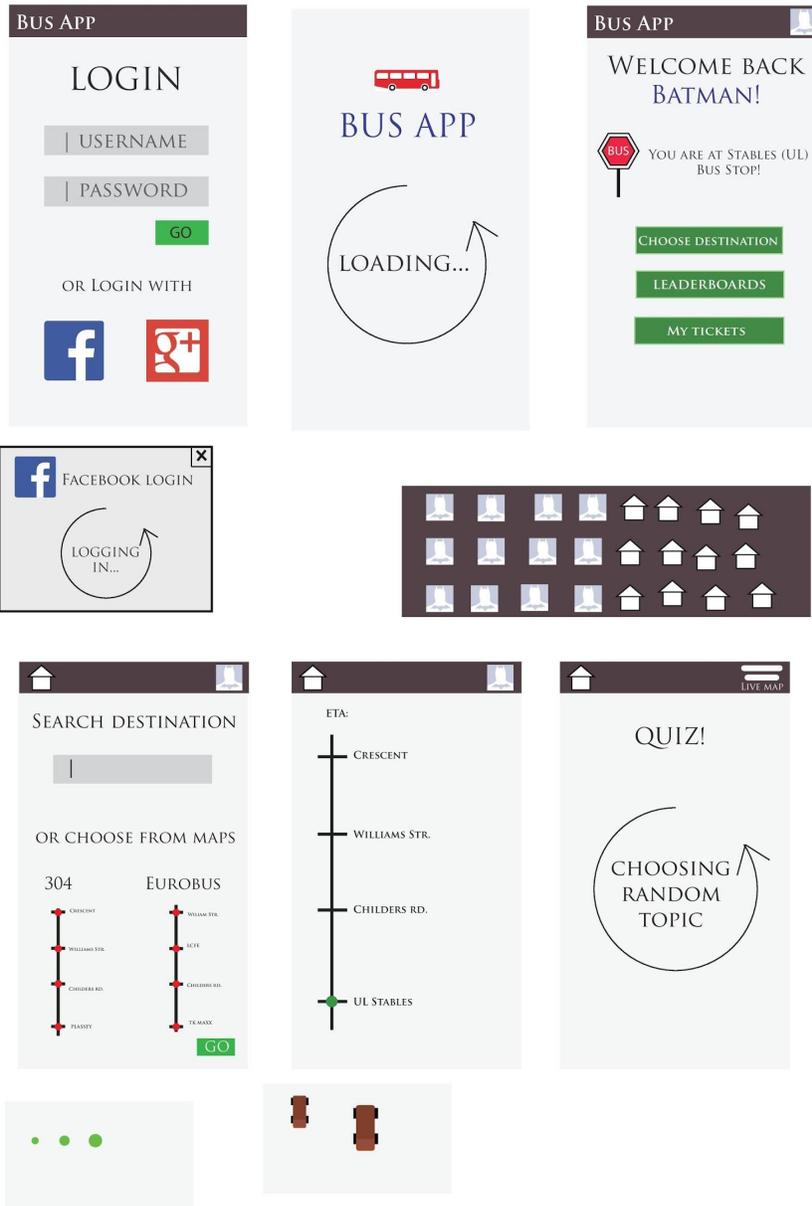


(Paper prototype screens cutout)

The final re-designed prototype functions and looks reasonably similar to our original prototype, except now it has a new social dimension. The user now has the ability to integrate their Facebook or Google + accounts with the Bus App, see their rankings in each game and overall, both in Limerick and among their Facebook friends. It also has a sharing option so results and rankings can be shared on social media, which also would promote the app. There is also a new “choose destination” option so that users can ensure that they are getting the correct bus and there is a drop-down horizontal live map in the games. The quiz game has also been modified to now include a variety of randomized themes with one bonus “bus-related” question in each round, worth 2 points. There is a newly created homepage also with a number of functionalities and each page has a profile and a home page icon on the top of the screen for quick access.

Appendices

Illustrator screens:



Q: WHAT YEAR WAS PULP FICTION RELEASED? Q: THE 302 ROUTE IS FROM CITY CENTRE TO ... Q: WHO DIRECTED A CLOCKWORK ORANGE?

1990 CASTLETROY STANLEY KUBRICK
 1994 CORBALLY DAVID LYNCH
 1995 CAHERDAVIN ROB REINER

CORRECT!
 WRONG!

BONUS BUS QUESTION!

POINTS:

WILLIAM ST. CHILDERS RD STABLES WILLIAM ST. CHILDERS RD STABLES

QUIZ TOPIC: MOVIES!

1990
 1995

TIME UP!
 BUS HAS REACHED ITS STOP!

YOUR POINTS:
 LIFETIME POINTS:

SHARE:

VIEW LEADERBOARDS
 RETURN TO LIVE MAP

TIME UP!
 BUS HAS ARRIVED!

YOUR POINTS:
 LIFETIME POINTS:

SHARE:

VIEW LEADERBOARDS

PLAY AGAIN
 NEXT TIME YOU'RE WAITING FOR THE BUS!

