



Design of a HIFI Prototype of a Mobile Commerce Application For Student Community

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ABSTRACT

A prototype is an early sample, model, or release of a product built to test a concept or process or to act as a thing to be replicated or learned from. The goal of a prototype is to test and inspect usability and to detect and correct potential design flaws. This research examines and evaluates a preliminary design sprint activities undertaken with prospective users of an Android shopping or mobile commerce application for students. This was achieved using low-fi (sketches, mockups and wireframes) and hi-fi techniques that also involve mixed research methods like interviews and questionnaire thus providing insight into design and implementation of mcommerce technologies.

Keywords: prototype, usability, mobile application, design

INTRODUCTION

Businesses of all sizes that are looking for a new way of allowing customers to purchase products will benefit from mobile commerce, which offers a range of advantages to both businesses and purchasers. Ecommerce and mcommerce have different meanings, though both aim at making customers' lives easier. Simply put, ecommerce is an umbrella term for selling and buying online, while mobile commerce, or mcommerce, is a subcategory of ecommerce that focus on purchasing via mobile devices (Mathew, 2004). Despite their similar goals of buying and selling with the help of the internet, there are many glaring differences between ecommerce and mcommerce (Islam, 2011).

Mobile electronic commerce (mobile commerce), has gained prominence only recently, around the 2000s, along with the penetration of mobile devices. Research shows that M-commerce is now seen as a business tool that has a greater potential impact on business world than it ever had ecommerce in 1990-2000 (Rajnish, 2006). Unlike e-commerce, m-commerce allows users to overcome the limitations of location and fixed Internet (Urbaczewski, Valacich and Jessup, 2003). There are multiple areas for using m-commerce, such as: mobile banking, school mobile app, acquisitions, location-based services, information services, mobile advertising, mobile shopping etc. This

research intends to hence investigate design choices and considerations of an mcommerce application code-named "IBBUL SHOPRITE" using prototyping techniques.

Prototyping is a fundamental instantiation of an idea as area of the item advancement process. Blackler et.a 1 (2006) defined the prototyping system as the arrangement of choices that will be undertaken or made to achieve the development of the product. Prototypes fill various needs both from a business and a planning view point. Burner (2004) examined that businesses use prototypes to gather detailed client feedback on issues like style, ergonomics, and themes, and for marketing research and cost analysis. Prototyping is used by engineers to give gathering and get together data, to investigate structure incorporation issues and to create examination and testing strategies (Hall, 1999). In a few cases, prototyping is additionally used in the idea age phase of the blueprint procedure to push makers to either expand or get the arrangement of conceivable ideas (Jongerius, 2012). Clearly prototyping is an essential area of most framework forms. Prototyping procedures consolidate a combination of differing choices. In the broadest sense, prototypes can be either physical or virtual. Virtual prototypes can

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include computer simulation or engineering analysis.. Physical prototypes can be created either for a subsystem or for the entire system. Furthermore, physical prototypes can be either full size or dimensionally scaled and can be either totally useful or be made to show just inadequate usefulness .

It has been observed that students are sometimes in urgent need for money to buy different things which may be very important to them academically or otherwise. Some of them includes handouts, textbooks, clothes, shoes, bags, foodstuffs, or even payment of their school fees, departmental fees, various levies, etc. In such situations, the students may be willing to sell any of his or her property in order to get some cash to meet these needs which might even be very urgent to them. A mobile ecommerce application or website becomes very desirable Thus, we walkthrough the prospective users (students) and watch how they think about how it should be designed and what functions they should accommodate. The scope of this study is limited to software design preferences of user of a proposed mobile e-commerce application for Ibrahim Badamasi Babangida University Lapai(IBBUL) students. Thus the research had focused on the design of an android based online shopping app for IBBU Lapai students. The following were some of the aim and objective of the research:

- i. To identify design guidelines for designing prototypes for android application.
- ii. Create a low-fidelity prototype of an android application using low fidelity tools.
- iii. Create a high-fidelity prototype of the application that allow students of IBBUL to shop online conveniently even from the comfort of being at their lodge or hostel.
- iv. To evaluate the prototype with prospective users students.

