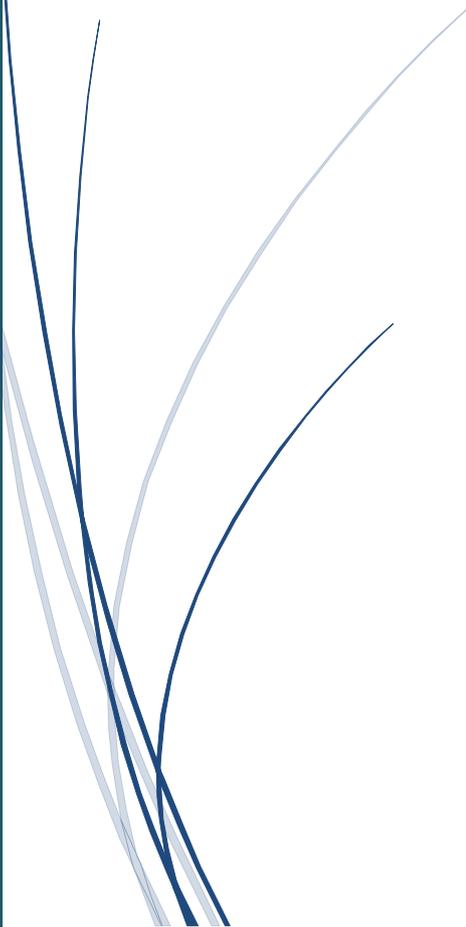




5/6/2019

UTILITY-APP

SPECIFICATION REQUIREMENTS
DOCUMENT



Adelaide Ntuli

NCI

Declaration Cover Sheet for BSHTM4 Project Submission

SECTION 1 *Student to complete*

Name: Adelaide Ntuli
Student ID: X15732075
Supervisor: Ron Elliott

SECTION 2 Confirmation of Authorship

The acceptance of your work is subject to your signature on the following declaration:

I confirm that I have read the College statement on plagiarism (summarised overleaf and printed in full in the Student Handbook) and that the work I have submitted for this assessment is entirely my own work.

Signature: Adelaide Ntuli

Date: 06th May 2019

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When referring to the work of another author within the text of your project you must give the author's surname and the date the work was published. Full details for each source must then be given in the bibliography at the end of the project.

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- That other examinations sat by the same student at the same sitting be declared void.

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- Suspending a student from college for a specified time.
- Expelling a student from college.
- Prohibiting a student from sitting any examination or assessment.
- The imposition of a fine.
- The requirement that a student to attend additional or other lectures or courses or undertake additional academic work.

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ABSTRACT

1. Requirement Elicitation & Analysis Planning

Final document draft

1.0 Introduction

The most important thing before beginning the Requirements Elicitation for the Requirements Specification Document is to gain an understanding of what the goals and objectives for this project are, and how it will be executed to achieve them. Utility-App is a mobile application that will serve as bridge between Vendors and the consumers who use Pay as you go services for their utilities such as Gas and Electricity which are some of the main household resources. Utility-App will provide a more convenient way of purchasing utility credit through the application from the comfort of their homes or on the go but, most importantly it will offer three main functions that other similar apps are not offering in the market yet. This will distinguish the difference between this Utility-App and other apps that already exist in the market, those three functions are a cross function option of topping up Electricity and/or Gas in one app, an automated top-up credit function to the customers' account, and an audio option for vulnerable users with different types of impairment or mobility challenges.

The rest of what the app's other functions are will be heavily influenced and determined by the requirements that will be elicited from the stakeholders which the main purpose for the project is to elicit requirements and produce a report that will shape the Requirements Specifications for developing the app in question. Utility providers/ Vendors do not rely on footfall but consumer approach them for their services therefore if the business offers an innovation that other businesses have not yet caught up to it broadens their consumer base. Having virtual technology creations that consumers can find useful and lessens some type of inconveniences faces is what sets them apart from their competitors. We now live in a world that is heavily technology influenced and if there is a possibility of creating something

that will not only be attractive to the Vendors to be a part of but also to the Consumers then it is worth the risk to try.

I was approached by a local Non-Profit Charity Organisation that chose to remain anonymous, they predominantly donate to help the local communities with their day to day living including household bills such as Gas and Electricity which may sometimes be given in a form of a voucher. When this Organisation donates to their clients, the intention is not just to engage in a continuous donation for the same or similar problems but to also show concern to their clients by helping them to find ways of avoiding having an ongoing financial crisis. They have another Organisation that they work hand in hand with where clients can go and get money advice and tips for budgeting strategies to help them build a structure that will possibly help them. The Organisation they use for that is MABS which is a Money Advice and Budgeting Service.

I then came up with an idea to create the app that will facilitate what the Non-Profit Charity Organisation was asking for as a Sponsor. They wanted something that the users could find easy to use, efficiently dispense services to them to an equal standard that Bill paying customers have the privilege of and be use the gift vouchers they may have received as payment. I drew the idea from personal experience and observation of users of pay as you go services for their utilities that I have witnessed being affected by how the current system of pay as you go works. The aim is that they find the app useful to them and hopefully it will match the evolving future business plans for numerous Vendors as it grows and possibly takes on more types of Vendors. The project's sole purpose is to elicit requirements for the proposed app's possible development. I will be one of the stakeholders taking on the role of a Business Analyst for the project.

The Business Analysis Body of Knowledge (BABOK) states an analysis approach which is what will be utilised for the project. According to (BABOK 2015v3) "Business analysis approaches describe the overall method that will be followed when performing business analysis work on a given initiative, how and when tasks will be performed, and the deliverables that will be produced". "The Business Analysis Approach should:

Align to the overall goals of the change,

Coordinate the business analysis tasks with the activities and deliverables of the overall change,

Include tasks to manage any risks that could reduce the quality of business analysis deliverables or impede task efficiency, and

Leverage approaches and select techniques and tools that have historically worked well.

(BABOK 2015 v3) pg24.

1.1. Business Need

Pre-paid utilities have vastly become a popular service particularly during the economy crash late 2008 beginning of 2009 and thereafter many have found it to be the best option for them. As technology advances and apps can offer more than they did before with each day that goes by and new innovations being born. A need has been identified and there is a gap in the market for an application like Utility-App that will integrate the purchase with the automated crediting feature and be inclusive of challenged users by offering an audio feature.

Utility-App will help with cutting costs from not issuing and replacing plastic cards currently used for purchasing particularly for Gas as you need the same card to feed the meter post purchase which will be a benefit for Vendors. This will provide one central business option to deal with the utilities by bypassing the middle man which is all outlets where purchases are currently made via Pay Zone.

This will be a business process management that will see the Vendors increase efficiency in dealing with customers. There will be more cost cutting by eliminating the use of human meter readers going door to door. It will expand consumer base for providers, in the recent years with economy stabilising from the financial crisis we have seen a rise in the country's population mostly whom are students who would prefer prepaid services to avoid getting into debts while they are studying. Overall the Utility-App will see Vendors grow their market share and Users enjoy using it for their purchases.

1.1.1 Benefits of the application

- Automated credit top-up into consumer's account.
- Reduced cost for utility providers and consumers.
- Voice call payment option (for vulnerable consumers).
- Accurate meter readings (use the app for submission).
- Savings account for winter season (use of electronic savings wallet).
- Account history storage (history of transactions to help with household funds management).
- Ability to top-up for loved ones regardless of where you are.

The Utility-App to some degree will help the clients with the budgeting as it will be demonstrated in further findings. To understand the business need in detail, requirements elicitation will be conducted for further determination of what stakeholders want or expect from the App. The analysis of those requirements will assist with what approach should be taken to pursue the development of the App from the development perspective then help shape the requirements specification document from a Business Analyst and Project Manager's perspective.

1.2. Business Case

The Project is my own idea influenced by a Non-Profit Charity Organisation client who is a silent and anonymous stakeholder. The concept of Utility-App is to provide users with something that will make users for pre-paid services feel somewhat equal to BillPay customers by lessening numerous inconveniences they experience as a result of being on pre-paid services. The App will provide a user friendly and efficient service that users will be able to use from any part of the country and all they need is an account number for their Gas or Electricity an internet connection to their gadgets and a bank account. Despite having initially influenced by the Non-Profit Charity Organisations' clients this App is for everyone that wishes to use pre-paid services not due to a financial struggle of any kind but as a chosen way they pay for their utilities. From a consumer perspective will be a more efficient way for purchasing their utility top-up for both Gas and Electricity.

From a Vendor perspective it's a more efficient way to provide services and grow their brand and market share. As business owners the Vendors for utilities do try to be accommodating of all their customers but may find themselves lacking in some areas due to either lack of knowledge of any difficulties that their customers face lack of resources to facilitate the problem at hand. This is where the application comes in to serve as that bridge between the Vendors and consumers/customers bringing business onto one central platform that users can utilised from the comfort of their homes or on the go.

1.2.1. Stakeholders list

- General Users
- Vendors
- Banks
- Sponsors
- Business Analyst
- Project Manager
- Developer

1.3. Power / Influence Matrix

Key	
High	H
Medium	M
Low	L

Stakeholders	Influence	Impact
1. Project Sponsor (Client)	H	H
2. Business Analyst	H	H
3. Project Manager	M	H
4. Developer (SME)	H	M
5. Vendors	M	H
6. Banks	L	M
7. Users	H	M

Stakeholder Matrix

Influence of Stakeholders	High	7	4	3	5	2	1
	Low			6			
		Low		High			

Impact on Stakeholders

Lane, L. (2018) pg9

1.3.1 Power Influence Grid

A Power / Influence Grid has been used to measure each stakeholders' impact and influence towards the project. This enables the project to operate more efficiently. Overall meeting stakeholders early, meeting them on a regular basis and keeping them updated on the progress of the deliverables for the project is crucial for elicitation and documentation of requirements. The stakeholders' ranking does not diminish their position in the but clearly defines it so they can be dealt with appropriately about what it relevant to their position and expertise.

1.3.2. Literature Review

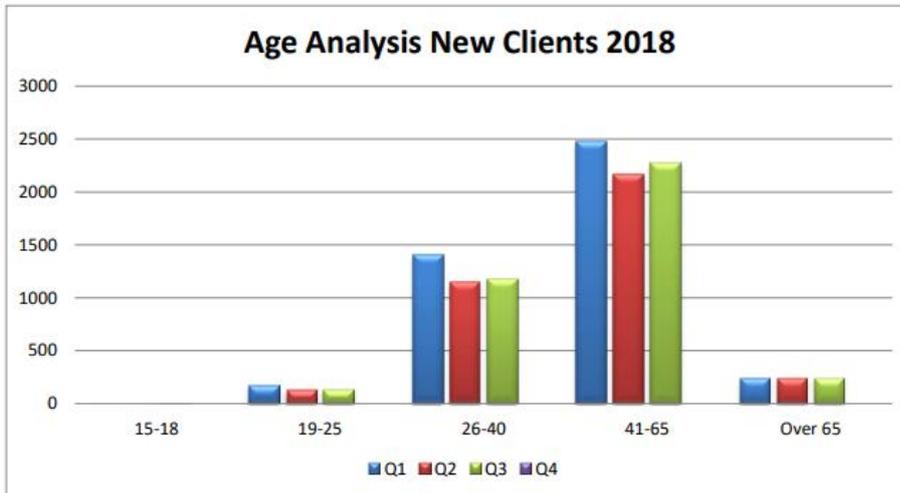
MABS is a money advice and budgeting services which makes up the name MABS and they are funded by Citizens Information. This Organisation that operates from over 60 offices nationwide through an appointment system. There are highly experienced money advisors who deal with clients experiencing difficulties with a wide range of personal debts such as but not limited to: personal loans, mortgages, credit card debt, legal moneylenders and those fallen behind with their household bills. MABS already engages in negotiations with Vendors for payment arrangement plans to be put in place on behalf of their clients for their debts which include the utilities particularly the energy suppliers that this App would be availing an electronic top- up system for household utilities. MABS also liaises with local Charities on behalf of their clients and the local Non-Profit Charity Organisation too. Below I have included diagrams from MABS that are available on their website for public viewing which show the 2018 Quarter 3 statistics.

1.3.2.1 MABS Supporting Charts

Diagram 1 Age Analysis chart

New Client Age Analysis (Budget Negotiable & Special Account Clients Only)

New Clients Age Analysis	Q1	Q2	Q3	Q4	Total
15-18		3	3	7	13
19-25		167	124	130	421
26-40		1399	1147	1181	3727
41-65		2470	2165	2270	6905
Over 65		239	239	240	718
Total		4278	3678	3828	11784



New Client Gender Analysis (Budget Negotiable & Special Account Clients Only)

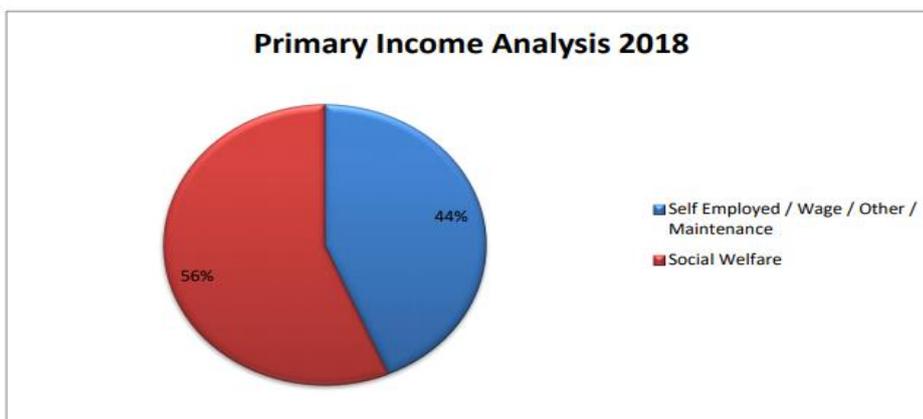
(Mabs.ie, 2018)

Above is the age analysis chart which clearly shows us the age ranges of clients that seek help from this Organisation this also illustrates the volume of those ages

1.3.2.2 Diagram 2 New Client income analysis

New Client Primary Income Analysis (Budget Negotiable & Special Account Clients Only)

New Client Primary Income	2018
Self Employed / Wage / Other / Maintenance	5134
Social Welfare	6650
Total	11784



New Client Debt Count (Budget Negotiable & Special Account Clients Only)

(Mabs.ie, 2018)

Above is income analysis which shows that people from all walks of life regardless of how their income is earned there are clients of MABS at some stage of their lives.

1.3.2.3 Diagram 3 Debt Types Analysis

New Client Debt Count (Budget Negotiable & Special Account Clients Only)

*Debts may not be recorded for all clients

Active Debt Types	Q1	Q2	Q3	Q4
Personal Loans with Financial Institutions	1477	1575	1575	942
Utilities	595	562	562	510
Credit Card	1004	532	532	452
Mortgage	1174	909	909	946
Hire Purchase Loan	107	105	105	99
Money Lender	202	143	143	126
Overdraft	194	109	109	125
Rent	111	120	120	105
Catalogue	74	57	57	59
Fine	49	33	33	30
Sub Prime	18	13	13	9
Waste Charges	5	1	1	1

We can clearly see that utilities during each quarter it remains among the top five types of debts experienced. (Mabs.ie, 2018).

1.3.4. Objectives & Overview of Requirements

Requirements are the key task in analysis of a business project which build the foundation during the conceptual stage of a project making them the most important part of the need or problem that the project will be trying to address or analyse. To produce accurate requirements that will serve their purpose they need to be complete, clear, correct and consistent. Requirements are also a usable representation of a need which focuses on understanding the kind of value that could be delivered if they are fulfilled. (BABOK v3, 2015)

Requirement Elicitation from users may present difficulties for one reason or another such as the following:

- User may find it difficult to express or describe their requirement

- Users may dislike the idea of having to use a new service or product if it is unknown to them.
- Sometimes the users may not be willing to participate in the elicitation altogether. There is evidence of that in the survey where other users were not willing to participate or omitted some parts of the survey but having said that it could have been errors or deliberate omission.

1.4. Requirement Categories

General	Technical	Functional	Non-functional
Business constraints, Business policies Legal Branding Cultural Language	Hardware Software Interface Internet	Data entry Data maintenance Procedural Retrieval requirements	Performance Security Legal and Access Backup and Recovery Archiving and Retention Maintainability Business Continuity Availability Usability Capacity

Paul, Yeates & Cadle (2010) p172

These are categories and functions that need to be captured by the requirements that will be elicited from the stakeholders using the chosen techniques.

1.4.1. Basic Requirements

- Excellent GUI to suit all customers
- Secure Login
- Vendors' Databases

Audio option for vulnerable users

Secure Payment Options

Voice command Payment option

No Password autofill

IOS and Android App friendly

1.4.1.2. Business Requirements

Sign up / Login (secure)

Audio option for vulnerable users

Payment method Algorithm (for both regular payments and the voice control payment)

IOS and Android App friendly

1.4.1.3. Functional Requirements

Sign up / Login

Audio option

Show top-up option amounts

Payment methods

Electronic Savings Wallet

Help chat popup

1.4.1.4. Non-Functional Requirements

Wi-Fi

Easy to use

History to-up

Real-time usage display

Low credit reminder

2. Requirement Elicitation Techniques

2.1. Survey

2.1.2. Survey Overview

A survey is used to elicit business analysis information including information about customer, products, work practices and attitudes from a group of people in a structured way and in a relatively short period of time. For this project I will be conducting a survey which will contain some Likert based questions.

There are three stages to a survey, the purpose should be clearly defined during the preparation stage which is the first stage of any technique.

The sampling group of the survey should be provided with a clear statement of why they were chosen, and they can either agree or decline to participate right off the bat. The next stage would be to conduct the survey which would in a form of questions that should be not in any shape or form leading them towards what the project manager may want to hear it should be completely unbiased. The results will be documented and stored safely for further analysis. (BABOK v3, 2015).

Survey Participants

General Public

Distribution Method

The survey was distributed via email (120)

2.2.2. Survey Objectives

The objective of the survey was to elicit requirements that would help with understand what requirements should be analysed for a possibility of implementation to the App. The requirements would have included but not limited to the questions asked.

2.2.3. Survey Link

<https://docs.google.com/forms/d/1Mp3dLePrqCMXopJO2A69cwNLS8oH4cb62xv5R35W0x0/edit>

Survey Consent**Consent Request Form**

To the readers, this is purely on voluntary basis for willing participants. I kindly invite you to help me with a project I am working on this will only take a couple minutes of your time 10 minutes at most. Information of this survey will be stored safely in a college storage and personal details will not be stored unless one expresses that they would like their details obtained and kept.

This is specifically designed for study purposes only not marketing purposes, should at any stage this become a commercial project all participants will be informed, their responses will only be used as a part of this with their full consent. The reason for this survey is stated below read it carefully and kindly respond to the best of your knowledge, interest and ability thank you in advance for your participation.

You were randomly selected as part of the survey. Questions will be either a YES or No, Scale of 1 to 5 or pick the answer that best describes your circumstances. Should at any stage want to stop participating in the survey or interview questions you have the right to stop.

Do you Agree to participate on your free will? YES or NO PLEASE CIRCLE YOUR CHOICE.

Q1. What is your age group?

- 18-30
- 31-39
- 40-49
- 50-59
- 60-65

Q2. Are you involved in the management and contribution towards utility payments in your household?

- Yes
- No

Q3. What is your current status? Please tick all that applies to you.

- Student
- Jobseeker
- Fulltime employment
- Part-time employment
- Retired on private pension
- Retired on state pension

Q4. Which of the following do you own or have access to?

