**RESEARCH PROPOSAL** An M-payment system for efficient college fees payment and tracking

**BY**

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**Declaration**

I declare that the work that went into the preparation for and presentation of this research proposal document is original and has not been submitted before to Zetech University for the award of a Diploma in Information Technology

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# Abstract

The primary focus of this research paper is to propose a mobile solution for Zetech university fee’s payment system. Students of the colleges have been paying all their fees such as tuition fees, hostel fees, mess fees and other college-relevant fees manually while waiting in the long queues waste not only student’s precious time but also the college management’s time. Due to this, colleges have to maintain all the information regarding the fees manually into their databases. This paper proposes to build an android application that will give the students a freedom to pay their fees from anywhere, anytime, 24x7. Although college can provide a particular time constraint for that. This android application serves as a more reliable and effective means of paying college fees and removing all forms of delay and stress that is involved in the manual system of college fees processing.

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# Abbreviations and Acronyms

**M-Payment: Mobile Payment**

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# CHAPTER 1: INTRODUCTION

# 1.0 Introduction

Mobile money services are being deployed rapidly across emerging markets as a key tool to further the goal of efficient payments in private and government institutions. New technologies and digitalization of life are shaping the ways of doing business as well as the behaviors of consumers. Finding opportunities in the dynamic business scape and benefiting from them using new technologies is a major area of focus for organizations in creating value. In this new digital era, mobile devices have become one of the most prominent consumer products ever to be launched.

These devices and the services provided by them rapidly became basic necessities of daily life throughout the world. The increasing popularity of the mobile devices around the globe may be attributed to their omni-present access to a wide-range of services (communication, access to information, entertainment, or commerce). Mobile devices create value in a multitude of dimensions for their users. Another trend emerged with the increasing mobile device adoption is the move towards mobile devices in accessing the Internet. The mobile traffic is replacing desktop reach as indicated by a research by ComScore (2014), 60% of the consumers in the U.S. prefer mobile devices as their primary method of Internet access. Another indicator of the increasing importance of these devices is the finding that 65% of the emails are opened on mobile devices (Burdge, 2014). These changes in behavior revealed by the aforementioned statistics from developed countries have also been spilling over to developing countries. For instance, in Turkey 28.4% Internet page views originated from mobile devices as of June 2015, and time spent on mobile devices increased by 115% annually between June 2015 and 2014 (IAB Turkey, 2015).

Increasing adoption of mobile devices and e-commerce led to the emergence of m-commerce. Use of mobile devices for buying products and services is getting more common every year. According to a research on 3,000 retailers by Criteo in 2015, mobile devices accounted for 31% of e-commerce transactions in the U.S. (that corresponds to a 15% annual increase) and half of the transactions in Japan and South Korea (Criteo, 2015).

Within this context mobile payment can be defined as ‘‘payments for goods, services, and bills with a mobile device such as mobile phone etc. by taking advantage of wireless and other communication technologies’’ (Dahlberg, Mallat, Ondrus, & Zmijewska, 2008). A similar definition by Pousttchi (2008) highlights the initiation, authorization, or completion processes of payment via mobile communication techniques and devices.

According to the Oxford Dictionary of Current (6th Edition), the fee is defined as an amount of money that one pays for professional services. Simply put, the school fee is that fixed interval payment made by a student or students to the school he or she attends. From the definition, one can outline that school fee payment is supposed to be in a regular interval that is timely, although some time may not be that ready by the student due to some financial lapses. Financial lapses pose a lot of problems to school management because of some pressing needs. However, when students refuse to pay their school fees on time the school management seems to lack money in the purse which at this render the management ineffective.