METHODOLOGY

This section outlines the methodology for designing the IBBUL Mobile Shoprite. Different methods of data collection were employed by this study to obtain answers which were valid, reliable and relevant to prototyping. There are two types of Prototypes we employ to use,

- i). Low fidelity (Low-fi) prototype and ii) High Fidelity (Hi-fi) prototype.

Low fidelity: Low Fidelity prototypes are very communicative as all parties involved can be included (everybody can draw, no need to be a professional graphic designer (Fig 1). Low fidelity prototypes have no or little functionality, limited ability to detect errors. Example of low fidelity prototyping methods or approaches include, the use of pen and paper for sketches, wireframes,

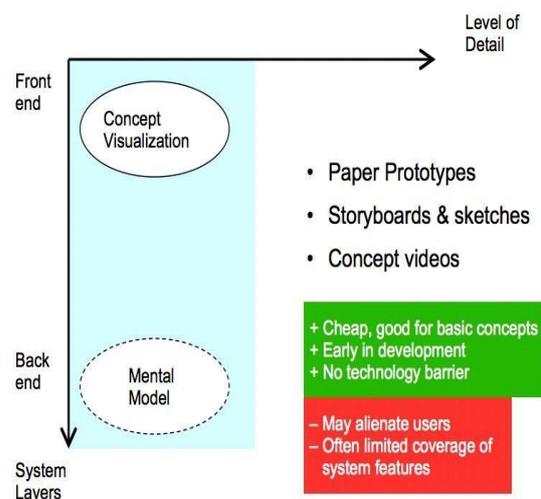


Figure 1.0: low fidelity prototype

(Design Research Society Biennial Conference, Sheffield, UK July 16-19 2008)

High fidelity: This are a more aesthetically appealing level of prototype that have great semblance with the real product. High-fidelity prototyping is used for testing details specific functionality or for designing more functionality, closer to the final product. They are easier to test, as users can interact with the prototype. However, this prototype is expensive and time consuming and thus it create reluctance to change (due to high costs) and in many instance the functionality might still be restricted.

Tools that can be used For Low and Hi-Fidelity Prototyping include Axure, Balsamiq, Mockflow, Appery.io, Pencil, Mockingbird, Wireframe Sketcher, Adobe XD and Marvel.

Tools Used For This Research

Paper and Pencil

This was the first low-fidelity tool used for this project, it was used for brainstorming and also for iterative design with some students of

Ibrahim Badamasi Babangida University (IBBUL).

Wireframe Sketcher

This is the second low-fidelity tool used for this project to further represent the already sketched interface which was formally represented with paper and pencil, with the wireframe sketcher, you can get a better conceptual view of the designs with addition of different colors, the sizes and also icons and they will be represented in form of images. Sketching is actually one of the first prototyping method that can be used at the beginning of any prototyping. It is the rough representation of ideas and proposed plans with paper and pencil. Sketch is very useful as an early step in prototyping techniques. Sketching prototyping is not so useful for identifying technical reliability, response times certain interactions: scrolling, if hand-drawn: colors, fonts etc.

Mock Plus

Mock plus is a low fidelity prototyping tool which has the capability of designing a user interface and also linking the various screens together i.e when you click an icon from your system it can link you to the next screen. This tool helped the researcher to further explain the functionalities of the proposed IBBUL Mobile Shoprite during series of interviews with IBBUL students.

Balsamiq

For the high-fidelity prototype, balsamiq was used which is a styling tool was used to style and enhance the design of the prototype and finally JavaScript was used to add functionality to the high-fidelity prototype. After which an intel SDK Was used to convert it to a hybrid Application.

The below algorithm illustrates the iterative process used to achieve the prototype of IBBUL Shoprite.