- Mobile smart phone
- Broadband internet
- Bank account

Q5. Please indicate which of the following do you use your mobile device for? please choose all that applies to you.

- Online shopping
- Bus timetable
- Leap card top-up
- Booking Cinema tickets
- Checking emails
- Other

Q6. How do you currently access the internet?

Q7. If an App that stores history of transactions of your purchases for Gas and Electricity was to be developed would you find it useful? Please rate on a scale of 1 to 5, with 1 being not likely and 5 very likely.

1. Not likely
- 2.
- 3.
- 4
5. Very likely

Q8. How likely are you to recommend an app such as described to others? Please rate on a scale 1 to 5 with 1 being not likely and 5 being very likely.

1. Not likely
- 2.
- 3.
- 4
5. Very likely

Q9. Who is your Electricity Provider?

- Electric Ireland
- Pre-Pay Power.ie
- Energia
- SSE Airtricity

- Board Gáis
- Eruia
- Panda Power
- BEnergy
- PINERGY
- Just Energy

Q10. Who is your Gas provider?

- Electric Ireland
- Pre-Pay Power.ie
- Energia
- SSE Airtricity
- Boar Gáis
- Eruia
- Calor Gas Ireland
- FloGas
- Panda Power
- BEnergy
- PINERGY
- Just Energy

Q11. Are you on BillPay or Pay as you Go service for any of your utilities?

- BillPay
- PAYG (pay as you go)
- Other

Q12. Do you find your current method of payment convenient? On a scale of 1 to 5 with 1 being not satisfied and 5 being very satisfied how would you rate it?

1. Not likely
- 2.
- 3.
- 4
5. Very likely

Q 13. Do you have a family member living independently that has some kind of impairment such as visual, mobility etc that would benefit from using an app with an audio feature?

- Yes
- No

Q14. How do you currently pay for your utilities? Please choose all that applies to you.

- Direct debit
- Pay as you go App
- Pay Zone shops
- Standing order

Q15. What colors would you find captivating for the app?

- Blue and white
- Purple and white
- Black and white
- other

Q16. What other features would you suggest for the app select your top three? Here is some possible features to choose from.

- Help chat
- Calendar
- Electronic Savings wallet (to use their credit for later)
- History transactions (detailed history purchases)
- Notifications for promotion offers (available discount offers)
- Cross function (for splitting top-up between Gas and Electricity for one account)
- News link (current news about your provider)
- Share button (allow user to share account number or top-up details with others)
- Social Medi links (link to social media for your provider for reviews etc)

2.2. Brainstorm

The first form of Requirements Elicitation techniques to be examined is brainstorming. It is considered an easy elicitation tool often utilised to develop highly innovative and creative solutions to a problem that is being addressed. O'Loughlin, E. (2009) pg61. Brainstorming is used to identify possible business analysis activities, techniques, risks and many other relevant items to help build the business analysis approach. This captures the raw analytical thinking at its' best which can bring out some very innovative ideas to the forefront of a business plan of a project. From some of the brainstorming ideas one can then narrow down some ideas which can be used to facilitate more techniques such as the structure of a survey questions. (BABOK v3, 2015).

Brainstorm sessions will be held to facilitate a discussion of ideas be stakeholders associated with the App. The main objective of brainstorming is to elicit requirements that can be analysed.

- Topics of discussion to be clearly identified.
- Group that will participate in the brainstorming.
- Location where and time when the brainstorming will take place.
- Verbal or written agreement that participants are taking part on their free will.
- Agreement that there will be no criticism of anyone's idea.
- Whiteboard, markers, pens, papers and laptops or any gadgets people need.

Participants

Clients

Two regular users

One SME / Developer

Location

National college of Ireland Room 1.05 Mmlab

Date & Time of Session

22rd November 2018, 13:00hrs – 13:30

Guidelines for Brainstorming Session

Please arrive 15 before starting time for refreshments and introduction

Do not discuss ideas before the session starts

Please kindly mute all gadgets such as mobile phones before the session

Each person will be allocated 5 minutes for bring their ideas to the table

Please remain silent while other participants put ideas forward

There will be 15 minutes recap at the end where further ideas can be put forward in back and forth interaction and further discuss ideas already put presented

Behaviour deemed unacceptable by the moderator will lead to participant/s being removed from the session by moderator.

2.3. Interviews

2.3.1. Interviews Overview

An interview is a systematic approach designed to elicit business analysis information from a person or group of people by talking to the interviewees by asking them relevant questions and record or document their responses for later analysis. Conducting informal interviews can help lighten the mood allowing the interviewees to loosen up and freely have a conversation which can bring the best out of them. The interview can also be used for establishing relationships and building trust between business analysts and stakeholders in order to increase stakeholder involvement or build support for a proposed solution.

(BABOK v3, 2015)

2.3.1.1. Interview One

Participant

SME / Developer

Shared via email

Questions

1. What developing background do you have?
2. Have you heard of an application like this before?

3. What do you need from myself to develop the app other than the requirement specifications?
4. How long will it take to develop?
5. How much will it cost?
6. What languages and software are you planning on using to develop the app?
7. Will you be able to connect to large multiple cloud-based vendors' Database systems?
8. How soon can I have an interface to show my stakeholders?
9. What functions do you think would be challenging to implement?
10. How soon will you know if there are functions that may too complex to attempt?

2.3.1.2. Interview Two

Participant

Financial Advisor (MABS)

Shared Via email

Questions

1. Tell me about the difficulties faced by your clients regarding their bills for Gas and Electricity please.
2. How much of an issue is this for your clients if at all?
3. What would your view be on how tech savvy your clients are?
4. What features would you like to see on the app below is a list of suggestions but feel free to include any feature you think may be of use?
 - History feature (This would show the history of transactions on how much was spend and when dating back a couple years).
 - Live chat (for help if anyone is stuck on how to use the app).
 - Promotion offers (available discount offers).
 - Electronic savings wallet (to use for saving their credit for later usage)
 - Cross function (work on Android and iOS).

5. In terms of what the app does would this be something you are happy to bring attention to on your website?

6. Would you recommend this app to your clients?

7. What colours do you think would captivate the interest of users of the app?

2.3.1.3. Interview Three

Participant

Sponsor

Location

Castleknock Hotel

Date & Time

23rd November 2018, 12:00 – 13:00

Questions

1. Tell me about the difficulties faced by your clients regarding their bills for Gas and Electricity, please.

2. How much of an issue is this for your clients if at all?

3. What would your view be on how tech-savvy your clients are?

4. What features would you like to see on the app below is a list of suggestions but feel free to include any feature you think may be of use?

- History feature (This would show the history of transactions on how much was spend and when dating back a couple years).
- Live chat (for help if anyone is stuck on how to use the app).
- Promotion offers (available discount offers).
- Electronic savings wallet (to use for saving their credit for later usage)
- Cross function (for splitting top-up between Gas and Electricity from one account to another).

5. In terms of what the app does would this be something you are happy to bring attention to on your website?

6. Would you recommend this app to your clients?

7. What colors do you think would captivate the interest of users of the app?

8. What is your opinion of the App

9. What benefits do you think the App would provide to your clients

2.3.1. 5. Interview Four

Participant

General user

Location

Full stop Cafe

Date

05/12/ 2018, 12:00 – 13:00

Questions

1. What type of services are you on for your utilities?
2. What issues do you face with the current payment method for your utilities?
3. Describe the process that you go through when topping up your meters.
4. Can you think of anything that would make these issues any less or not have them at all?
5. Would you use an App that could possible address the issues you are having?
6. How likely are you to recommend the App if developed to others?

2.4. Focus Group

Overview and Objectives

There will be a specific profile of people who will gather to discuss the requirements needed for the App. One main area of the project will be the focus to elicit requirements specifically for that area. The diversity of the different profiles of people is what will enrich the aim to narrow down certain aspects of the project and this produce a broad view which will encourage ideas to be put forward. This will also give a better understanding in the area that will be focused on. The venue where the focus group will be should be an environment that is conducive for such a meeting. Things to consider for making such arrangements would be the size of the group, the location of venue, type of venue and its' surroundings. Study room or meeting designated room would be suitable. For preparation participants

were recruited, an experienced Moderator and recorder were assigned, a discussion guide was created, and reservations of site and services were made.

Participants:

8 General Users

Developer

Experienced Moderator

Location:

National College of Ireland Room 1.05 Mmlab

Date & Time: 5th December 2018, 13:00 – 14:00

Focus Group guidelines:

- Each person can speak freely uninterrupted and there shall be no judgement, criticism.
- Participants can positively add onto a previously mentioned idea.
- Strictly focus on the chosen topic at hand.
- No distractions allowed all devices to be either muted or turned off.
- There will be no discussions about the idea before the session starts.

2.5. Prototyping

Overview and Objectives

Prototyping is a tool used to elicit requirements from stakeholders by developing a model for facilitating a visual demonstration. This would help with establishing requirements and confirm expectations. This will serve as a non-functional low fidelity prototype. The objective of the low fidelity prototype which will be hand sketched is to visually interact with the stakeholders about what the actual application can possibly look like. Then when a

more suitable layout and design has been established a wireframe will be developed using tools such as Balsamiq.

Resources Required

- Pen
- Paper
- Computer/Laptop
- Balsamiq for prototype development or other similar software

Prototype Development Checklist

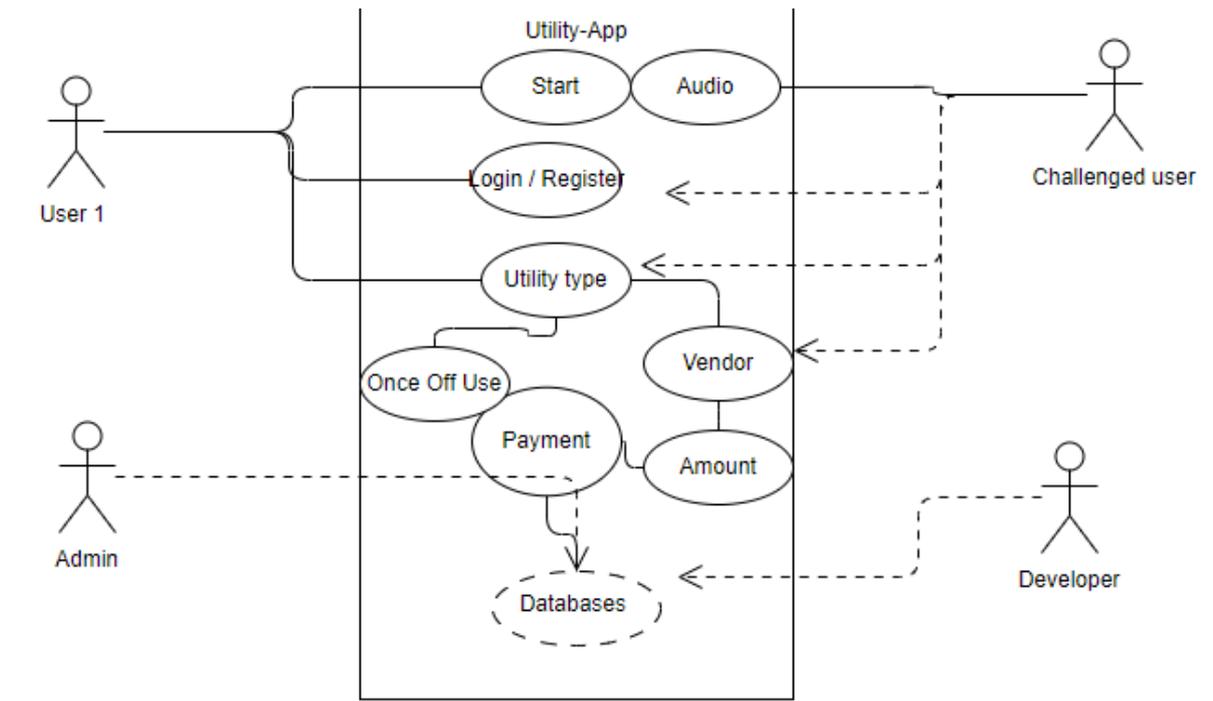
- Merge the requirements based on the results from all forms of elicitation techniques conducted, survey, brainstorming and four interviews.
- Develop a prototype using Balsamiq or another suitable software to be utilised for demonstration purposes during the focus group meeting.

Participants

- Business Analyst
- User
- Project Manager

2.6. Interface Analysis

A use case diagram



Overview and Objectives

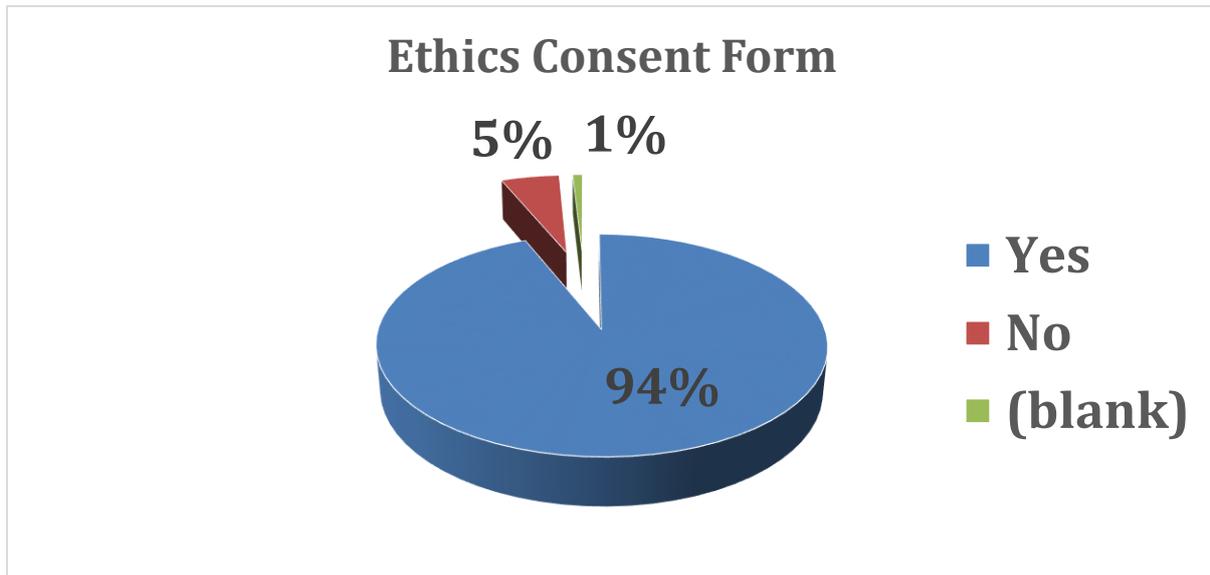
A UML use case diagram that emulates the prototype will be developed as a representation of the visual interactions that will exist within the app from the point of view of all stakeholders involved. This will illustrate their interactions that will take place

2.7. MoSCoW Analysis

3. Requirements Elicitation & Analysis Results

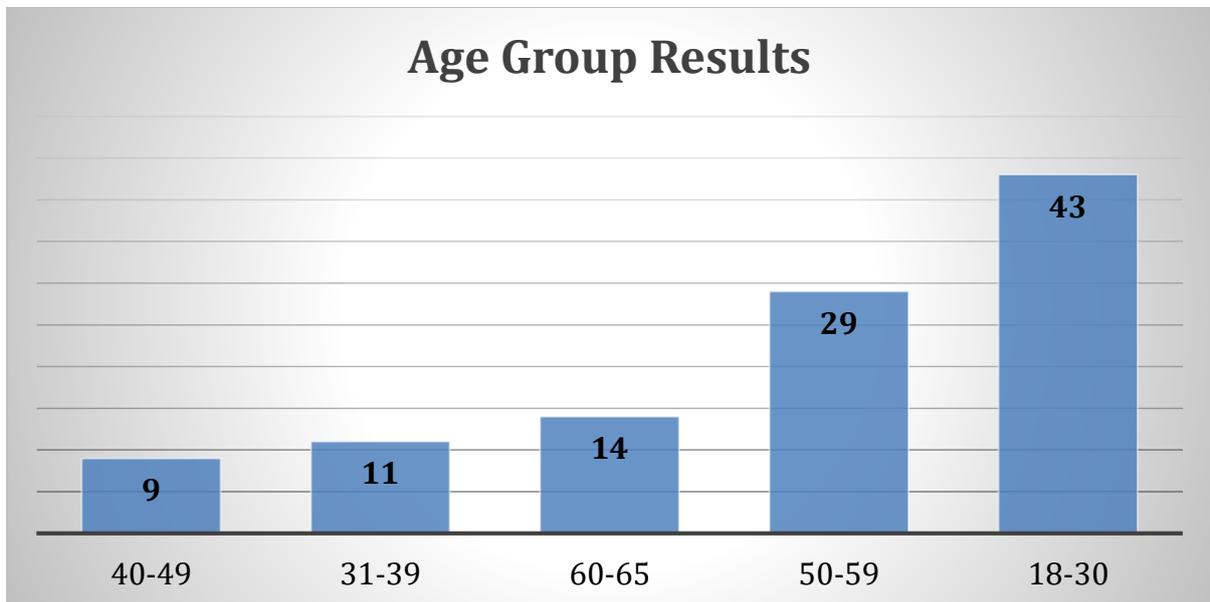
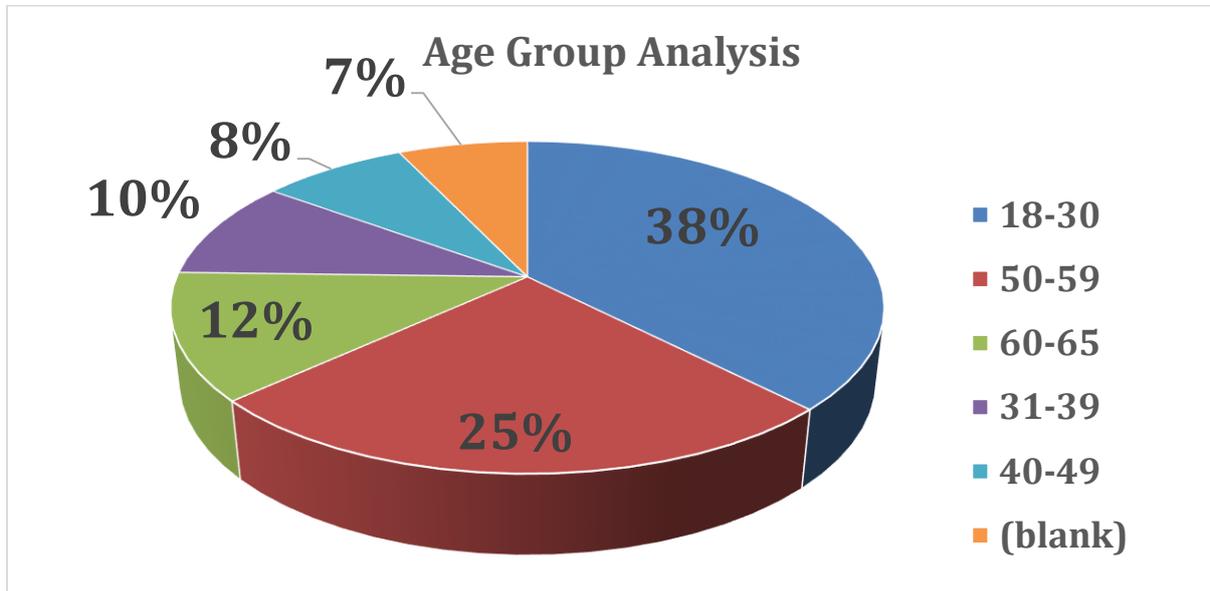
3.1. Survey

Consent



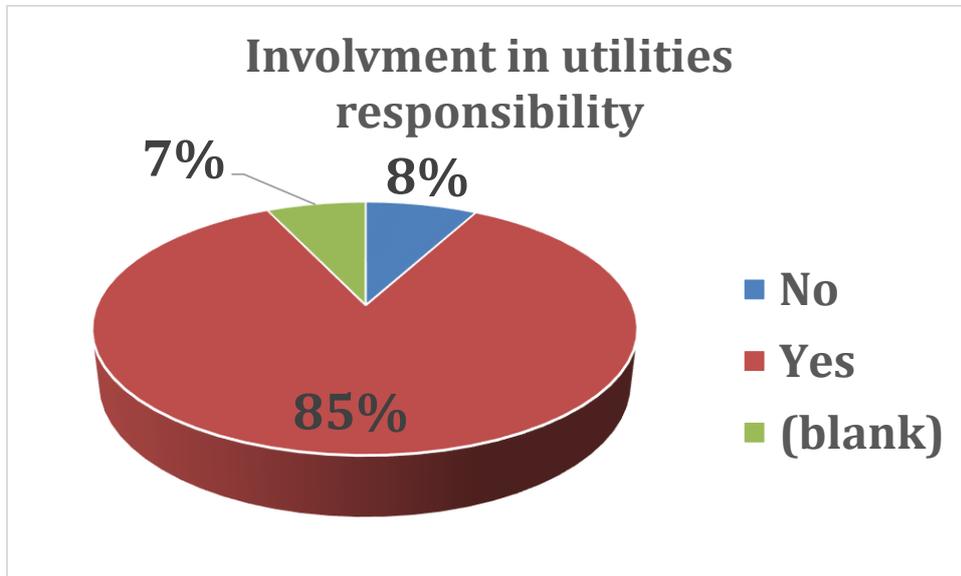
Q1. What is your age group?