LEADERBOARDS

LIMERICK FRIENDS

QUIZ	↑ #17	↑
ALL GAMES	↑ #35	↑ #5

#3

LEADERBOARDS

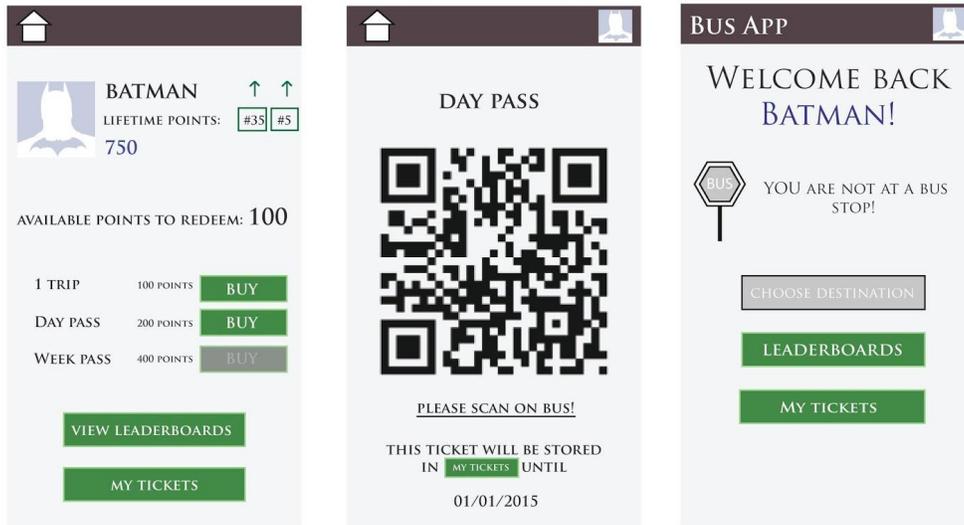
QUIZ FRIENDS

1:	JOHNJO	220PTS
2:	TIMMY	194PTS
3:	BATMAN	125PTS
4:	TONI	117PTS

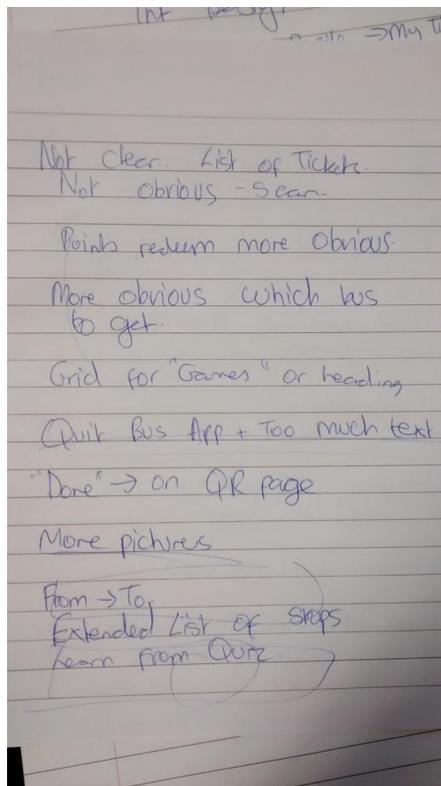
SHARE WITH FRIENDS

I HAVE 750 LIFETIME POINTS IN BUS APP!
 I AM RANKED #12 IN LIMERICK!
 DOWNLOAD BUSS APP

SHARE CANCEL



Handwritten notes from evaluations:

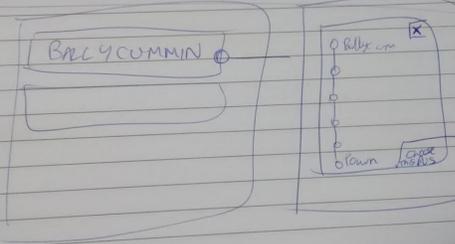


Int Design - Evaluation

Enter Home Page → Profile → My tickets → Cho

When clicking on buses, have a map of all the stops pop up

Enter Destination Create Shopping



Games are not labelled

Maybe icons

More obvious that bus has arrived

Profile icon

Home Page - Tell where you are + highlight bus stop

Highlight right answers

Make it more obvious to redeem points
Graphical indicator
Close to next page

Informed Consent Form



UNIVERSITY of LIMERICK
OILESCOIL LUINNIGH

INFORMATION AND CONSENT FORM

User Testing for A Limerick City Bus Mobile Application Prototype

We are designing a mobile app prototype aimed at persons who commute on the Limerick city buses. We are inviting volunteer participants to test the prototype app under our supervision in the CSIS design studio room and evaluate it/comment on it orally and in writing. This is to help with future design improvements to the app.

If you would like to participate in the use testing, please sign the attached form, and return it to Joe O'Brien or Keith Dunne. You are free to withdraw from this project at any time.

This project is being carried out by Joe O'Brien and Keith Dunne as part of a postgraduate module, taught by Cristiano Storni.

Questions or concerns regarding this project can be sent to the researchers Joe O'Brien (10126228@studentmail.ul.ie) or Keith Dunne (10487839@studentmail.ul.ie)

I, the undersigned, declare that I am willing to participate in the user-testing evaluation of this mobile application prototype. The project includes playing, commenting and evaluating the app.

- I fully understand that I am free to withdraw my participation at any time without having to explain or give a reason.
- I am entitled to full confidentiality in terms of my participation and personal details.

Thank you for your time and participation.

Signature: _____
Name: _____
Date: _____

Bibliography:

<http://www.nngroup.com/articles/why-you-only-need-to-test-with-5-users/>

<https://play.google.com/store/apps/details?id=com.skgames.trafficracer&hl=en>

Link to Video Prototype: <https://www.youtube.com/watch?v=slt-3FCdh-k&feature=youtu.be>