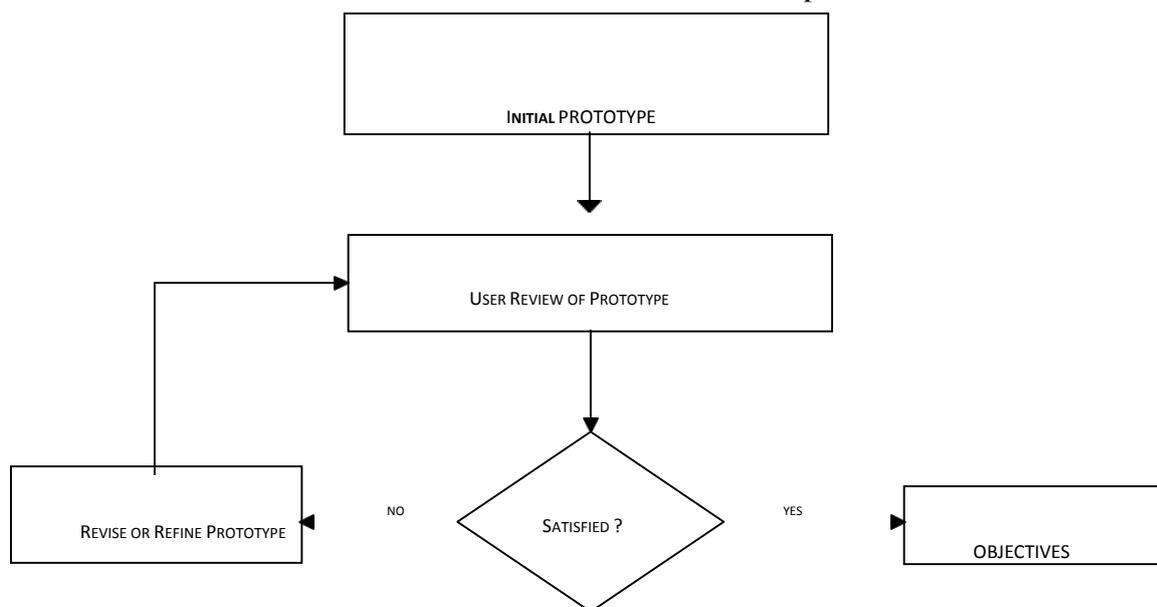


Figure 2: prototyping process

(Transactions on Computer-Human Interaction (TOCHI) 17.4 (2010))

Quantitative and Qualitative Research for Design

To expand on our findings and make more meaning to our prototypes, during the course of this work, we used mixed method was used. The methods used are:

- i. Interview (to obtain Qualitative information and sketch).

- ii. Questionnaire (to obtain quantitative information).

Interview (1) with IBBUL Students

Designing an android prototype for an educational or higher institution anywhere must always start by knowing what the students of that particular university actually needs in the proposed mobile application. Several interview sessions were carried out

randomly amongst students of Ibrahim Badamasi Babangida university (IBBUL). Find below, sample interviews and response of a particular participant available at:

Sample of interview and response:

- i. Name: Mubarak Ibrahim Usman (not real name).
- ii. Features you expect in the App: features that enables easy buying and selling.
- iii. Should the App be multilingual: No, English language is general and advised?
- iv. Any special Logo for the App: No, IBBUL logo is good enough.
- v. How many screens should the App have: 7 to 10 screens.
- vi. What is your choice color: IBBUL color (green and milk color)?
- vii. Should the App integrate with other social media: No, that is not necessary.

From the results gotten from this and similar interview above, the low fidelity and high-fidelity prototype was designed. Below is the various low fidelity prototype for the user interface for the IBBUL Mobile Shoprite.

Design Artefacts From Interview Session
The Splash Screen

The splash screen is the first screen that will display immediately you click on the IBBUL Shoprite it can also be referred to as the welcome screen, this screen will last for a maximum of five (5) seconds after which you will be directed to the login page.