Apart from the management being ineffective financially, students also face barriers by not being allowed to write their examinations which is one of the academic frustration or setbacks. Applying systems development principles with a focus on automating this payment necessitated this research to help solve this problem. Creating a platform for individual students’ fees indicating name, department, registration number, level/class, date of payment, amount of money paid, academic session/semester/ bank’s name, account number, phone number, school name, and other personal records, etc. This will enhance prompt payment and safe delivery and automatically stop the management and students from being frustrated financially and otherwise. The key stakeholders in this payment system will be the school student finance department, the college ICT department, the university administration at large, the students and the representatives, the bank or money platform for example Mpesa or Airtel Money.

The current system of cash payment or paying through the bank has weaknesses. There is a disconnect between bank and college and hence monthly reconclliations are to be done. There is high cost of multiple recipts, there are high chances of corrupt practices and poor management processes. The advantages pointed out in their study included accountability and Transparency, Easier and convenient transactions, reduction in physical money circulation. (Roopadarshini & Lakshminarayana, 2018). According to Kumari and Khanna (2017), the easy way of conducting financial transactions is the key motivator towards going digital. Mobile money payment services have so many advantages that were not available in the traditional way of payments and transaction. According to the author, well-known advantages are privacy, integrity due to easy of tracking transactions, good transaction efficiency as a result of elimination of time spent counting and sorting cash, appropriateness, convenience, low financial risk of carrying cash and also money laundering is reduced.

With the noted high growing inclination of mobile money services adoption by learning institutions, it is important for institutions to encourage and promote full adoption of this mode of payment in order to reduce high queues of students paying their fees over the bank counters. To see to it that mobile money payment services succeed, there is need to have a well laid down infrastructure for both users and service providers. For the users, they need to apply for the service from the service provider after making sure that they have a reliable network. The service provider will then organize training to the personnel who will run the mobile money payment platform and later deliver the portal to the user (Safaricom, 2018).

Zetech University launched an M-pesa Pay bill number years ago to help students pay their fees conveniently via their mobile gadgets. This was also aimed at making fee receipting very easy and prompt since it is a real-time kind of transaction. This can be iproved by having a unviversity based M-Payment App. Lonie (2007), Biljon and Kotzé (2008) as cited by Kithinji (2016) while researching on factors influencing adoption of mobile money payment services among institutions of higher learning in Kenya pointed out that formal financial industry in Kenya has structural weaknesses because most of them are concentrated in urban centers, and with them there are conditions that make them unfavorable to those in rural areas.

# 1.1 Problem Statement

According to Osewa (2018), mobile payment services make life easy due to advantages of it being an easy to user service, good service for the unbanked and that the service can easily be accessed by the poor rural population. Frydrych, Scharwatt and Vonthron (2015) found out that Cote d'Ivoire is among the first countries that have taken up mobile money payment system as a medium of paying school fees, tax collections, healthy services and official documents to the Public institutions. The researchers noted that the school registration fee payment has worked well due to the efforts by the Ministry of National and Technical Education of Cote d'Ivoire as a result of digitizing students’ records since 1998. The researchers further stated that before, the country`s all fee payment was done by cash which was vulnerable to theft, security issues and even bribery.

Given the many advantages of mobile payments and now coupled with the advent of Covid-19, it is paramount for higher learning institutions to reduce contact-based sercives. These include money and receipting services provided.

This paper proposes an application that is built on the Android framework for Zetech University. This application is compatible with all the versions of Android OS above Lollipop(v5.0). It focuses on the problems that are faced with the payments of fees offline and overcomes them by providing an easy and simple to use an application to do the same. To overcome the problems of manual fees payment system we propose an android based application that is, even more, easier than the web-based solution. The web-based system needs to have a computer system or even if used via mobile

it's not that user-friendly, whereas, with the Android application it's easy to treat users with more personalized experience. The application provides more user-friendly experience than the web-based system of fees payment. The web-based system allows the students to pay only their college fees but the proposed application provides the students with an option to pay any kinds of college-relevant fees whether its mess fees, hostel fees or even stationary related fees. The application provides the user to have a personalized experience.