106 responses



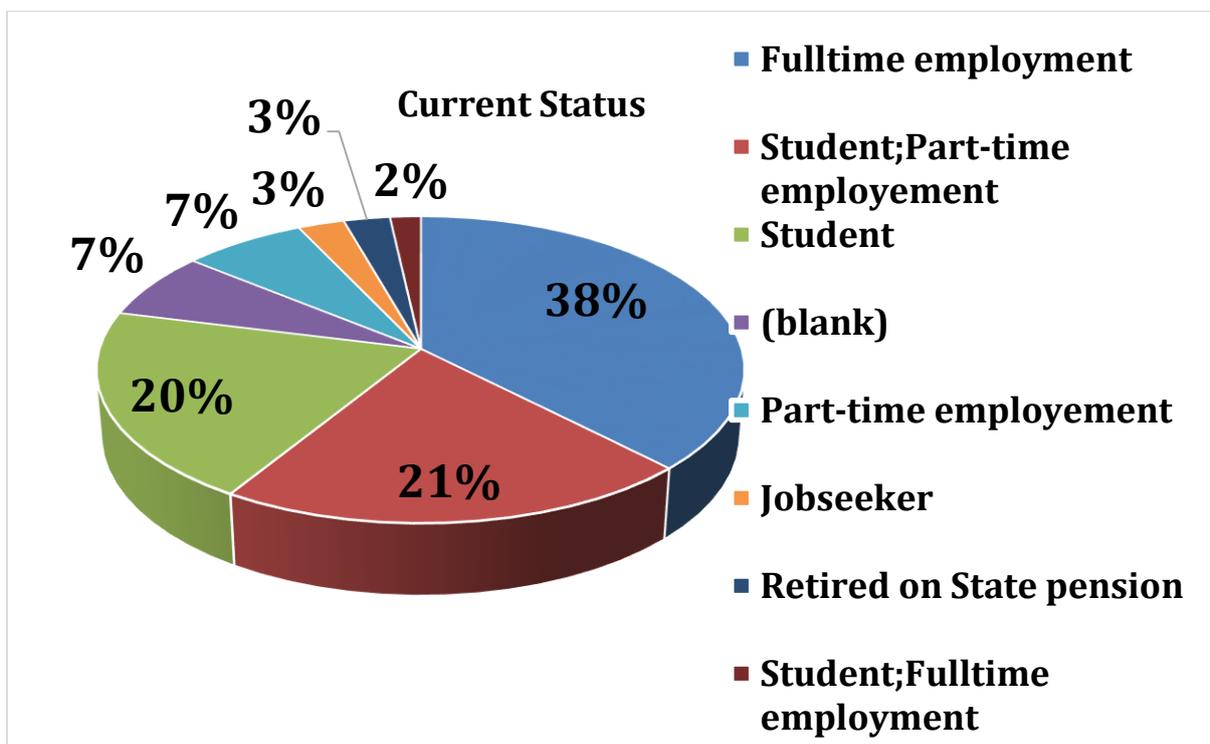
Q2. Are you involved in the management and contribution towards utility payments in your household?

106 responses

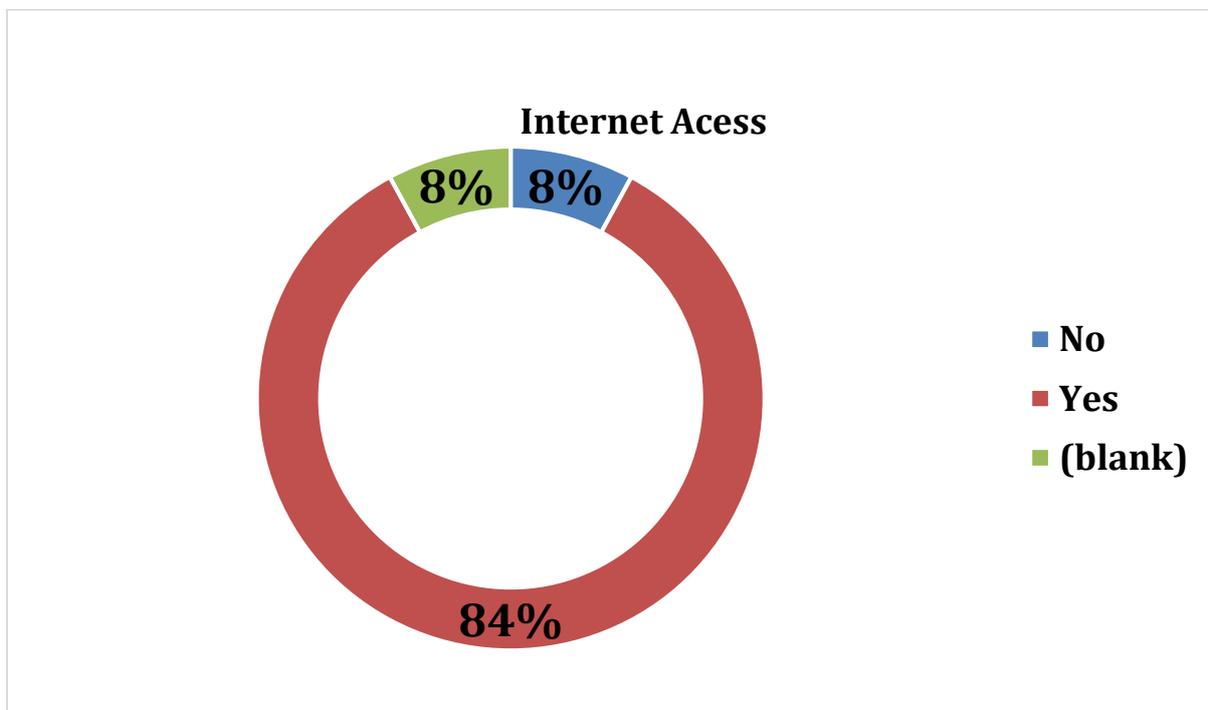
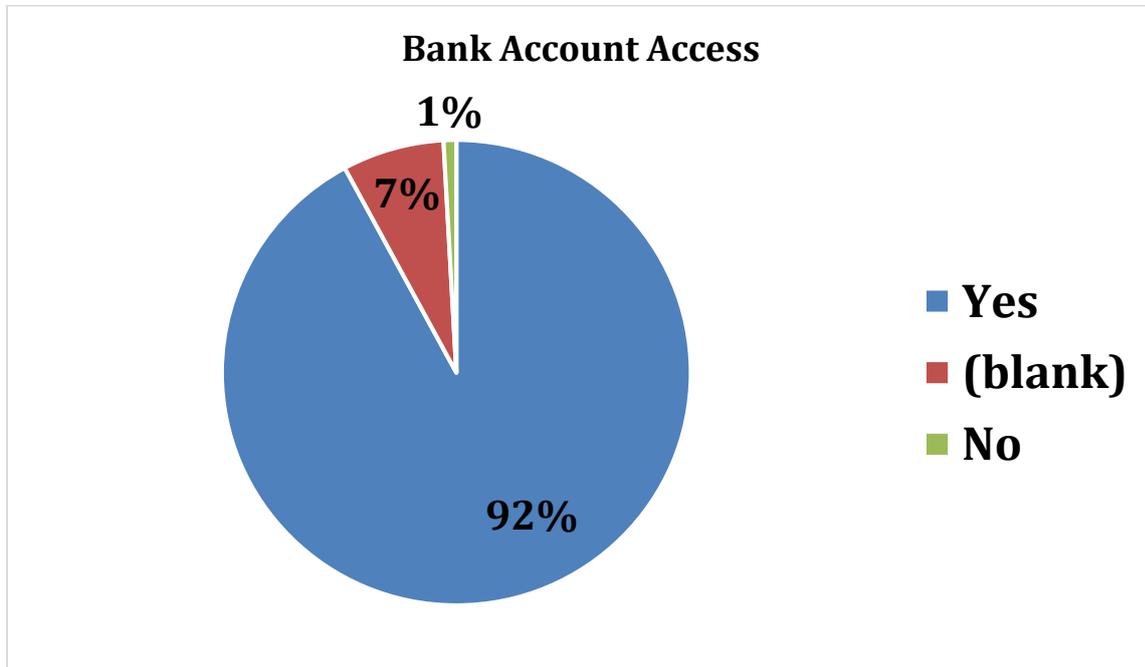


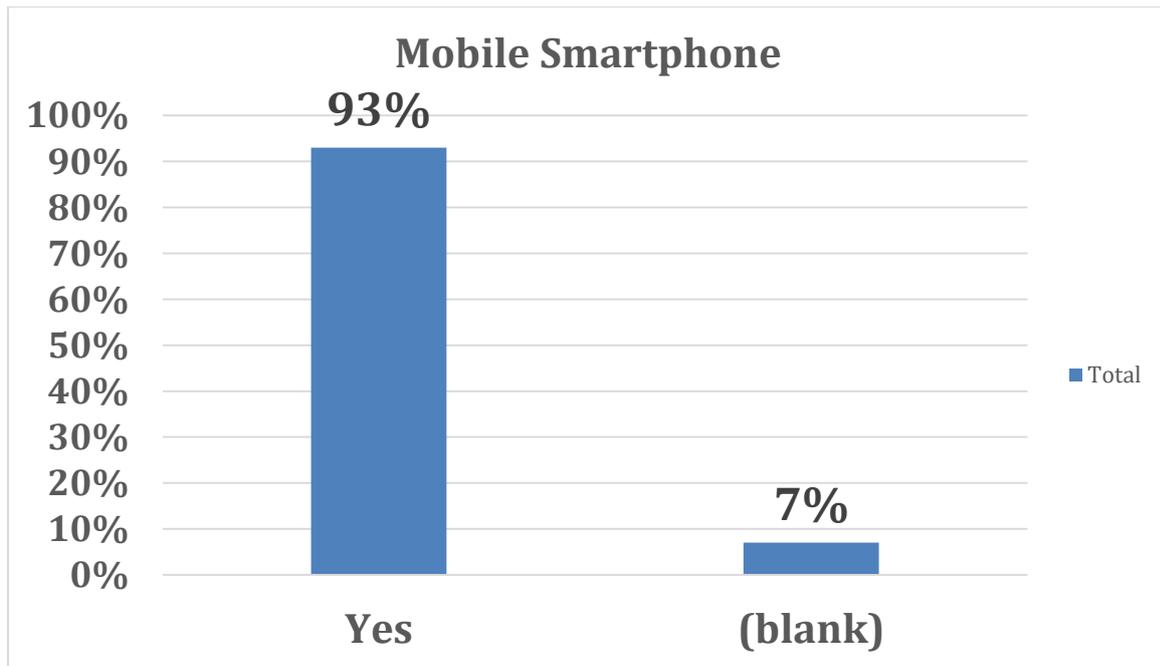
Q3. What is your current status? Please tick all that applies to you.

106 responses



Q4. Which of the following do you own or have access to?

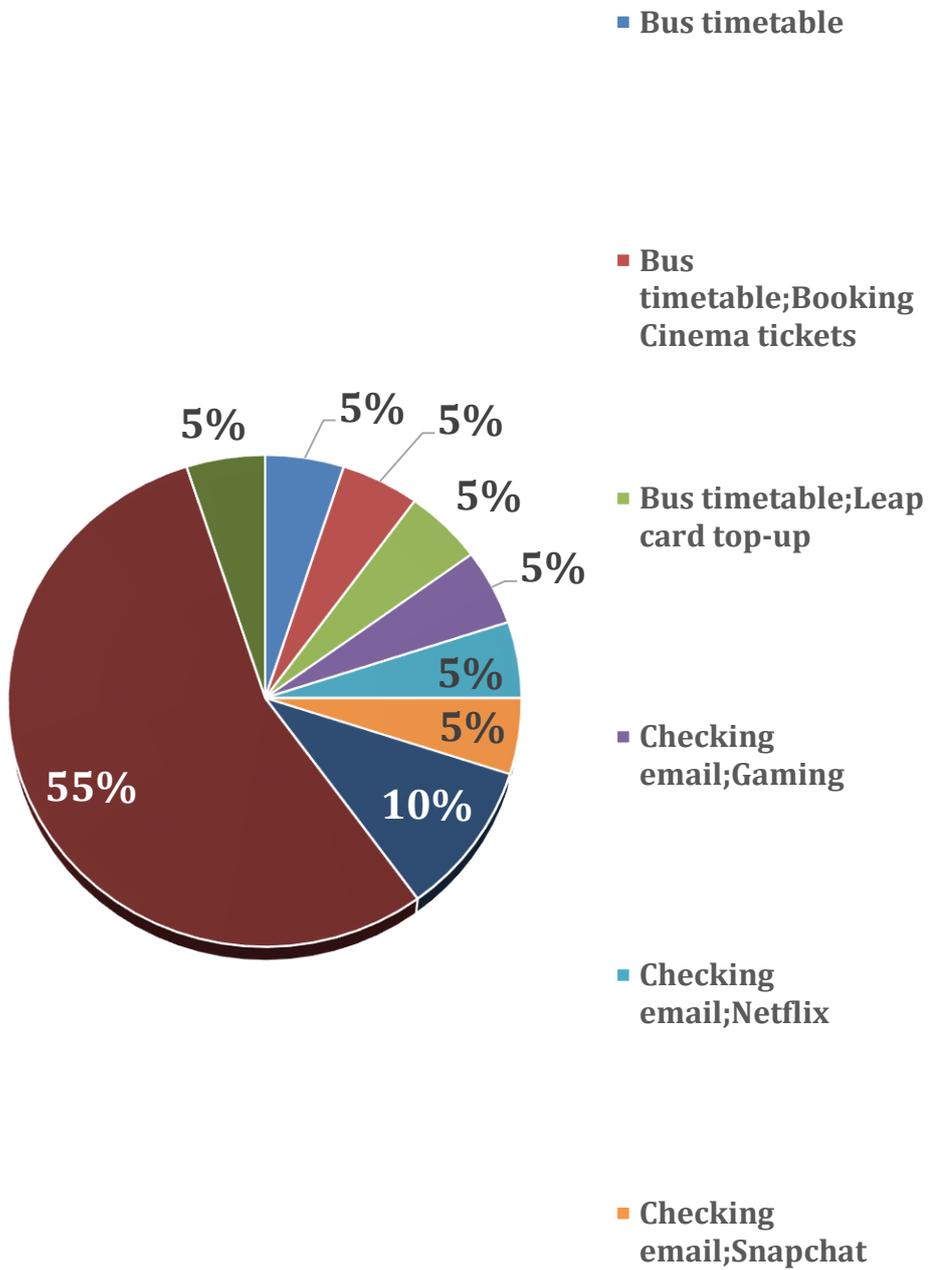




Q5. Please indicate which of the following do you use your mobile device for? please choose all that applies to you.

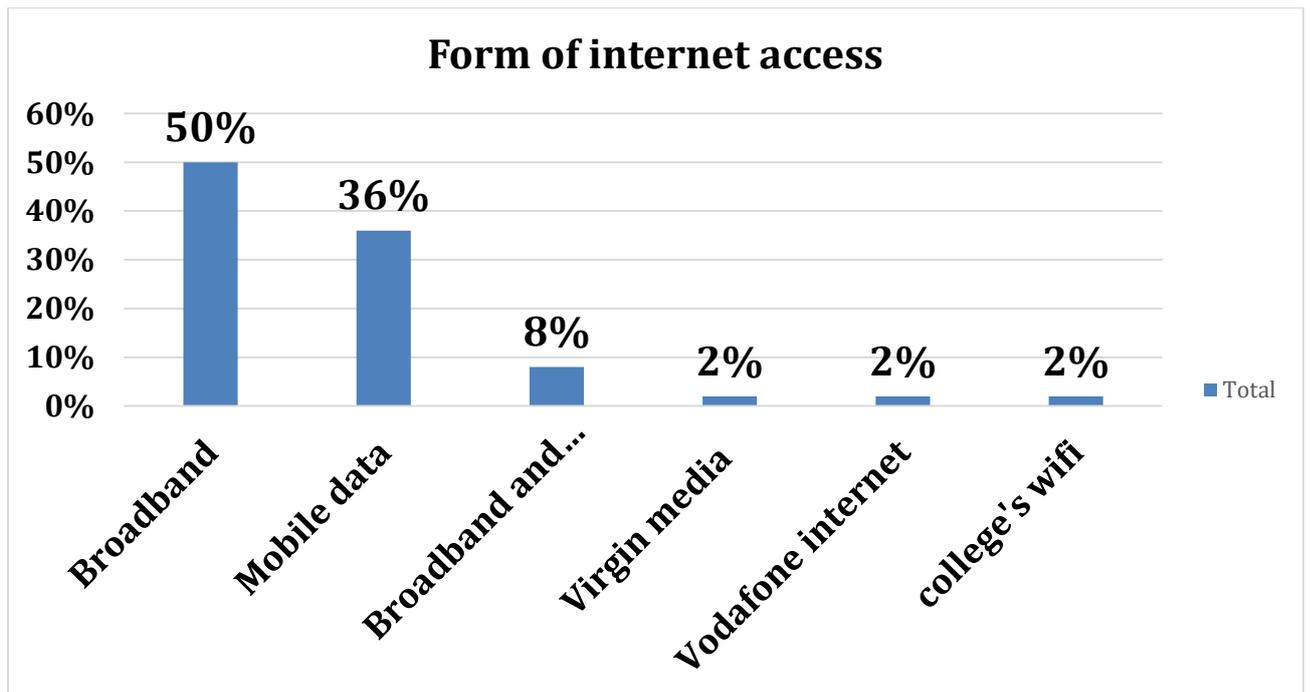
106 responses

Typically Accessed Apps



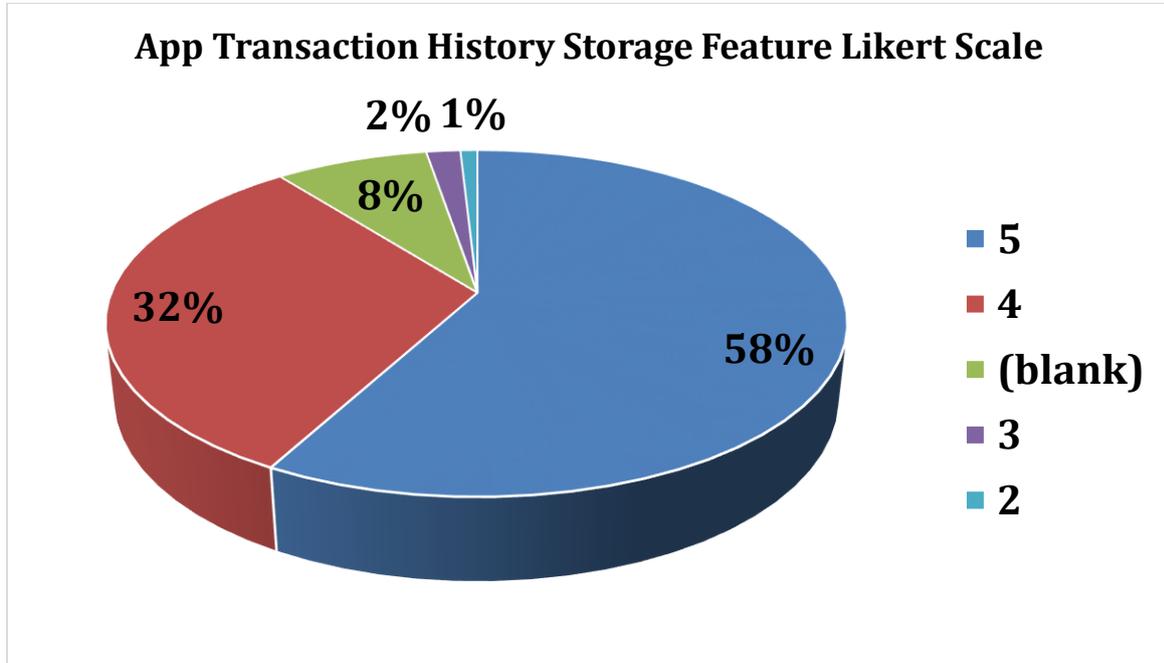
Q6. How do you currently access the internet?