Figure 3.8: splash screen

Login Screen

After the splash screen, the application re-directs the student directly to the login page which provides a platform where the students will be authenticated and verified with their

matric number and password. It also has a sign-up button below which enables you to register if you have no account yet.

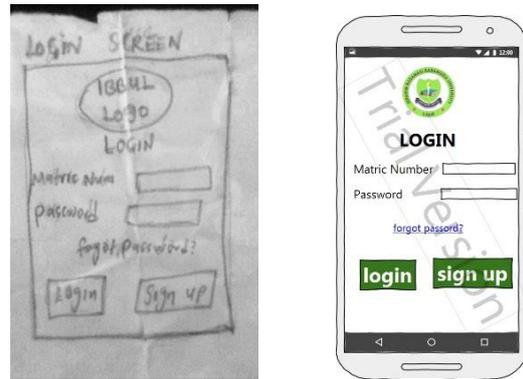


Figure 3.9 login screen.

Sign Up Screen

After collating responses from prospective users, they came up with their proposed sign-up page. From their design, you will be able to register so that you can have an account with the IBBUL Mobile Shoprite, on this platform you will required to enter your name, department, matric number, email address, and phone number after which you will click the register button beneath then you will have an account with the IBBUL Mobile Shoprite.



Figure 9.10 sign up screen

Home Screen

This is the screen that provides you the platform to buy and sell after you have been authenticated and verified that you are a student and you have an account. on this screen you will see a search platform where you can easily search for any available item using the name of the item, it also has a slide show below displaying the list of available items from different categories.

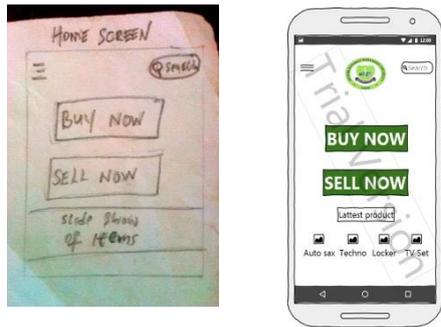


Figure 9.11: home screen

Profile Screen

In the profile screen, it contains all information about the student’s profile. A student will be able to upload or change his or her profile picture, through this platform also a student can change or edit their phone number and their email address.

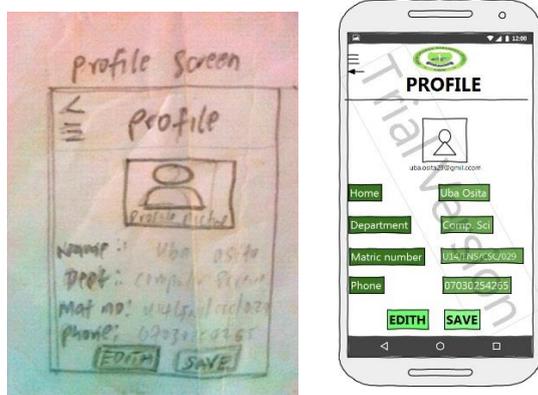


Figure 9.12: profile screen.

Sell It Page

This is the screen that enables you to sell any item you want to sell, on this screen is a camera icon when you click, it takes you direct to your phone gallery and camera then you can now capture/select the item to be sold and upload it.



Figure 9.13: sell it page

Buy It Screen

this screen displays all the available items on the list at that particular time. From this screen, students can select their choice item and purchase them by clicking on them.

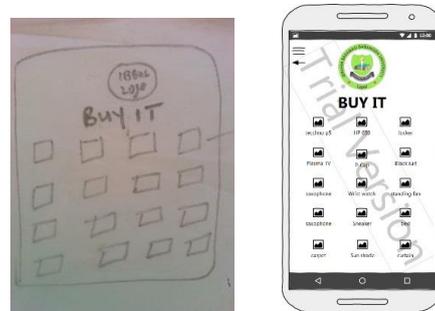


Figure 9.14: buy it screen

RESULT OF PROTOTYPING AND DESIGN QUESTIONS

This section is designed and aimed at the representation, analysis, and interpretation of various response gotten from the interviews and questionnaires. Percentage and frequency of each variable was calculated. 50 questionnaires were distributed to students from various faculties of Ibrahim Badamasi Babangida University Lapai. The data presented below is from the questionnaires that were administered by the researcher. The questionnaires were administered to undergraduates of Ibrahim Badamasi Babangida University Lapai, Niger State. The table below shows the result of the questionnaires..