# 1.2 Objectives of the study

The main objective is to develop An M-payment system for efficient college fees payment and tracking

**Specific objectives**

1. To find out the perceived ease of use of M-payment app by users
2. To assess the perceived compatibility of M-payment app with the existing system
3. To investigate the perceived security concerns from the users
4. To review the existing system used in paying university fees so that its strength and weaknesses are identified.
5. To design a new system that enables students and their sponsors to pay university fees online from wherever they are using credit and debit cards.
6. To implement the prototype of the designed system.
7. To test and validate the system prototype.

# 1.3 Significance of study

Offer the public the means to digitalize their money thus making the paying experience simpler, safer and faster. Offer universities the chance to modernize their services and maximize the their efficiency. Automation isn’t just about saving time or money. Done well, automation reduces errors, increases employee satisfaction by freeing staff from tedious tasks, improves the customer experience, and allows you to scale up.

Automation also forces users to address hidden problems in your processes that are normally handled by staff working around the process. That kind of routine exception handling greatly reduces employee productivity. Automated systems are also self-service systems; automating the most common tasks in a process will free up time for staff to spend on more nuanced problems that require judgment. Automating school, the transaction will lead to convinience, speed, security, productivity and transparent financial process.

# 1.4 Limitations of the study

The limitation of the study may include the sample used but the researcher will apply tested methods. The second limitation may be lack of data or accuracy of data based on the data protection rules.

# 1.5 Scope of the study

The study will be carried out in Zetech University with intend to offer an extra channel for fees payment, through the development of a secure online fees payment system. The study will focus on the development of a mobile based system that allows secure online fees payment for Zetech University. The system will be used by students and their sponsors to pay all kinds of university fees through the app, and by university accounts offices to verify students‟ payments. The

system captures financial information after payments are made. The research will be carried out between September and December 2021.

# CHAPTER 2: LITERATURE REVIEW

# 2.0 Introduction

# 2.1 Global literature review on the topic

According to the World Mobile Applications Market - Advanced Technologies, Global Forecast

(2010-2015) there were about 6.4 billion (free, paid, and ad supported) applications, that were downloaded in 2009 alone which generated revenues of $4.5 billion in the same year. Apple ruled this market with 2.5 billion downloads from its store in 2009. Later, other market players like Android, Google, and Nokia have started creating a marketplace for themselves in the mobile apps field with the emerging smart phone market.

Mobile payment systems around the world haven’t reached mass adoption however in certain developed countries they are used by a significant portion of active mobile users. According to a report from 2011, 33% of active mobile users in Japan have used their mobile devices for payment in the last six months (Vodafone, 2013). A more recent report by Capgemini forecasts an annual growth of 60.8% through 2015 as mobile devices have become common devices for shopping online. Nearly 80 million U.S. consumers, which corresponds to half of digital buyers in this country are expected to make purchases using mobile devices (Capgemini 2015). Forecasts mobile payments in the U.S. to reach 142 billion US$ by 2019 up from 52 billion US$ in 2014 (Carrington, 2014). The increasing popularity of mobile payment systems in developed countries is expected to reflect into developing countries. In fact, the mobile payments in China increased by 170% and reached 4.5 billion transactions in 2013 according to Capgemini (2015).

As Americans embrace mobile money payment system, India has not embraced the service fully. Roopadarshini Lakshminarayana (2018) noted that, although the Indian policies and development in technology has made cashless system very possible, most Indian citizen have not adopted it. The researcher stated that because not every conceivable use of money today has equivalent digital or methods of purchase could be the reason behind low uptake of the technology.

In an analysis of impact of online payment systems and ecommerce in China Osafo-Kwaako, Singer, White and Zouaoui (2018) noted that with the growing of science, mobile technology, computer as well as network technology, mobile money payment has become a routine in human life. The researcher noted that mobile payment has and advantages of reducing paperwork, transaction costs and even labour costs.