99 responses



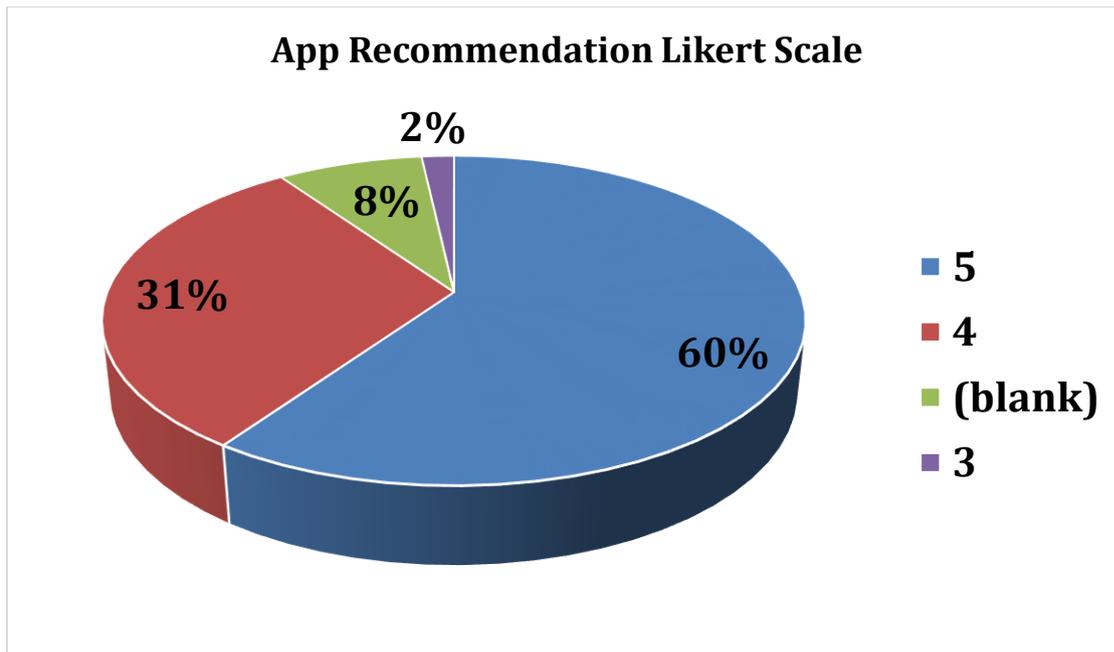
Q7. If an App that stores history of transactions of your purchases for Gas and Electricity was to be developed would you find it useful? Please rate on a scale of 1 to 5, with 1 being not likely and 5 very likely

105 responses



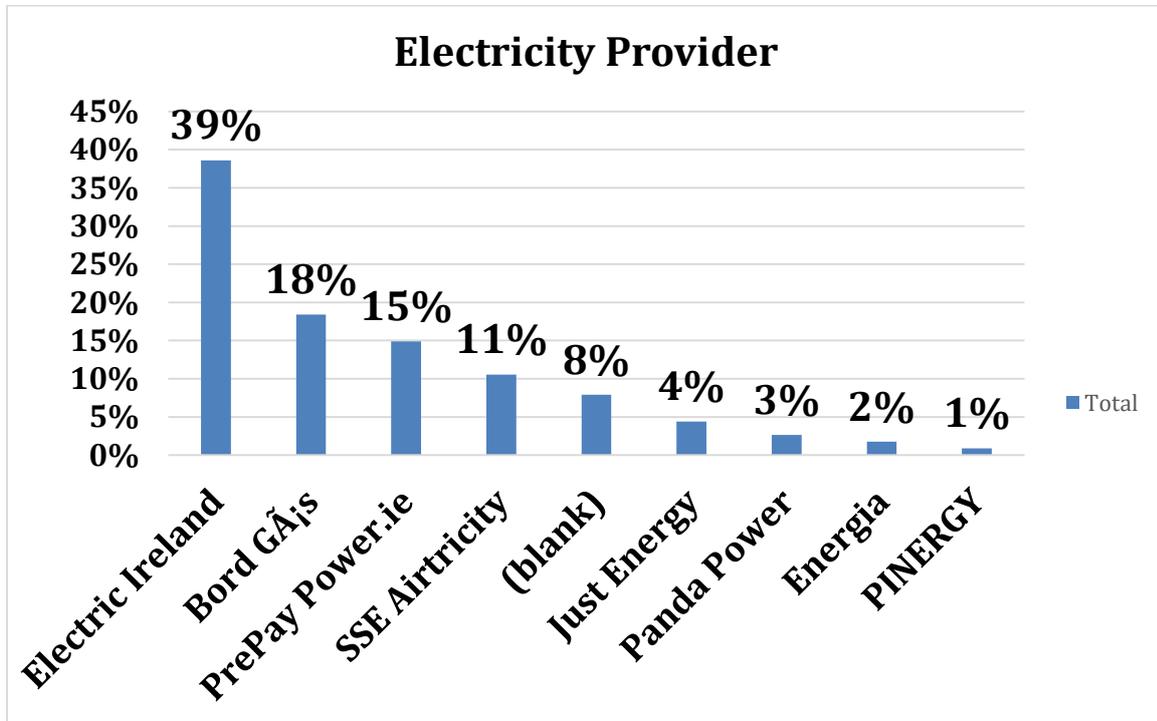
Q8. How likely are you to recommend an app such as described to others? Please rate on a scale 1 to 5 with 1 being not likely and 5 being very likely.

105 responses



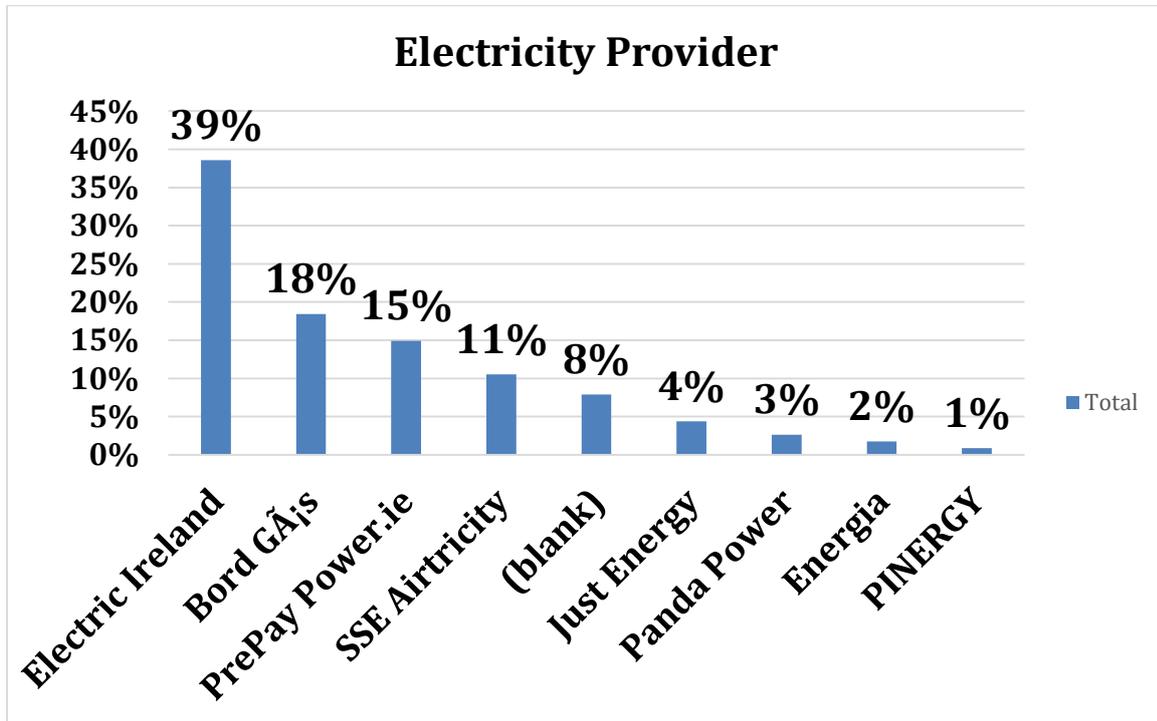
Q9. Who is your Electricity Provider?

105 responses



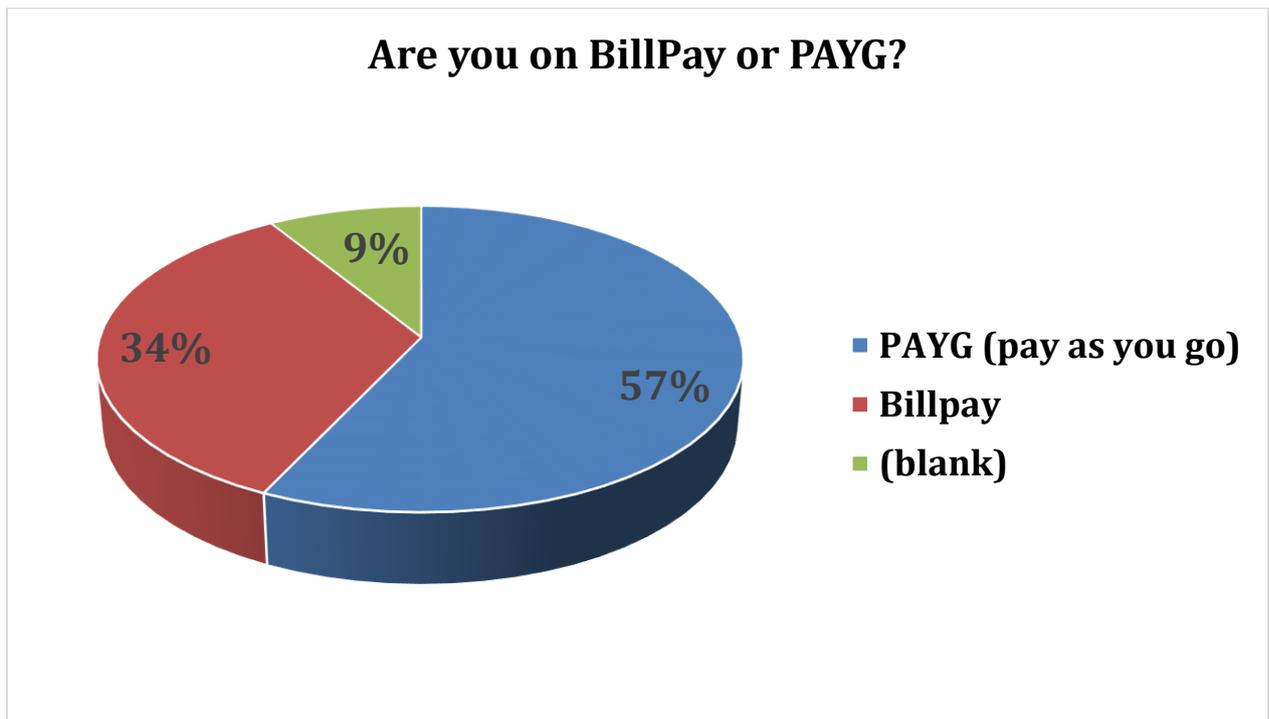
Q10. Who is your Gas provider?

104 responses



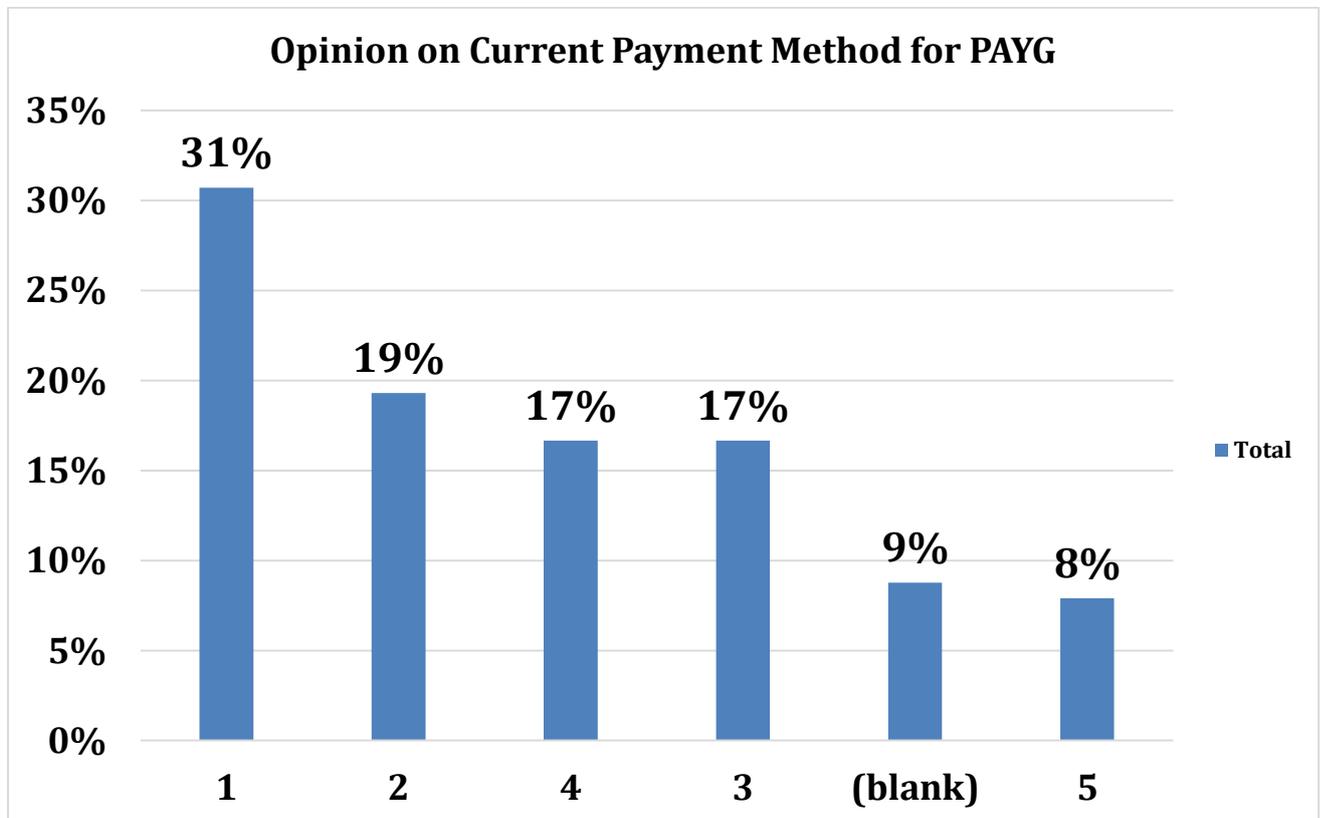
Q11. Are you on BillPay or Pay as you Go service for any of your utilities?

104 responses



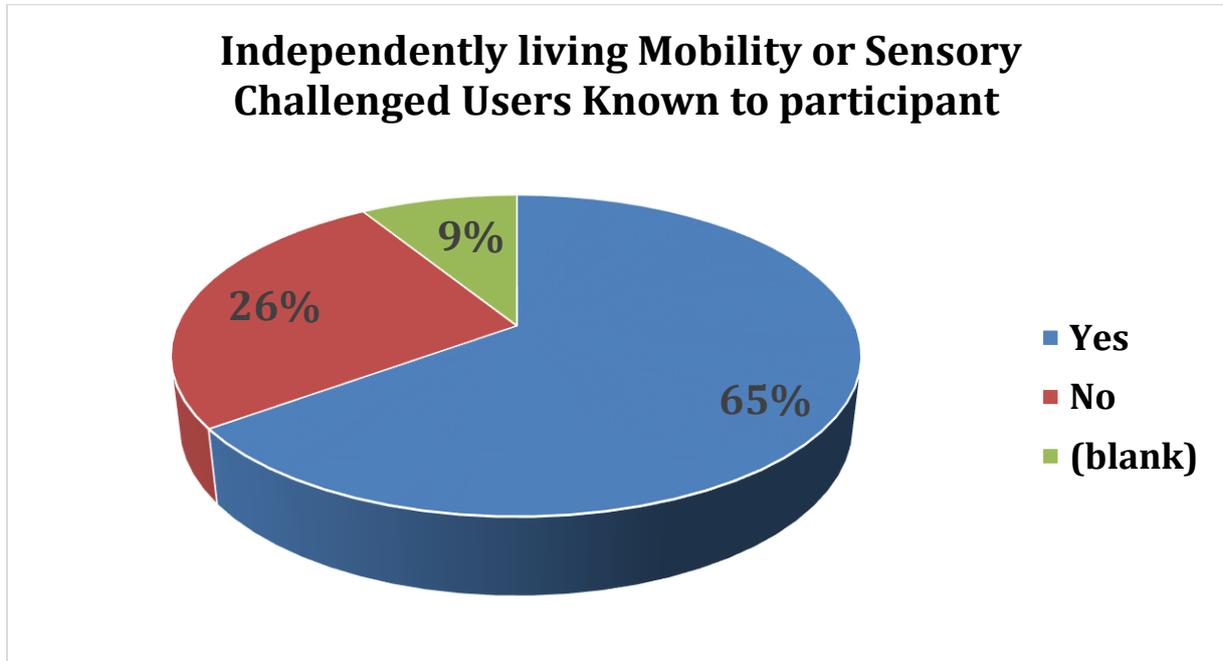
Q12. Do you find your current method of payment convenient? On a scale of 1 to 5 with 1 being not satisfied and 5 being very satisfied how would you rate it?