Should the App be multilingual?

From the below statistics, 40% of students prefer the App to multilingual, while 60% prefer the App not to be multilingual but just English language.

Table 1: statistics of multilingual or English

Variables	Number of Respondents	Percentage
YES	20	40%
No	30	60%
Total	50	100%

Which orientation should the App have?

From the below statistics, 60% of students prefer the App to be in portrait while 20% prefer in landscape and while 20% prefer the both.

Table 2: Statistic of orientation type

Variables	Number of Respondents	Percentage
Portrait	30	60%
Landscape	10	20%
Both	10	20%
Total	50	100%

Should the App be used offline?

From the below statistics, 30% of students prefer the App to be used offline only, 40% prefer it to be online while 30% prefer the both.

Table 3: Statistic of offline, online or both

Variables	Number of Respondents	Percentage
offline	15	30%
online	20	40%
Both	15	30%
Total	50	100%

Do you want a special logo for the App?

From the below statistics, 30% of students want a special logo for the App, while 70% of students do not want a special logo for the App rather they prefer the IBBUL logo to be used for the App.

Table 4: Statistics of special logo or IBBUL logo

Variables	Number of Respondents	Percentage
YES	15	30%
No	35	70%
Total	50	100%

How many screens would you want the App to have?

From the below statistics, 40% of students prefer the App to have the range of 5 to 7 number of screens while 60% of students prefer the App to have the range 7 to 10 number of screens. So, considering the highest

number of statistics, the App was designed to have the range of 7 to 10 number of screens.

Table 5: Statistics of the number of screens

Variables	Number of Respondents	Percentage
5 to 7	20	40%
7 to 10	30	60%
Total	50	100%

What color do you want the App to have?

From the below statistics, 80% of students prefer the App to have IBBUL color while 20% of students disagree with the App having the IBBUL color, sob following the highest number of statistics, the App was designed to have the IBBUL color.

Table 6: Statistics for color combination

Variables	Number of Respondents	Percentage
YES	40	80%
No	10	20%
Total	50	100%

Should the App integrate with another social media App?

With the below statistics, 60% of students prefer the App not to integrate with other social media like Facebook, WhatsApp, and twitter. But 40% of students prefer the App to integrate with those social media. Following the highest number of statistics, the App was designed not to integrate with other social media platforms.

Table 7: Statistics for external integration

Variables	Number of Respondents	Percentage
No	30	60%
YES	20	40%
Total	50	100%

DISCUSSION

From the result of the research that was carried out, the response from the participants clearly states that students prefer the App to be just English language and not multilingual (see

Table 1). Elaborating this point during the interview, some participants clearly stated that the App shouldn't be multilingual because the App is been designed for an educational community and thus vernacular should not be encouraged. Also, from *Table 2*, from the statistics, it is clear that students prefer the App to be in a portrait orientation. Students also prefer this App be accessed online from the result shown in *Table 3*, students also prefer institution logo to be used as it adds trust to the application as can be seen in *Table 4*. Students also want the number of screens to be between the range of 7 to 10 as can be confirmed in *Table 5*, this is to make the App less complicated and more user friendly.

Conclusion

Prototyping is simply an act of designing a throw away version of a system which is not the real entity but looks like the real entity. The purpose of this study is to co-design a prototype of an Android Application which will enable the students of Ibrahim Badamasi Babangida (IBB) university to shop online otherwise known as an mCommerce application. Prototyping this application enable the researcher analyze the design requirements for building this application together with prospective users. The result of the study also shows how interesting and user friendly the co-designed is perceived to become.

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