Chen, Chen, and Carpenter, (2018) did study on why individuals in China use mobile money payment. In their study, it came out that there were cost advantages in using mobile money payment technology. The interviewees gave two major advantages of the mobile money payment services. First, they talked of discounts they receive especially from major money payment companies like Alibaba and Ten cent. Secondly, there are no transaction costs for money transfer.

According to Cozzarin and Dimitrov (2016) in their study of investigating whether perceived risk affects e-commerce in Canada, found out that perceived risk was very important for e-commercein both mobile users and personal computer (PC) users.

Davies (2017) while researching on university students` perceptions towards cashless financial transaction in the United Kingdom found out that student had a higher preference in paying their fees by electronic form simply because they had the perception that there is no additional risk over cash. The researcher also attributes the embracing of the mobile money payment services to age and generation.

# 2.2 Regional literature review

In Coted’lvoire Côte d’Ivoire’s government has benefited from the digital payment system in two main ways. Firstly, the payment of school registration fees via mobile money has drastically reduced lost payments, fraud, and theft. According to local stakeholders, a large proportion of school fee payments were lost when school fees were paid in person with cash, and armed robbery at local cash collection points was common. Mobile money has also reduced the cost and administrative burden of managing cash, and the risks associated with it. For secondary school students and their parents, using a mobile phone to register for school and pay registration fees has a number of advantages. Firstly, it is more convenient because registration can happen at

any time and from any location, as long as there is a positive balance in their mobile money account. Before, students and parents had to stand in long queues, spending significant amounts of time away from incomegenerating activities, to submit paper registration forms and cash payments. Secondly, the service is also more transparent. The parent receives an SMS receipt of payment including a unique reference code. Using this code, parents can print out a paper receipt from the official MENET website. This confirms and guarantees their child’s registration. The penetration of mobile technology, especially mobile money services, has enabled all schools in the country—even those in the most remote areas without electricity—to benefit from the power of the digital economy. Students are now able to register for school more efficiently, and school registration fee payments can be collected earlier and in full.

Research by Baganzi and Antonio (2017) on examining trust and risk in mobile money acceptance in Uganda indicated that the adoption of mobile money payment systems has gradual acceptance. In this study 62% of respondents had done at least a mobile money payment transaction within a year.

Braniff (2017) in his study on why Schools in Africa aren’t taking advantage of mobile money payment services noted that 99 percent of Secondary schools registration fees in Cote d'Ivoire are via mobile money. The same study reported that Uganda is among countries that have highest mobile money activities. However, the use of mobile payment system has not picked up as expected. The schools and learning institutions have not embraced the idea of settling school bills and fees through mobile phones. It went on to emphasize that by using mobile money payment services, Ugandan parents will have a faster and cheaper process of fee payment without even leaving home.

Koloseni and Mandari (2017) in Tanzania on investigating the reasons behind the continual usage of mobile phone payment services found out that although satisfaction towards mobile money services is determined by both perceive trust and cost, only perceived trust influences users’ adoption of mobile money services more than perceived transaction cost.

# 2.3 Local literature review

Mobile money services were introduced in Kenya as early as 2005. The main Mobile Network Operators (MNOs) in Kenya are Safaricom, Airtel and Telkom Kenya with M-Pesa, Airtel money and Orange Money respectively as mobile money payments platforms. Key statistics from Central Bank of Kenya indicated that by the end of March 2014; there were slightly an above twelve million mobile money customers, thirty million mobile money transactions par day and one ninety two billion six hundred mobile money transactions per month. The statistics also show that within the same period, twenty-six million two hundred thousand accounts had been registered on mobile money platforms (Central Bank of Kenya [CBK], 2017).