104 responses



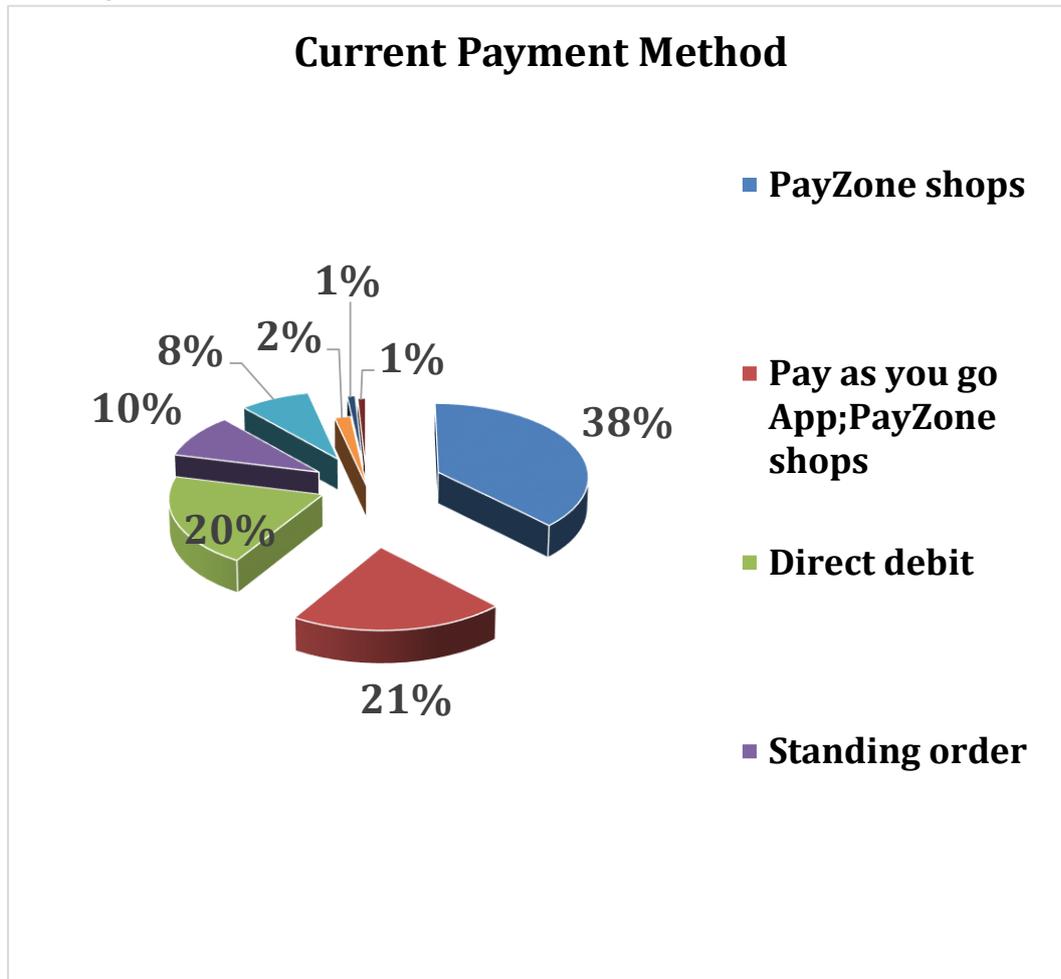
Q 13. Do you have a family member living independently that has some kind of impairment such as visual, mobility etc that would benefit from using an app with an audio feature?

104 responses



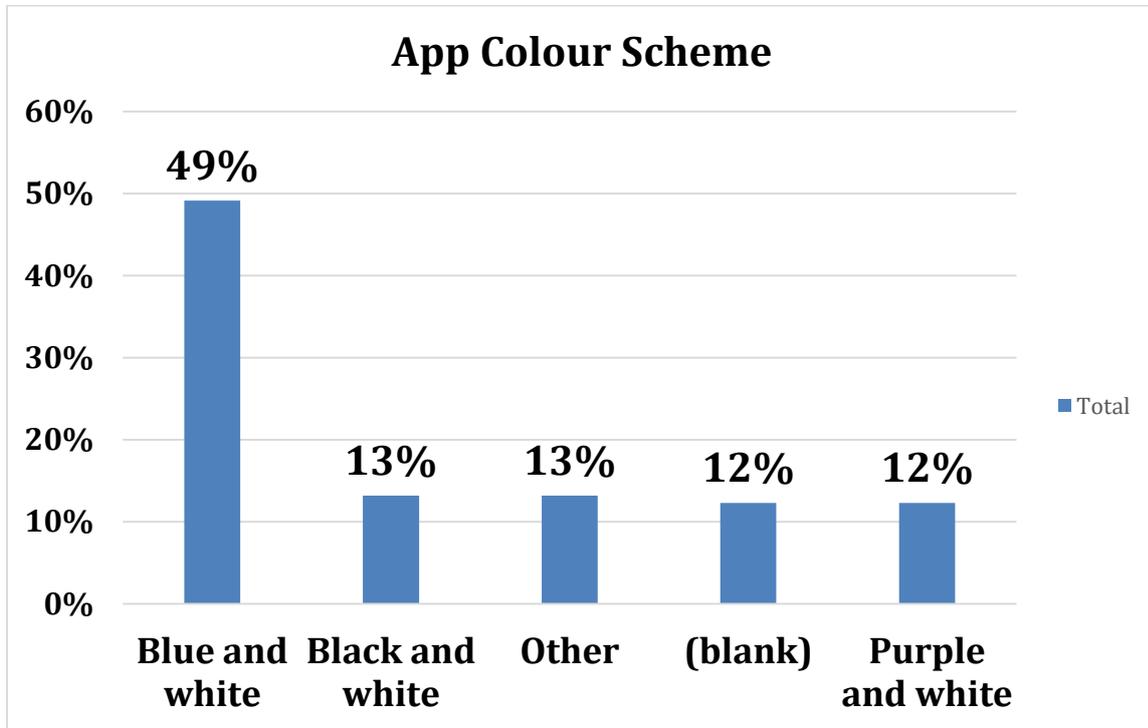
Q14. How do you currently pay for your utilities? Please choose all that applies to you.

105 responses



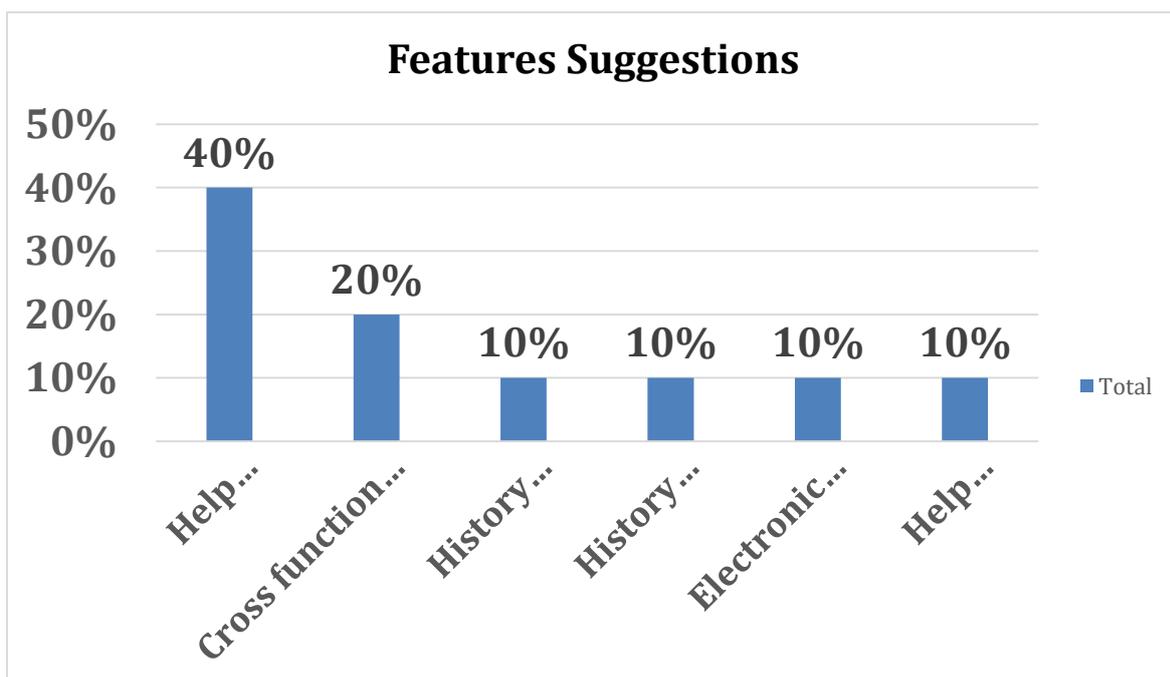
Q15. What colors would you find captivating for the app?

100 responses

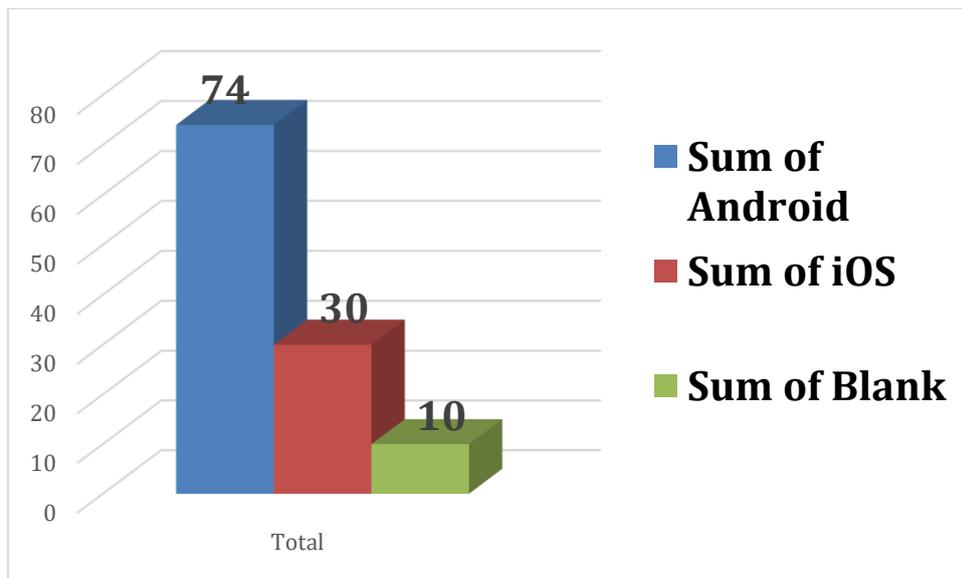


Q16. What other features would you suggest for the app select your top three? Here is some possible features to choose from

105 responses



Q17. Which software platform should the App cater for?



3.1.1 Survey Conclusion

The survey was conducted using Google Forms and shared via email a total of 120 individuals and there was a response from a total 114 of those, a consent form was included at the beginning of the survey as a form of written agreement that taking part was on a voluntary basis and at any given time, they were free to discontinue partaking. There was 94% that consented, 5% that declined and 1% blank responses which is considered a success. The age range of the participants ranged from 18 -65 so that the sampling could be spread on a wider range of ages. There was 85% that said they were responsible of utility payment in their households.

The App will need users that are on pre-paid utilities service somewhat tech savvy, have a bank account to pay from, have access to the internet and have a mobile phone. There was an average total of 89.2% participants that have access to all five basic requirements for the user to have access to the app and be able to use it. This average percentage was measured by asking them about access to internet, bank account and owning a mobile phone. The colour scheme requirement got a total of 49% for blue and white and other colours were spread across with low percentage on all of them. There was proof of the use of Pay Zone shops among the pre-paying users a total of 38% strictly using Pay Zone then a further 21% using a combination of Pay Zone and other Apps the other higher figure was 20% who are on Bill pay and used direct debits. Overall survey was a success.

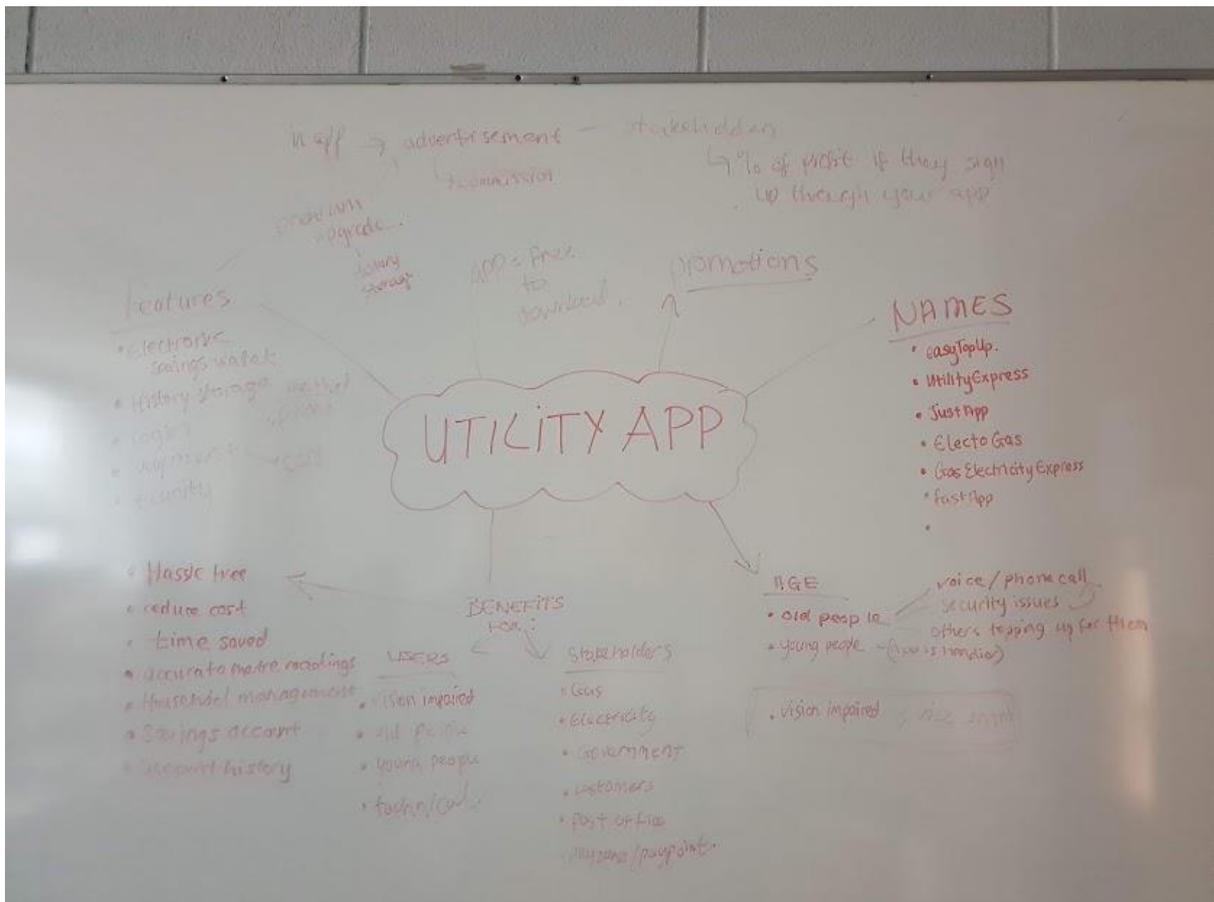
3.1.2. Brainstorm

Participants

Clients

Two regular users

One SME / Developer



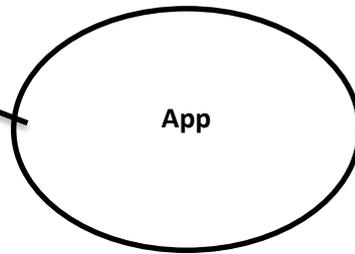
Analysed version

Pages

- Start
- Secure Login
- Registration
- Vendors
- Amount selection
- Payments
- Logout

Layout

- User friendly
- Discount offers
- Amount minimum
- Amount max
- Notification bell



Functionality

- Audio option
- Help chat
- Share option
- Electronic savings wallet
- Notification when account is credited
- Notification for low credit
- Realtime usage
- Logout button

3.1.2.1 Brainstorm Conclusion

Brainstorming was successfully executed, and the outcome was numerous requirements elicitation from stakeholders / users. The participants were potential users of the app and all showed great interest, maintained great focus and respected each other as they all confidently took turns contributing their ideas. The agreement made prior was one person at a time would state their idea/s and they also took turns writing on the board. The writer would pick a person to talk then in rotation speaker became the writer. As a project manager and Business Analyst for the project there was a need to focus on the interaction taking place without the distraction of overseeing the board but rather the conversations.

Requirements Elicited

- Start
- Secure Login
- Registration
- Vendors
- Amount selection
- Safe Payment
- Logout
- User friendly
- Audio option
- Help chat
- Share button
- Electronic savings wallet
- Notification when account is credited
- Low credit alerts
- Realtime usage
- Logout button

3.1.3. Interviews

3.1.3.1. Interview one

Participant: **SME Developer**

Interview Questions & Answers

1. What developing background do you have?

In my second year of my degree at the National College of Ireland, I created an Android application in a group project. This app took audio from the user and would analyse the sound for sound quality for recording for the likes of YouTubers.

In my third year, I created a website in a group project called Hybrid Web Search. It's a website designed for older people to book events and get the likes of medical assistance.

In my final year, for my software project, I am creating a web application and Android app that is a social network for people with tattoos and piercings. There's an Artificial Intelligence chat bot within the network to get help for its users.

2. Have you heard of an application like this before?

There are similar apps available for each service provider, but I have not seen an app that combines them all. It's very innovative.

3. What do you need from myself to develop the app other than the requirement specifications?

We will need to have a conversation about the finer details, such as the likes of colours of the app and the style. I also do projects with the agile methodology, so changes can be made throughout the project as needed.

4. How long will it take to develop?

If you wish to have 1 developer, it will be 6 months.

If you wish to have 2 developers, it will be 3 months.

5. How much will it cost?

The cost is €1,500 per person per month.

This will cost a total of €9,000 provided there are no delays.

These figures are based of apps that I and my team have created before and are estimated.

Connection to the web servers, API or external sources may cost extra.

6. What languages and software are you planning on using to develop the app?

The app will first be created in Android Studio.

For the Android app, the languages that will be used are C++, XML, R.java, Java and other native Android Studio languages.

7. Will you be able to connect to large multiple cloud-based vendors' Database systems?

Yes, this will be done through web services and API to connect to the likes of Google Firebase or Amazon Web Services.

8. How soon can I have an interface to show my stakeholders?

A Project Plan will be created, and I will be able to give you a date when this is expected. For your stakeholders, I would be able to create mock-ups of how the interface would look like. This can be done nearer the start of the project.

9. What functions do you think would be challenging to implement?

Usually the most difficult function to complete is connecting the databases and storage. This is because different providers use different technology and languages in their systems.

10. How soon will you know if there are functions that may too complex to attempt?

If a function within the app is too difficult, I or my team will look at alternatives and

consult with you. I cannot give you an exact time as when a roadblock is met, we deal with it at that moment.

3.1.3.2. Interview one Conclusion

The interview with the SME / Developer was very eye opening in many areas of the project and all the questions helped with the research an elicitation of requirements. It also highlighted certain areas that would vital to facilitate for the success of the App such the server that the App would be connected to. There The first question asked was to jumpstart the interview while getting the developer's background. He highlighted his experience of having previously developed something that incorporated audio and sound which was very useful considering that Utility-App will have an audio function integrated into it and should a chat box be one of the requirements the App need he would be capable of executing that too. The developer had not heard of an App that offers what Utility-App aims at providing to the users and even commented on how innovative he thought the ideas was. There was time element which led to an estimation of how long the development could take depending on the complexity of the requirements, how many person months would be involved in the development.

There was also a cost element which also would depend on person months involved in the development. Languages to be used and software that would be suitable for development were addressed. The results of this interview also investigated the possibility of dealing with multiple large cloud-based Vendors' Databases being connected to the App which the developer said he was very capable of and elaborated on how he would execute that. How soon an Interface could be produced, the response was that a Mock-up of how the interface would look for demonstration purposes to the Stakeholders would be ready right at the beginning stages of the project which the Project manager advised that could be done as soon as the requirements specifications were dealt with and analysed.

There was an agility element there which is very useful for the project as progress can noted, roadblocks can be address by calling in reinforcement for those roadblocks as the project progresses and if needs be iterations can be made in an Agile Managed Project.

Requirements Elicited

- Scope
- Mock-up
- Languages to used C++, XML, R, Java
- Software (Android Studio)
- Cost estimation
- Databases storage

3.1.4. Interview Two

Participant

Debts Financial Adviser

Interview questions and answers

1. Tell me about the difficulties faced by your clients regarding their bills for Gas and Electricity please.

Difficulties facing our bill paying clients are the levels of arrears accruing. This may sometimes be as a result of meter readings not being submitted for a variety of reasons, including faulty meters.

Difficulties arising for both gas and electricity threat of disconnection often worsen a vulnerable client's situation as this is often a signifier that there also other debts in the household.

2. How much of an issue is this for your clients if at all?

There are a few difficulties with utilities however they all bear their own issues. The most prominent of all of these issues a client having no supply or put on unsustainable repayment plans.

3. What would your view be on how tech savvy your clients are?

From our client base this is not something that we track, however approx. 40% of the clients who call us are waged clients so on this basis I would say yes.

4. What features would you like to see on the app below is a list of suggestions but feel free to include any feature you think may be of use?

- History feature (This would show the history of transactions on how much was spend and when dating back a couple years).
- Live chat (for help if anyone is stuck on how to use the app).
- Promotion offers (available discount offers).
- Electronic savings wallet (to use for saving their credit for later usage)
- Cross function (for splitting top-up between Gas and Electricity from one account to another).

***Answer:** Re-occurring top up so if a client has a payment plan in place (These are typically weekly) it will pay X amount of money on a particular day. Would be useful to select weekly or monthly and have a debit card associated with this re-occurring payment*

5. In terms of what the app does would this be something you are happy to bring attention to on your website?

This is not something I would comment on as we are funded by Citizens Information and generally we remain impartial, however if it was an independent, it could be put forward for approval.

6. Would you recommend this app to your clients?

If this APP works to aid the client's budget then yes I don't see why not however I could not guarantee this as this is only my own personal opinion and not that off MABS network

7. What colours do you think would captivate the interest of users of the app?

Orange & Yellow as I think empowering colours and feel good colours would work best

"These answers are solely my opinion and do not represent the opinions of the MABS National Development Organisation or that of the MABS companies, its employees or funders."
Participants words.

3.1.4.1. Interview Two Conclusion

Requirements Elicited

- Meter reading submission feature
- Re-occurring top-up feature
- Colours
- Vulnerable clients are at more risk

3.1.5. Interview three

Participants

Sponsor

1. Tell me about the difficulties faced by your clients regarding their bills for Gas and Electricity, please.

There is usually a factor of unemployment which results in them falling into areas and when people have limited funds the last thing they would think of is areas of anything but their everyday needs such as food and the rental first. Then when they fall into areas there is usually the fear of disconnection which when they normally would ask for financial assistance sometimes directly to the organisation and sometimes indirectly via different sources that I am not at liberty to disclose. There has been some complaints previously of clients saying their cost were high due estimated cost and broken meters.

2. How much of an issue is this for your clients if at all?

This is a serious issue for those involved and for those that are parents it is something that might leave some parents feeling miserable when they cannot provide basic human needs such as the lights and heating. We as an organisation do try helping and part of the help, we offer is to refer them to MABS for financial and budgeting advise.

3. What would your view be on how tech-savvy your clients are?

Going by technology being everywhere mainly on our phones which we all use I would say they well able to use technology.

4. What features would you like to see on the app below is a list of suggestions but feel free to include any feature you think may be of use?

- History feature (This would show the history of transactions on how much was spend and when dating back a couple years).
- Live chat (for help if anyone is stuck on how to use the app).
- Promotion offers (available discount offers).
- Electronic savings wallet (to use for saving their credit for later usage)
- Cross function software (Android and iOS gadgets).

Answer: The history feature sounds appealing and close to what we had in mind so they can track their spending.

Electronic savings wallet too is what we would like to see that app have.

5. In terms of what the app does would this be something you are happy to bring attention to on your website?

Our website might be the best suitable platform as they come on it quite often to make applications for help, they would be able to see it. We also work with MABS the money advising service and they interact with most of our clients more and we would be happy to also get them involved and talk to the clients about the app.

6. Would you recommend this app to your clients?

I would be happy to recommend the app, we want our clients to be able to manage their household income as best as they can, I would assume by using this app it will help them keep track of the bills

7. What colors do you think would captivate the interest of users of the app?

I think off white with pale blue would be nice, but I am really not one to look at colours that much so whatever colour you may find suitable we would be happy either way.

8. What is your opinion of the App

It sounds interesting and we are happy to be a part of it.

9. What benefits do you think the App would provide to your clients

We think this would be helpful not only to our clients because this will be availing of a service that everyone uses whether they are the families needing assistance or not. Overall the idea sounds very innovative because it has integrated two different utilities into one app.

3.6.1. Interview Three Conclusion

Requirements Elicited

Meter reading submission

Reoccurring top-up

Transaction history

Electronic savings wallet

Colours

3.1.7. Interview Four

Participants

General User

Interview questions and answers

Q1. What type of services are you on for your utilities?

I am currently using the pay as you go services for both Gas and Electricity.

What issues do you face with the current payment method for your utilities?

Sometimes electricity or Gas may run out and needs to be recharged and the whole thing of having to buy from the shops and feed the meters manually does my head in. One time I lost my Gas card and it was a nightmare.

Q2. Can you think of anything that would make these issues any less or not have them at all?

I think if there was a Gas top-up app that would be brilliant because for electricity, I do use the app for that but of course you still need to manually feed the meter too. I think they could even make it so you can sometimes pay on the app just to keep credit there even when you are not using it?

Q3. How do you currently pay for your utilities?

I buy the Gas from the shop around the corner with a card and for the electricity I use the same method but sometimes use the app.

Q4. Would you use an App that could possible address some of the issues you are having?

Top-up

I would be happy to use such an app if there was one, that would mean I don't need to struggle trying to feed the meter or buy from the shop. Do you know they charge you every time you buy?

Q5. How likely are you to recommend the App to others if developed?

I am very likely I would tell all my friends that use this prepay service because I have quite a few of them who do.

3.1.7.1. Interview Four Conclusion

Requirements Elicited

Automated credit feature

Electronic savings wallet

Electronic payment

3.2. Focus Group

Participants:

8 General Users

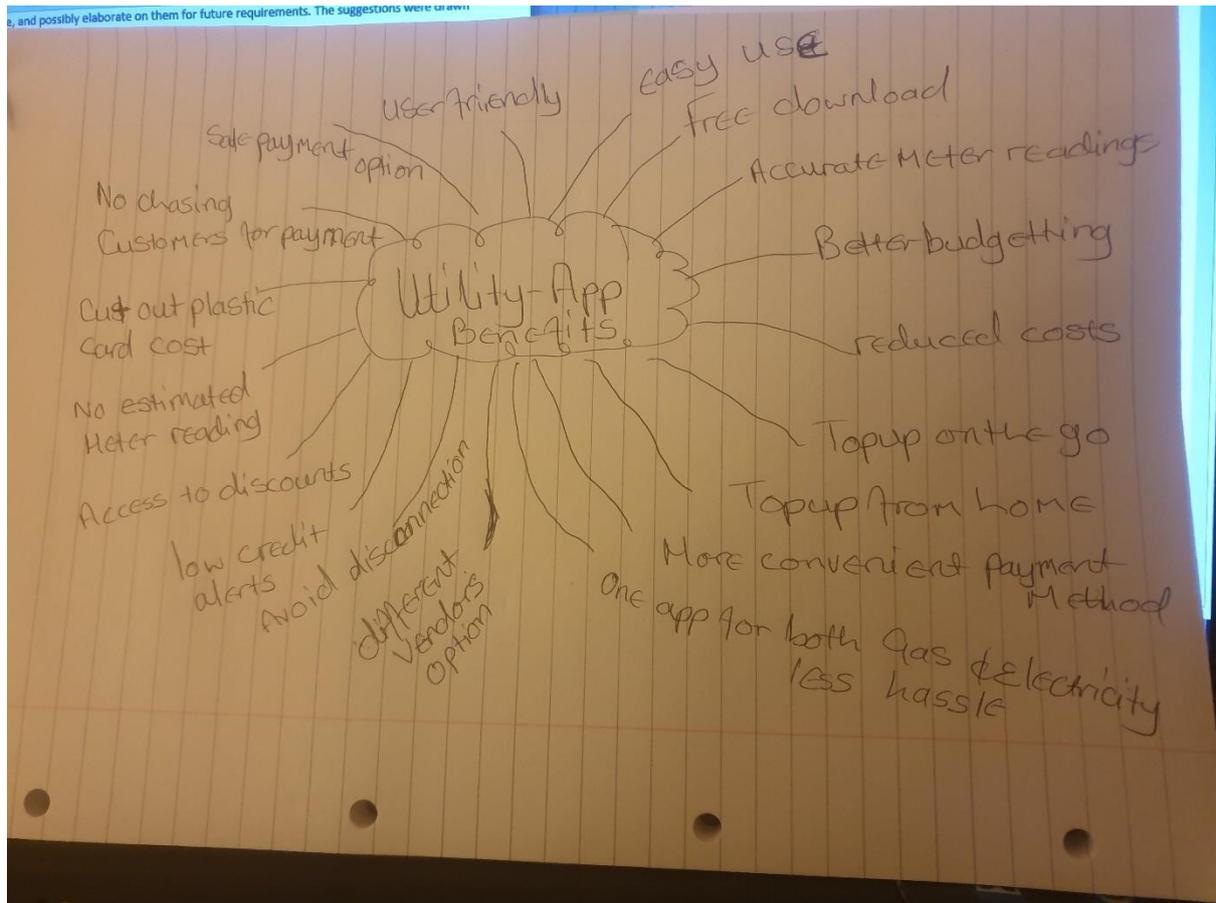
Developer

Experienced Moderator

Date & Time: 13th December 2018, 13:00 – 14:00

The focus group was a useful tool to use to explore and identify more benefits of the app from both consumer and vendors' perspectives. Some of the benefits were previously identified during brainstorming but the focus group was also needed.

The focus group was held in National College of Ireland. A few participants were invited via doodle poll and thankfully they were available to attend. There was a brief discussion at the beginning for making sure participants stayed within topic. Useful requirements were elicited during focus group and there was a steady flow of ideas without any distractions.



The requirements elicited from the Focus Group about the benefits of the app are as follows:

Consumer Perspective

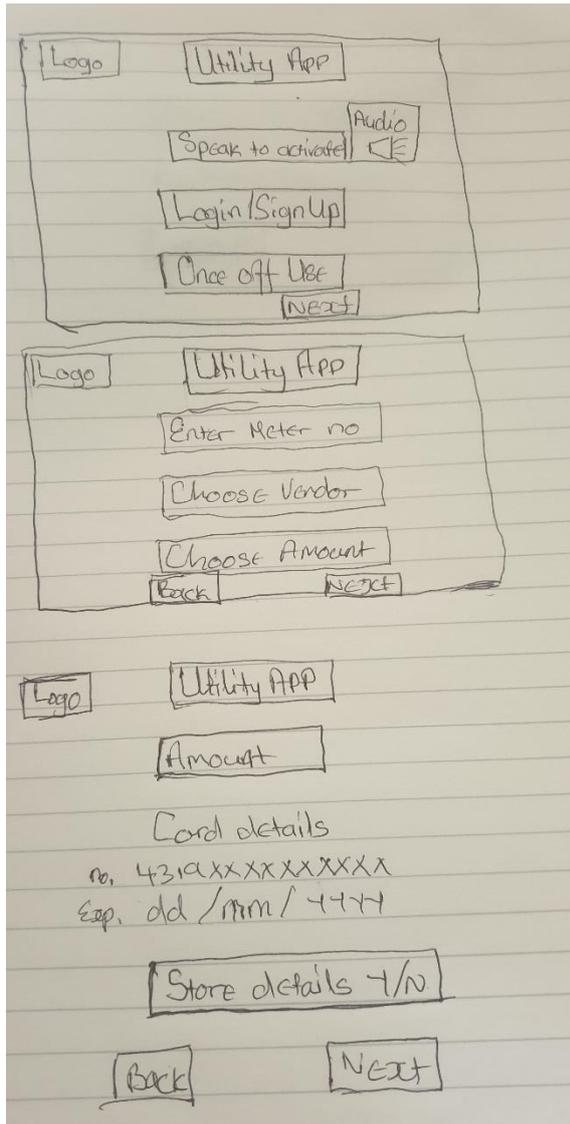
- User friendly
- Easy use
- Free download
- Meter reading submission
- Top-up on the go
- Top-up from home
- Low credit alerts
- Safe payment

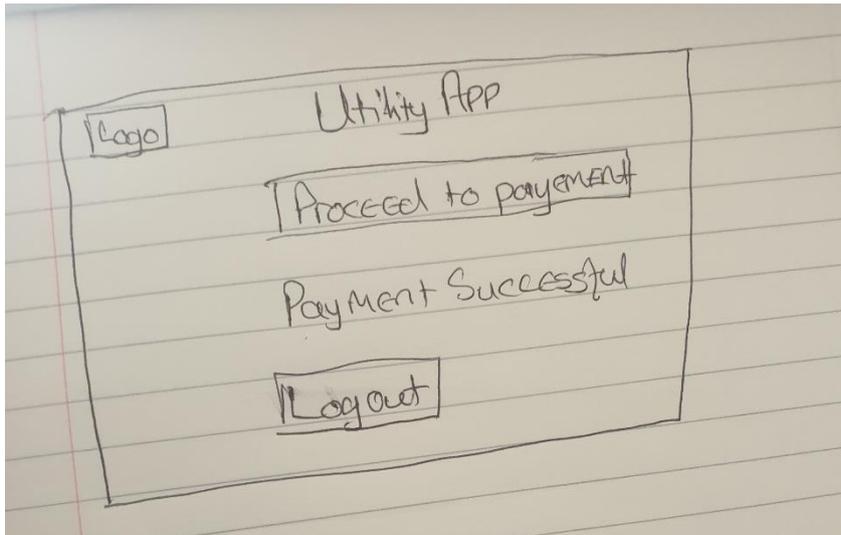
Vendors Perspective

- Efficient payment method
- Accurate meter readings

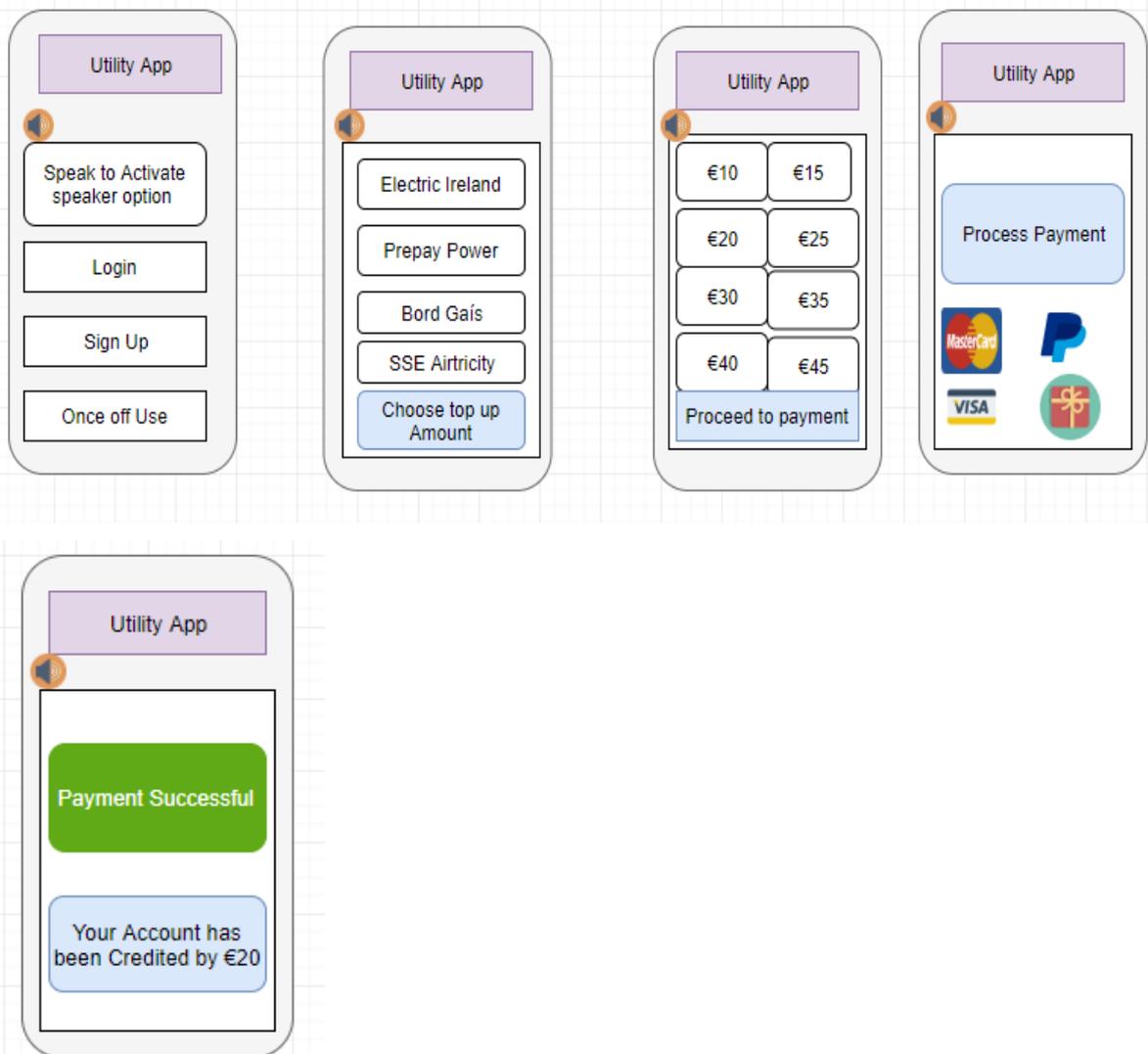
3.3. Prototyping

3.3.1. Prototype 1





3.3.2. Prototype Version 2

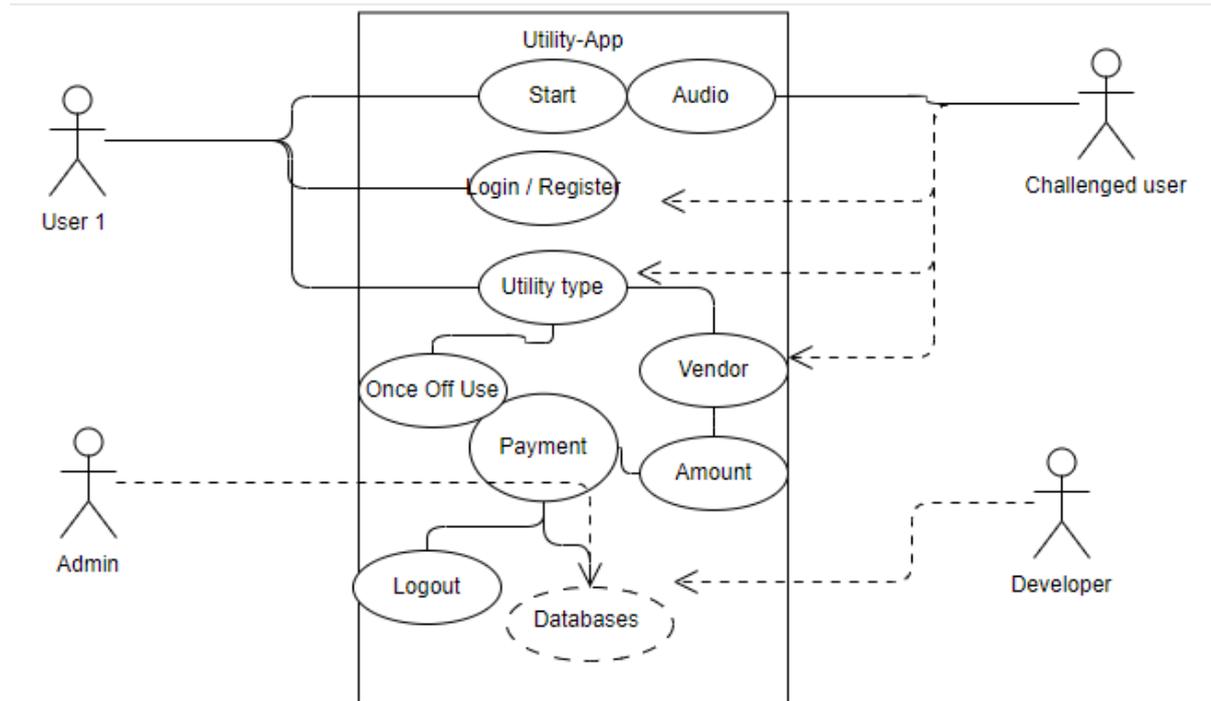


(Draw.io, 2018)