Communications Commission of Kenya [CCK] (2013) report showed that Kenya is leading in the world in mobile money-related services. Out of the thirty-onemillion, thirty-one thousand mobile subscribers in the country, 83% translating to twenty sixmillion and two thousand users use mobile money services. These include utility bills payments, school fees settlement, making supermarkets and in-store purchases, M-ticketing, doing phones top up, ATMs withdraws, sending money from forty-five countries abroad to home.

A good number of institutions in Kenya have now been forced to embrace the “LIPA NA MPESA” service being provided by Safaricom. Safaricom stands out as the largest mobile phone service provider as indicated by customer base study done by Communication Commission of Kenya (CCK, 2013). Learning institutions have adopted mobile money services in their fees collections and payment of bills; businesses entities, governmental organizations and Non-Governmental Organizations are using it for cash transfers, procurement and salary payments.

Some of these institutions are Kenya Electricity Generating Company, Machakos Institute of Technology and Nairobi Institute of Technology whose Mobile Money Payment Platforms are hosted by M-pesa on pay bill numbers M-PESA 929510, 906 650 and 900 175 respectively (Safaricom, 2018b). Apart from M-Pesa pay bill number 168633 for Strathmore University, the institution also has M-Karo by Co-operative bank which facilitates Mobile Money fee payments (Strathmore University, 2018).

Wasunna and Frydrych (2017) in their report on Person-to-government (P2G) payment digitization, with focus on lessons from Kenya noted that Kenyan government after realizing the need for cheap and efficient transaction in services delivery, it opted for a partnership with the MNOs. This gave birth to Persons to Government (P2G) payment system which was aimed at enhancing accountability, improved collection of revenues and traceability.

According to Wambua (2014) in his study on the effect of mobile money transfer services on financial deepening in Kenya, it was found that although mobile money payment services provided the convenience,flexibility and reliability required by the low-income earners, it significantly failed to come up with relevant structures that would foster discipline and low transaction costs in particular for low-value transactions.

# 2.4 Summary and conclusions

In this chapter, mobile money payment services adoption is reviewed. Several studies on the adoption have been reviewed as indicated in the specific objectives of the study. From the reviewed literature, it is clear that mobile money payments services have revolutionised the way payments are done. Even though several findings indicated there are perceived risks, the adoption of the service is encouraging. The reviewed literature did not differiantiate between mobile payments based on paybill or till numbers and that based on mobile apps.

# CHAPTER 3: METHODOLOGY

# 3.1 System Development Techniques, Methods and Tools

# 3.1.1 Techniques

Agile Software Development Methodology is widely used in many projects as it has many advantages. After gathering the project requirements, it is reviewed frequently in the form of small iterations and made into action by executing it. After completing tasks each iteration, it could be reviewed properly and moved to next iteration. The main advantage of this methodology is that we can change the requirements or design even in the middle of the project when the situation arises. Also, code maintenance is easier in contrast to Waterfall Approach. In Waterfall methodology, there is no flexibility in changing the requirements when we develop the project because we must understand the working flow of the project at least 80% even before the start of the project and work according to that. Only if the design process is done, we can move to construction, testing, and support. Though this is not a team project, I have approached this project using agile methodology by applying its principles.

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**Figure 1: The Agile software deveopment method**

# 3.1.2 Methods

As the project is developing an Android Application, the default programming language is Java. All Android applications are built using Java in Android Studio or Eclipse or both. Java is a popular and widely used language throughout the world. As mentioned in, Java is one of the powerful programming languages like C, C++. developed by Sun Microsystems which has many powerful features. The language is also easy to learn, understand and implement. Java is used in various kinds of applications like Web, Desktop, Mobile, and Big Data. Many powerful features are supported by Java including various libraries, application services, graphics library for 2D/3D applications. The language is flexible enough to maintain code complexity, test,

implementation, integration and support.

# 3.1.3 Tools

Android Studio is exclusively designed for developing Android applications. It consists of all Android SDK tools to design, develop, maintain, test, debug and publish our app. The IDE is designed very efficiently which makes the developer’s job easy. It also supports the IntelliJ IDE, the main idea behind this IDE is that it automatically senses the variables, methods, classes, built-in functions or it could be anything else when we press the first letter of it. Other main tools include Android SDK, ADB, and Gradle Build.