3.3.3. Prototype version 3

3.4. Interface Analysis

3.4.1. Use Case



3.5. MoSCoW Analysis

3.5.1. Overview and Objectives

MoSCoW Analysis is a common technique used by Business Analysts to prioritise and rank requirements accordingly. It helps with establishing common ground between stakeholders and developers for proposed projects. MoSCoW Analysis is carried out to determine which requirements are most important than others and they are then ranked in the order they must be developed. These are requirements that have been analysed from previously carried out requirements elicitation techniques and the prototypes. These requirements include both functional requirements and non-functional requirements. Some requirements

may be reoccurring and will need to be narrowed down and there can be only one entry per identical requirement. The categories that are will be used for prioritisation are **Must Have, Should Have, Could Have, Won't Have**. Holding meetings on a regular basis with stakeholders is pivotal to the success of the project.

M: Must

All Must requirements should be regarded as mandatory for the project to succeed and that means they are non-negotiable either. For the report to be successful if the requirements are not met to the standard that they were agreed on that satisfies the stakeholders. The Must category is of high requirement hence its' first ranking. There would be no point in delivering a project without all requirements from ranking.

S: Should

The Should requirements are second ranking in line making them second most important and if there is a possible way to execute them, they should be implemented to the software development.

C: Could

The Could requirements may seem appealing and attractive to have them incorporated into the software but are they are not of importance as the software would function without these requirements. If these Could requirements are implemented, they may sometimes cause scope creep or impact on the budget agreed on.

W: Won't

These requirements the last ranking category despite being a part of the elicited requirements, they have not been agreed on to have on the development of the software therefor will not be implemented. (O'Loughlin, 2009) pg80.

3.5.2. MoSCoW Table

Requirements	As a	I want to	So I can	Raised by	Priority
1.	User	Be able to login into the app	Use the app	Brainstorming	Must
2.	User	Register/Signup Email address	Store my account details	Brainstorming	Must
3.	User	Create a password	Keep my account secure	Brainstorming	Must
4.	User	Be able to send a password reset request	Reset password if I forget it	Brainstorming	Must
5.	User	Be able to send and receive audio	Use a voice command on the app	Brainstorming	Must
6.	User	To see a help-chat, popup	Ask for help if I am struggling using the app	Brainstorming / Survey	Must
7.	User	Enter bank card details	Purchase pre-paid top-up	Brainstorming	Must
8.	User	Enter a verification pin	Verify card details	Brainstorming	Must
9.	User	See Vendors list	Select the correct Vendor to	Brainstorming	Must

			purchase from		
10.	User	See the list of top-up amount options	Select the amount I want	Brainstorming	Must
11.	User	Be able to store my card details	Re-use to make purchases in future	Brainstorming	Must
12.	User	Be able to see the Re-occurring option	Set up a weekly or monthly regular payment	Interview	Could
13.	User	Access a cross function platform software	Use the app from Android or iOS gadget	Survey	Must
14.	User	To use a share option button	Share my account details with friends and family to purchase top-up on my behalf	Brainstorm	Could
15.	User	See Realtime display	See how much I am using	Brainstorm	Could

16.	User	Be able to see the savings wallet option	Use it to save some of the top-up	Survey Brainstorm	Could
17.	User	Push notifications	Be alerted when my credit is low	Brainstorm	Should
18.	User	Be able to logout of the app	Keep my account secure after use	Brainstorm	Must
19.	User	To have no password autofill on my account	Be protected from unauthorised users	Brainstorm	Must
20.	Developer	Implement a secure strong algorithm	Be certain that payments can go through securely	Brainstorm	Must
21.	Developer	Use native languages	Know that users can understand the language	Interview	Should
22.	Developer	Implement cross functional software	Users can access the app from different types of phone	Survey	Should

			Android or iOS		
23.	Stakeholder	Offer a Cross functional platform	Attract a larger user consumer base	Brainstorm	Could
24.	User	See the list of types of payment	Select the suitable payment type	Brainstorm	Must
25.	Developer	Implement chosen colour scheme	Users can navigate easy on the app	Survey Brainstorm Interview	Must
26.	Developer	Implement cloud-based databases	Link the users' accounts to their assigned Vendors	Interview	Must
27.	Developer	Implement number input function	Let the users submit their meter readings	Interview Brainstorm	Should
28.	User	Download the app for free	Use the app	Brainstorm	Must
29.	Developer Client User	Make sure that Correct security measures	Be certain that users' personal details are secure	Brainstorm	Must

30.	Developer	Synchronize with existing systems Banks, PayPal & Vendors	Process payment	Brainstorm	Must
31.	Stakeholder	Have a business Logo	Use the Logo on the pages of the app	Brainstorm	Could
32.	Admin	Have an admin login page	Update users' & vendor's details	Brainstorm	Must
33.	Admin	Push discount notifications	Let users know of special offers	Brainstorm	Could
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37.					
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4. IEEE App Requirements Specification

4.1. Introduction

Purpose:

The IEEE requirements specification document being developed is for Utility-App which is a utility mobile application. IEEE requirements specification document's purpose is to identify and document key functional and non-functional requirements in detail. This aim at ensuring the appropriate development steps are adhered to and fully capturing what the finished product must be and meet all the stakeholders' needs. The finished IEEE document will be inspected and analysed by stakeholders mainly the client making sure that all requirements have captured and there are no errors and the vision that was conveyed to the Business Analyst have been delivered and it will then be passed onto the developer.

Scope:

The App is being developed for a Non-Profit Charity Organisation that remains a silent and anonymous stakeholder. The aim is to facilitate a service that will avail flexibility and comfort to pay as you go users in how they pay for their pre-paid Gas and Electricity. This includes everything from pre-purchase, during purchase and post purchase. How and where they purchase utilities from and having to manually feed meters to get credited. There is a need for service like Utility-App. There are other apps that may do something similar but not quite how this App will do.

Definitions, Acronyms and Abbreviations

User: Is a stakeholder that uses Utility-App. The user can register, login and access the features on and the regular user is any member of the public using pre-paid utility service for either Gas or Electricity.

Administrator: Is a person that will manage the App and perform tasks such as updating users' details, account numbers, banking details etc.

Stakeholder: Is an individual or group that may interact with the App

Sponsor: Is the client who proposed addressing the problem

4.2. Functional Requirements

User Requirements

Functional Requirement 1	
Identification Code	FR1
Title	Login
Description	Enter email details and password
Priority	Must have
Criteria	
Justification	For a successful login user must enter correct email and add a password that meet security standard requirements of 8 characters inclusive of Sensitive case and a symbol then it allows them to start using the app.

Functional Requirement 2	
Identification Code	FR2
Title	Register
Description	Upon a successful login into the app user needs to register utility account with the app by selecting type of utility, selecting Vendor's name and input account number.
Priority	Must have

Justification	This secures the users' details and restricts their information from being viewed by unauthorised person. It also links the app to users account number for future use. This will now allow user to credit their account for use of either Gas or Electricity by following a couple steps.
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Functional Requirement 3	
Identification Code	FR3
Title	Once off Use
Description	Once user is successfully logged into the app but does not want to register and still use the app.
Priority	Must have
Justification	This will allow the user to do a Once off or seldom use or because they are crediting someone else's account they can proceed to once off use which will allow them to input similar credentials as FR2 which are selecting the type of utility, selecting Vendor, selecting amount then input account number they intend to credit without the need to register or linking the account number to the particular user performing the transaction.

Functional Requirement 4	
Identification Code	FR4
Title	Audio
Description	This allows user to use a voice commanded option by speaking into the app.
Priority	Must have

Justification	This allows challenged or vulnerable users to use a voice commanded feature to go the process from FR1, FR2 and or FR3 using their voice. The user should say request audio from the home page of the app and the app will be prompted to allow user to send and receive commands in audio.
----------------------	---

Functional Requirement 5	
Identification Code	FR5
Title	Forgot password
Description	The user may request a password reset in case they forget their existing one.
Priority	Must have
Justification	This allows the user to request a password reset link from the app. They will be asked to input their email address for security reasons to confirm if they are the account holder that they seek a password reset for. The app will then ask them verify email vial their mailbox which should now link them back to the app and prompt them to reset the password to a new one and confirm it then ask them login with the new password and the process ends.

Functional Requirement 6	
Identification Code	FR6
Title	Change Password
Description	User may want to salt their password to make it stronger and unique.
Priority	Should have

Justification	If the user feels the need to salt their password to make it unique, this allows them to do so. They will be asked to input their email address for security reasons to confirm if they are the account holder that they seek a change password for. The app will then ask them verify email vial their mailbox which should now link them back to the app and prompt them to change the password to a new one and confirm it then ask them login with the new password and the process ends.
----------------------	---

Functional Requirement 7	
Identification Code	FR7
Title	Help Chat
Description	If the user is having some difficulty using the app or not sure what to click there will be and pop-up help chat.
Priority	Should
Justification	This will allow the user to interact with the automated system that will be pre-programmed with all possible answers for assistance for the app interactions. However, if they seek what the system does not have it will redirect them to call the helpline where they will speak to an operator.

Functional Requirement 8	
Identification Code	FR8
Title	Top-up
Description	When the user has achieved a successful login and or registration or once off use, they must be able to

	start the process of purchasing the top-up for the account.
Priority	Must have
Justification	This will allow user to purchase a chosen amount of credit they want.

Functional Requirement 9	
Identification Code	
Title	
Description	
Priority	
Justification	

Functional Requirement 10	
Identification Code	
Title	
Description	
Priority	
Justification	

Functional Requirement 11	
Identification Code	
Title	
Description	
Priority	
Justification	

Functional Requirement 12	
Identification Code	

Title	
Description	
Priority	
Justification	

Functional Requirement 13	
Identification Code	
Title	
Description	
Priority	
Justification	

Functional Requirement 14	
Identification Code	
Title	
Description	
Priority	
Justification	

Functional Requirement 15	
Identification Code	
Title	
Description	
Priority	
Justification	

Functional Requirement 1	
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Justification	

Functional Requirement 1	
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Functional Requirement 1	
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Priority	
Justification	

Functional Requirement 1	
Identification Code	
Title	

Description	
Priority	
Justification	

5. Bibliography

Business Analyst Learnings (2015) Tips for developing questionnaires and surveys

Available at: <https://businessanalystlearnings.com/ba-techniques/2015/3/16/tips-for-developingquestionnaires-surveys>

(Accessed: 10 December 2018)

O'Loughlin, E. (2013) How to create a basic Gantt chart in Excel 2013 [Online video]

Available at: <https://www.youtube.com/watch?v=QdsjVN3du78>

(Accessed: 17 December 2018)

Play.google.com. (2018). [online] Available at:

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

[Accessed 13 Dec. 2018].

Online.visual-paradigm.com. (2019). *Log in Visual Paradigm Online*. [online] Available at:

<https://online.visual-paradigm.com/w/ypnppgtq/diagrams.jsp#diagram:proj=0&id=1>

[Accessed 6 May 2019].

Agile Business Consortium. (2019). *The DSDM Agile Project Framework (2014 Onwards)*. [online]

Available at: <https://www.agilebusiness.org/content/moscow-prioritisation>

[Accessed 6 May 2019].

O'Loughlin, E. (2009). *An introduction to business systems analysis*. Dublin, Ireland: Liffey Press.

Paul, D., Cadle, J. and Yeates, D. (n.d.). *Business analysis, second edition*.

Cadle, J., Paul, D. and Turner, P. (2014), *Business Analysis Techniques, 99 Essential Tools for Success*, BCS The Chartered Institute for IT.

International institute of business analysis (2015) "A guide to the business analysis body of knowledge" Guide v3. National College of Ireland

6. Appendix

6.1. Proposal

6.1.2. Objectives

For my final year project, the objective is to produce a detailed requirement specification document in pursuit of the potential development for the proposed Utility app. This project will mostly use business analysis approach stated by BABOK 2015. The project will document the process of the elicitation techniques from preparing, conducting, documenting and evaluating them. The requirements will be elicited from numerous stakeholders through elicitation of requirements stated in Business Analysis Body of Knowledge (BABOK). Techniques used will include surveys, brainstorming, interviews, focus groups, prototyping, use case and MoSCoW analysis. To elicit the requirements, different stakeholders that are relevant to the possibility of the development of the app such as the Sponsor, users, MABS and developers will be interviewed. Using the elicited requirements, a detailed requirements specification document will be formulated using the IEEE standard requirements.

Identifying the main stakeholders will be one of the main things to be carried out. Once the stakeholders are identified. The following task will be eliciting requirements from the identified stakeholders.

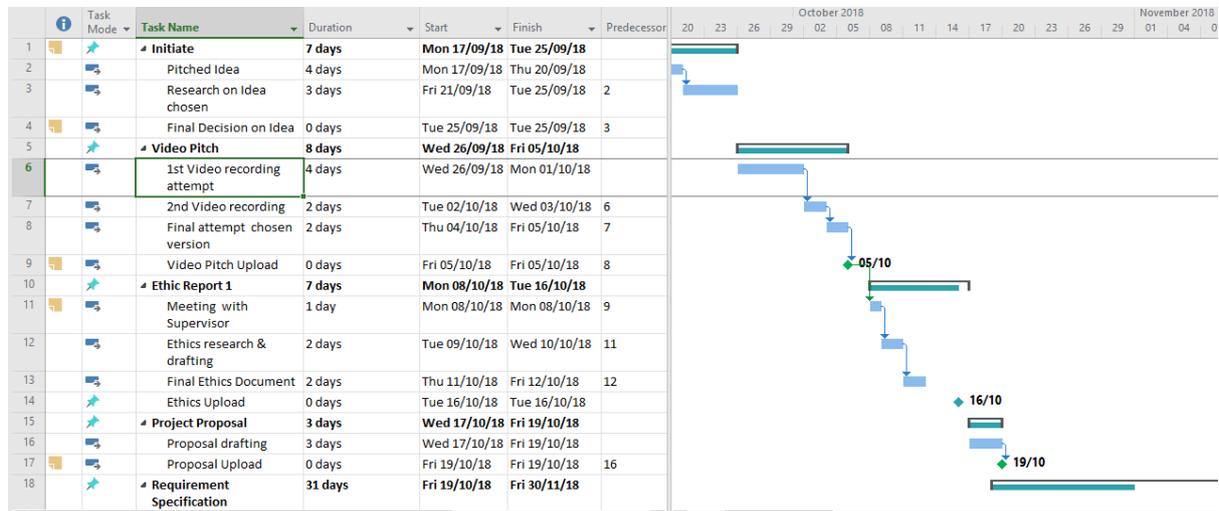
6.1.3. Background

Deciding on which idea to use took some time for me because I wanted to find something that was not a like other ideas that already exist out there yet facilitating what the project Sponsor asked for. Part of the reason for this idea was from a previous personal experience. This led to the idea chosen being better than others I had thought of.

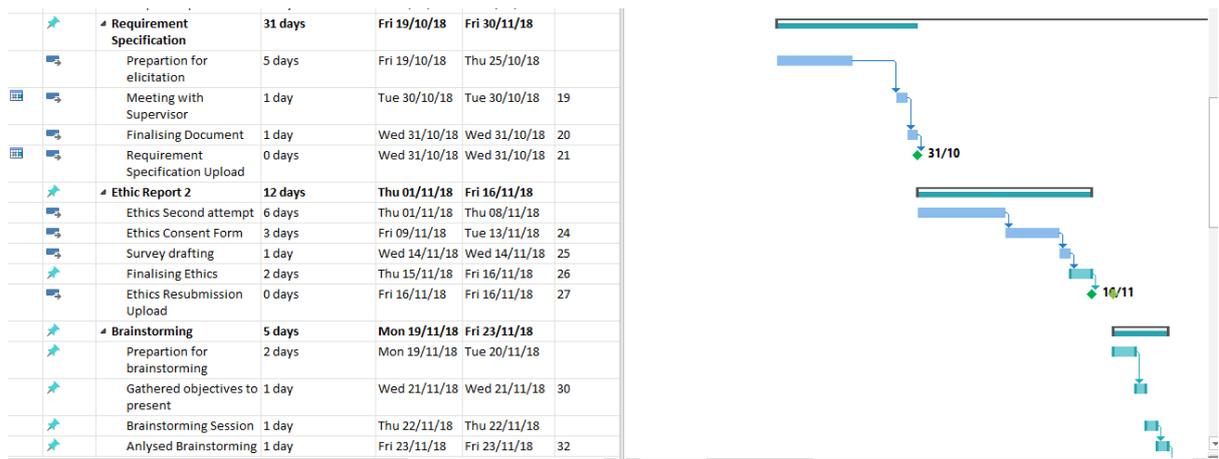
6.1.4. Project Plan

Below is a Gantt chart with tasks and time of the project plan. This illustrates the tasks carried out and future tasks, deadlines to be met as required. Then the breakdown of how and when the tasks, deliverables are to be executed.

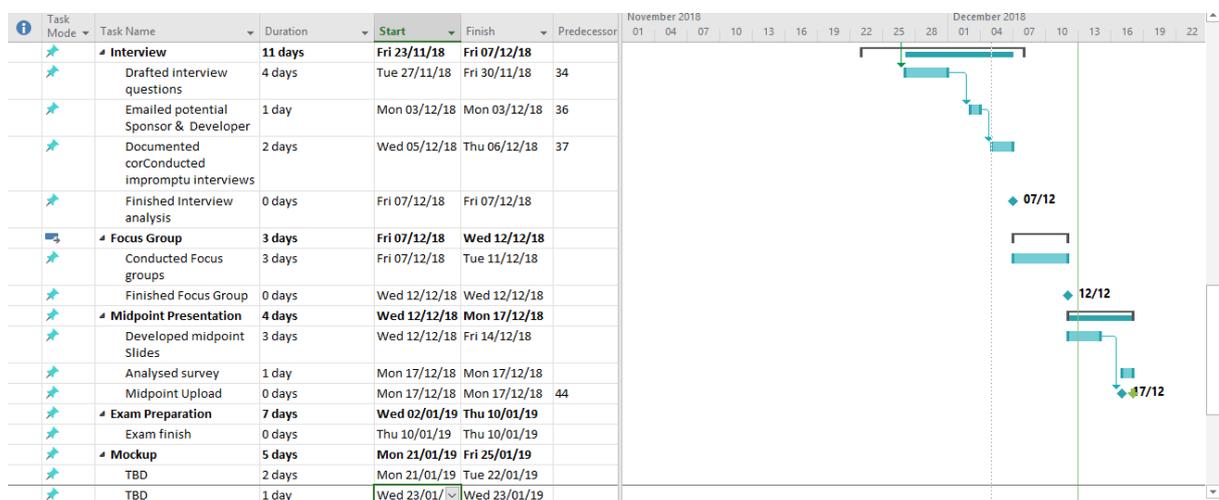
Part 1



Part two

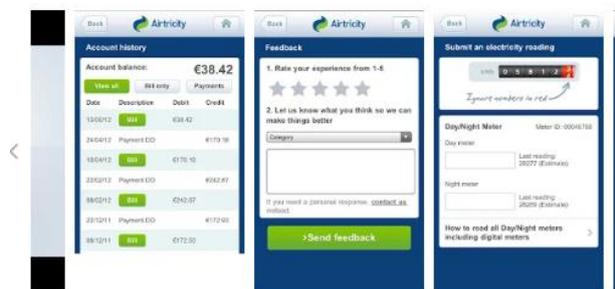
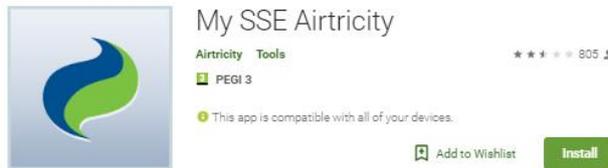


Part three



6.1.5. Competitors

Below is one of the competitors with an almost similar app but does not offer what the proposed app intends to. There are reviews screenshots clearly showing how unsatisfied some of the consumers are with Airtricity app.



REVIEWS

[Review Policy](#)



- William Park** ★★★★★ October 28, 2018 4

Trash. Will be looking for alternative energy providers because this app is so poor. The least it could do is remember some card numbers so you don't need to run about looking for your bank card and electricity card. For all the money they receive they could make a better customer top up experience....

[Full Review](#)
- Eddie Fitzgerald** ★★★★★ May 6, 2018 14

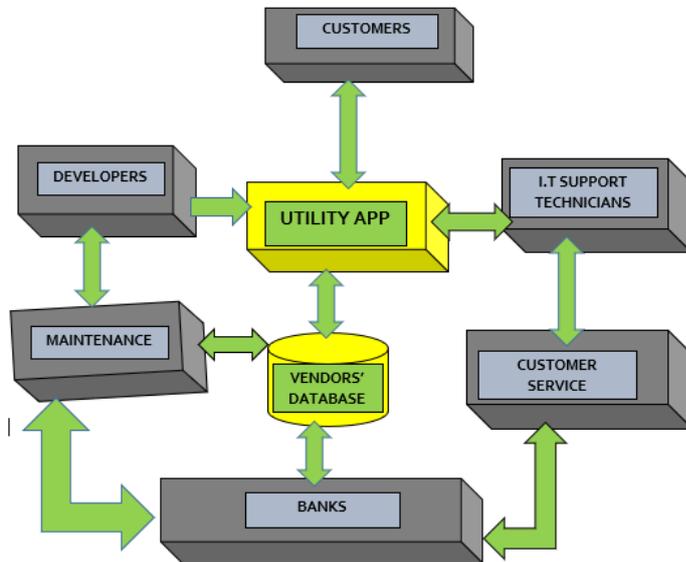
Does not recognise my password even after changing it and entering the new one. More recently when the password is entered correctly it does not open the app. Just getting a continuous grey loading circle. Very frustrating.
- Lyndsey Galloway** ★★★★★ April 30, 2018 19

Doesnt recognise your email address. So bloody stupid... need to sort it out would be a whole lot easier to use it and top up my electric. Behind the times 😞😞
- A Google user** ★★★★★ November 26, 2018 1

How can any reputable company actually want this app on release? Can't even get logged in even though I know I'm submitting the right credentials. Utter rubbish.

6.1.6. Technical Approach

Architecture Design



Evaluation

To evaluate the project, I will produce a requirement specification document which will include the elicited specification requirements.

7. Reflective Journal

Student name: Adelaide Ntuli

Programme: BSc in Technology Management

You don't have to follow the suggested format. These sub-headings and questions below may help you to get the most out of this journal, but you are free to modify as you see fit. Through this journal you demonstrate that you are engaged with the process and that you can identify what you need to do or change to progress and succeed in this project.

Upload one journal every month. Expected word count 300 words (of you own words).

My Achievements

This month, I was able to ...

My contributions to the projects included ...

My Reflection

I felt, it worked well to

However, I was not successful in ...

Intended Changes

Next month, I will try to ...

I realised that I need to ...

Supervisor Meetings

Date of Meeting:

Items discussed:

Action Items:

8. Requirements Validation Emails

8.1. Brainstorming

Hi guys,

I would like to invite you to a half an hour long brainstorming session for my 4th-year project that I will be holding soon Monday afternoon December 3rd which I think will be most likely suitable for you and myself. Please kindly let me know if you will be able to make it or not so I can arrange a suitable venue for the day. The location will be NCI

Kind regards,

Adelaide



1:08 PM (2 minutes ago) ☆ ↶ ⋮

Hi Adelaide,

We would be happy to do that everyone has confirmed their availability and only one 2 people [redacted] and [redacted] will not be available.

Kind regards,

Adelaide

Hi guys,

I have the venue confirmed for the agreed date and time and I kindly invite you to take a look at the following rules.

There will be no criticism of anyone's ideas

Everyone will respect each other

An agreement for no tolerance of any kind of abuse toward other participants will be signed at the beginning of the session.

Topic of discussion

Mobile app for pay as you go utilities (Gas and Electricity) top up

Date: 03/12/2018

Time: 13:00 - 13:30

Room: 1.05 Mmlab

Kind regards,

Adelaide


Hi Adelaide,

Thank you for the details on behalf of everyone we look forward to seeing you.

Kind regards,

Adelaide Ntuli

Hi guys,

Thank you so much for attending the brainstorming session. The requirements elicited will really be helpful for my project again thank you and kindly invite you to take a look at the results below.

Requirements elicited:

The app will be named Utility-App and have the following pages

Start page with Audio option - for users with challenges

Login

Register

Once off use - for users who may be using the app on someone's behalf

Vendors - a selection of utility providers

Amount - different amounts to select which suits your intention of purchase.

Payment - payment method

The app will have these functionalities and layout

Promotional offers - which will avail seasonal discounts.

Savings Wallets - to keep extra credit.

History storage - this will show previous transactions.

Should any of you feel any requirements have been misinterpreted or they want to add something on please let me know I would be happy to make some changes.

Kind regards,

Adelaide

8. Interviews

8.1. Interview One

From: Adelaide Ntuli
Sent: Tuesday 4 December 2018 15:18:17
To: Keith Feeney
Subject: Developer questions

Hi Keith,

Kindly answer the questions below for me as discussed and agreed in support of my project and then email the responses back to me please. I have also included a paragraph that explains what the app is meant to achieve for your review so that you have an idea of what the app is meant to achieve. I am happy and receptive for any suggestions if you have any many thanks.

A specific understanding of what this service that requirements are being elicited for will provide is a must. The utility application will be bridge between utility providers and the consumers who use the Pay as you go services. This will provide a more convenient way of purchasing their utilities through the application from the comfort of their homes or on the go and offer more functions some which will be heavily influenced by the requirements that will be elicited from the stakeholders.

1. What developing background do you have?
2. Have you heard of an application like this before?
3. What do you need from myself to develop the app other than the requirement specifications?
4. How long will it take to develop?
5. How much will it cost?
6. What languages and software are you planning on using to develop the app?
7. Will you be able to connect to large multiple cloud-based vendors' Database systems?
8. How soon can I have an interface to show my stakeholders?
9. What functions do you think would be challenging to implement?
10. How soon will you know if there are functions that may too complex to attempt?

Thank you so much for taking your time to do this for me I really appreciate it.

Kind regards,

Adelaide

Keith Feeny <x15015556@student.ncirl.ie>
to Adelaide ▾

Dec 5, 2018, 8:59 AM ☆ ↶ ⋮

Hi Adelaide,

Here are the answers you requested:

1. What developing background do you have?

In my second year of my degree at the National College of Ireland, I created an Android application in a group project. This app took audio from the user and would analyse the sound for sound quality for recording for the likes of YouTubers.

In my third year, I created a website in a group project called Hybrid Web Search. It's a website designed for older people to book events and get the likes of medical assistance.

In my final year, for my software project, I am creating a web application and Android app that is a social network for people with tattoos and piercings. There's an Artificial Intelligence chat bot within the network to get help for its users.

2. Have you heard of an application like this before?

There are similar apps available for each service provider, but I have not seen an app that combines them all. It's very innovative.

3. What do you need from myself to develop the app other than the requirement specifications?

We will need to have a conversation about the finer details, such as the likes of colours of the app and the style. I also do projects with the agile methodology, so changes can be made throughout the project as needed.

4. How long will it take to develop?

5. How much will it cost?

The cost is €1,500 per person per month.

If you wish to have 1 developer, it will be 6 months.

If you wish to have 2 developers, it will be 3 months.

This will cost a total of €9,000 provided there are no delays.

These figures are based of apps that I and my team have created before and are estimated.

Connection to the web servers, API or external sources may cost extra.

6. What languages and software are you planning on using to develop the app?

The app will first be created in Android Studio.

For the Android app, the languages that will be used are C++, XML, R.java, Java and other native Android Studio languages.

7. Will you be able to connect to large multiple cloud-based vendors' Database systems?

Yes, this will be done through web services and API to connect to the likes of Google Firebase or Amazon Web Services.

8. How soon can I have an interface to show my stakeholders?

A Project Plan will be created and I will be able to give you a date when this is expected. For your stakeholders, I would be able to create mock-ups of how the interface would look like. This can be done nearer the start of the project.

9. What functions do you think would be challenging to implement?

Usually the most difficult function to complete is connecting the databases and storage. This is because different providers use different technology and languages in their systems.

10. How soon will you know if there are functions that may be too complex to attempt?

If a function within the app is too difficult, I or my team will look at alternatives and consult with you. I cannot give you an exact time as when a roadblock is met, we deal with it at that moment.

regards

-



Adelaide Ntuli

Thu 5/2/2019 8:55 AM

Joey Tatú <x150155556@student.ncirl.ie>



Hi Keith,

I trust you are keeping well this is just to confirm if the requirements match what your responses were to the interview questions if there is anything misinterpreted or omitted please do let me know and I will rectify the errors immediately.

Requirements Elicited

- The skillset required for the development is available
- Agile Methodology to be used (good for iteration)
- Web Server implementation capability (this increases the cost)
- The scope could be 3 months for 1 developer and 6 months for 2 developers
- The capability of working with large cloud-based databases
- Mock-up provision for demonstration of interface
- Languages to be used C++, XML, R, Java
- Software to be used Android Studio
- Colour Scheme to be elicited from the next meeting
- Cost estimation of €9,000 based on 2 developers over 3 months, but may cost more for Connection to the web servers, API or external sources.

Kind regards,

Adelaide



8.2. Interview Two

From: Adelaide Ntuli [mailto:x15732075@student.ncirl.ie]**Sent:** 03 December 2018 21:09**To:** MABS Helpline**Subject:** Feedback request

Dear Sir / Madam,

I am a final year student completing a BSc (Hons) in Technology Management. For my dissertation I am producing a complete Requirements Specification for an "App" to help users manage their bills more efficiently with less stress. In order to ensure that a comprehensive and robust Requirements Specification document is produced, I must elicit requirements from all stakeholders involved.

I have prepared a brief questionnaire which I would be delighted to forward for your consideration. Hope to hear from you regarding a possibility of permitting me to forward the questionnaire to you or arrangement of a face to face interview with one of your team members many thanks.

Yours sincerely

Adelaide Ntuli

Hi Adele,

The MABS Helpline forwarded the below email request to me. If you'd like to send me a copy of your questionnaire I would be happy to answer it and discuss it further with you at some stage.

Regards,

Colette Power

National Development Officer – Financial Inclusion

MABS National Development CLG

Registered Office: Commercial House, Westend Commercial Village, Blanchardstown, Dublin 15

Telephone: 0761 07 9668, Mobile: 087 2742375, www.mabs.ie

MABS National Helpline 0761 07 2000 Monday to Friday 9am to 8pm

MABS National Development is funded and supported by the Citizens Information Board.

Company number: 383414

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EFQM

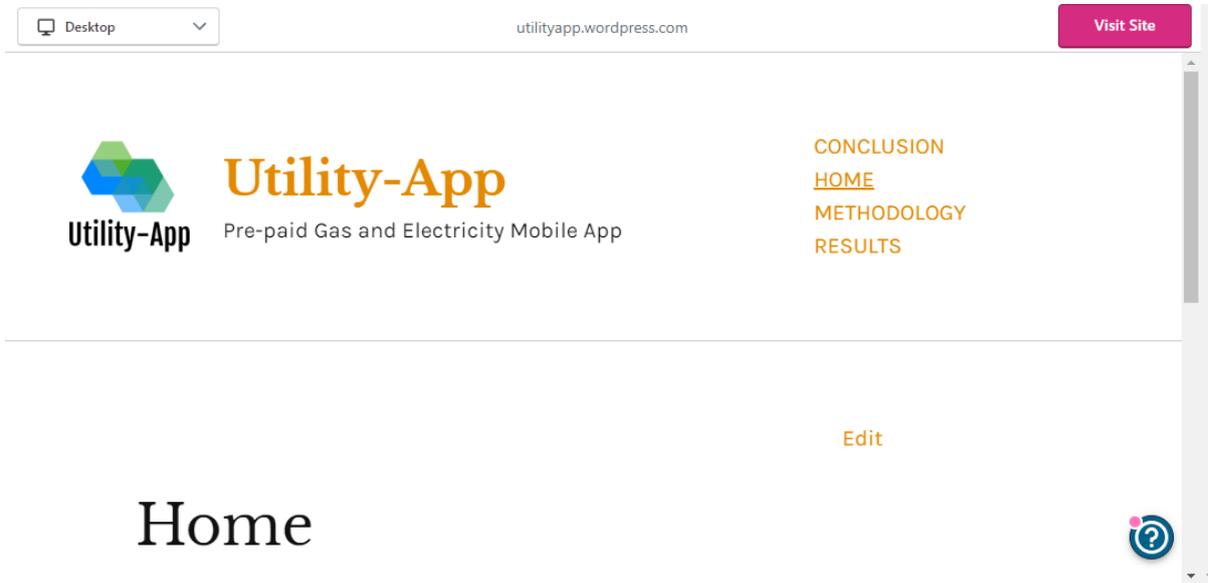


8.3. Interview three

8.4. Interview Four

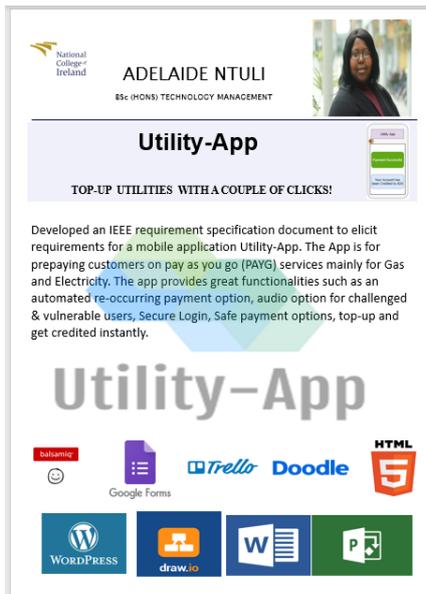
9. Website & Poster Screenshots

9.1. website



<https://utilityapp.wordpress.com>

9.2. Poster screenshot



10. Project Evaluation

10.1. Reflection

This project has been by far the most challenging part of my study, right from coming up with an idea, deciding which idea was suitable, pitching the idea with hopes that it caught someone's interest amongst the panel of supervisors' that had to view the pitch video. I had other modules to deal with along with exams for both semesters meaning all these had to be juggled along with the project. This has taught me a lot of patience and tons of time management lessons. I honestly could have managed my time better than I did in the beginning, but I quickly learnt that I needed some adjustments as the weeks went by.

I was able to make some adjustment that were necessary which included cutting back on some social activities that would have taken some of my time which I then used to work on the project instead. I have tendencies of being consistent which came in handy for having to keep up with my studying in general. I am happy that the level of detail in what I have worked to put together in the requirement specification document is accurate and precise for the developers to be able to implement and develop exactly what is expected with minimal recoding, retesting and redesigning.

What most important lessons did I gain?

I have gained a lot of different lessons such as the use of different types of technology some that were known to me prior and some that were not. I attended all seminars that were offered for assistance with things such as the website to present the project from, Trello where I used a virtual board to prioritize my work, track progress, identify blockers and list what was done. The seminars were held by Pat Delaney for time management, Sam Cogan for WordPress and Webhost for the purpose of website development and Vikas Sahni for analysis output. I found all seminars very helpful and was appreciative that they were offered. I made use of all the guidance that I received from all these seminars with the time

management is when I changed around some of my activities to help manage my time for the project. I successfully created the website for showcase presentation purposes. I was able to take onboard the advice that came from Vikas for the output of my analysis by making sure that the graphs were presented in an appropriate way with clear data labels etc. I used Balsamiq for wireframes, then later developed the second version from Android Studio. The journey of learning about all different technologies and information was exciting but at time challenging. Most importantly I have learnt about the role of a project manager and business analyst in depth to a certain degree knowledge that I did not have prior to embarking on the journey of the project.

What I found difficult

I found the process of coming up with an idea that was not just suitable for the Sponsor's ask but unique and innovative but also something that I would find passion in exploring and had somewhat information about enough to entice me to researching more about.

What do I wish I had done differently?

I wish I had started researching about the project I chose sooner than I did as I later found out that it would have helped me tremendously to have that head start. I do sometimes wonder that had I chosen a different idea could I have delivered a different document than I did which I doubt. Having said that I am extremely proud of my project and the document I have managed to put out including all trials and tribulations that I endured from a health point of view during this entire year. I could have had better questions for my interviews and survey which could have helped with eliciting certain type of requirements, results and analysis but we live and learn. Overall it surely has been a big learning curve that I know I needed.