One of the main tools used in developing android applications, as it packages many core features into one SDK and it can be used in the application easily. This helps us to avoid writing lot of code, and building applications faster. Android SDK uses ADB tool as a connection device which allows us to connect the Android Devices or Emulator with the machine via USB. After developing or while developing applications, we can connect with the device to check how the application runs. Later, we can debug and run the applications.

Gradle Scripts are the recent feature that is added to Android Studio. It is basically an automated build system which is used to automate the various phases involved in designing an application that includes design, development, test, debug, and publish. We need to configure the project and modules by mentioning all the supported jar files, SDK’s, version name, level, compiled SDK version, build tools version. to ensure that the developed app is compatible with the testing device/emulator.

# 3.2 Design & Prototopes

Prototyping is necessary for any project to plan the testing phase and decide the scope of the project. Test plan involves collecting design specifications about the project, wiring test cases, executing them manually or automatically using automated testing tools. Testing any application is highly important. Test plan is a method of documenting the test cases, specification plans and other basic level details about how the application works. Test Activities for this project includes various testing like: black box testing where sample test cases are written and manual testing

is done to check the functionality of the application. White box testing, once the application meets the user requirements and functionalities according to the test cases, its internal logic are completely tested to ensure that the application does not have any logical errors or issues. Integration testing, after testing the modules individually, tested them by integrating all the sub modules, modules into one application.

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**Figure 2: System development**

# 3.3. Coding

The objective of the coding phase is to transform the design of a system into code in a high level language and then to unit test this code. Code walk through is an informal code analysis technique. In this technique, after a module has been coded, successfully compiled and all syntax errors eliminated. A few members of the development team are given the code few days before the walk through meeting to read and understand code.

# 3.4 Testing plan

Testing a program consists of providing the program with a set of test inputs (or test cases) and observing if the program behaves as expected. If the program fails to behave as expected, then the conditions under which failure occurs are noted for later debugging and correction.

# 3.5 System requirements analysis – Functional Requirements

To deploy this system, students must first create an account with the school registration number on the school website students’ account management portal. This management portal is linked with the payment software running on a cloud server and accessed through the networked computers at the bursary office.

The operation of this automated payment system will begin when students go to the bursary with their debit cards (having been credited at their bank). Students will log in to the system and fill the details of their payments. At checkout, they will use the Pos (or any online payment processing). Details of the transaction are automatically backup on the server and forwarded to the student account management portal on the school website. Personnel working at the bursary office shall be trained to manage the payment software and assist students during payments, while the ICT company that provides the software sees to its upgrade and maintenance.

The registrar, Heads of departments, and Deans shall have a limited authorization to access the financial status of students. The Bursar and Vice-chancellor shall have the full authorized access into the system. The payment software will manage the school financial accounting, keeps track of students’ payment status, and perform routine audits.

# CHAPTER 4. WORK PLAN AND BUDGET

# 4.1 Summary and Conclusion

There is a need for a system that eases the life of students in case of fees payment. This application eliminates all those unnecessary steps that were required before such as standing in long queues of the banks, standing in long queues in college to submit the receipts. This approach provides an efficient solution to all those problems. Of course, the application can later be extended for different purposes related to the college administration and various other activities but currently it is limited to just paying the fees and related levies.

* 1. **Recommendation**

The university should adopt a mobile payment app to ease the payment procedures of fees. Moreso, with the increase in mobile phone usage it will be important for the university to move with the dynamic technological environment. Another important factor is the adoption of safe payment methods that reduces human contact in the face of Covid-19 cases.

# CHAPTER FIVE: REFERENCES, BIBLIOGRAPHY AND APPENDICES

# REFERENCES

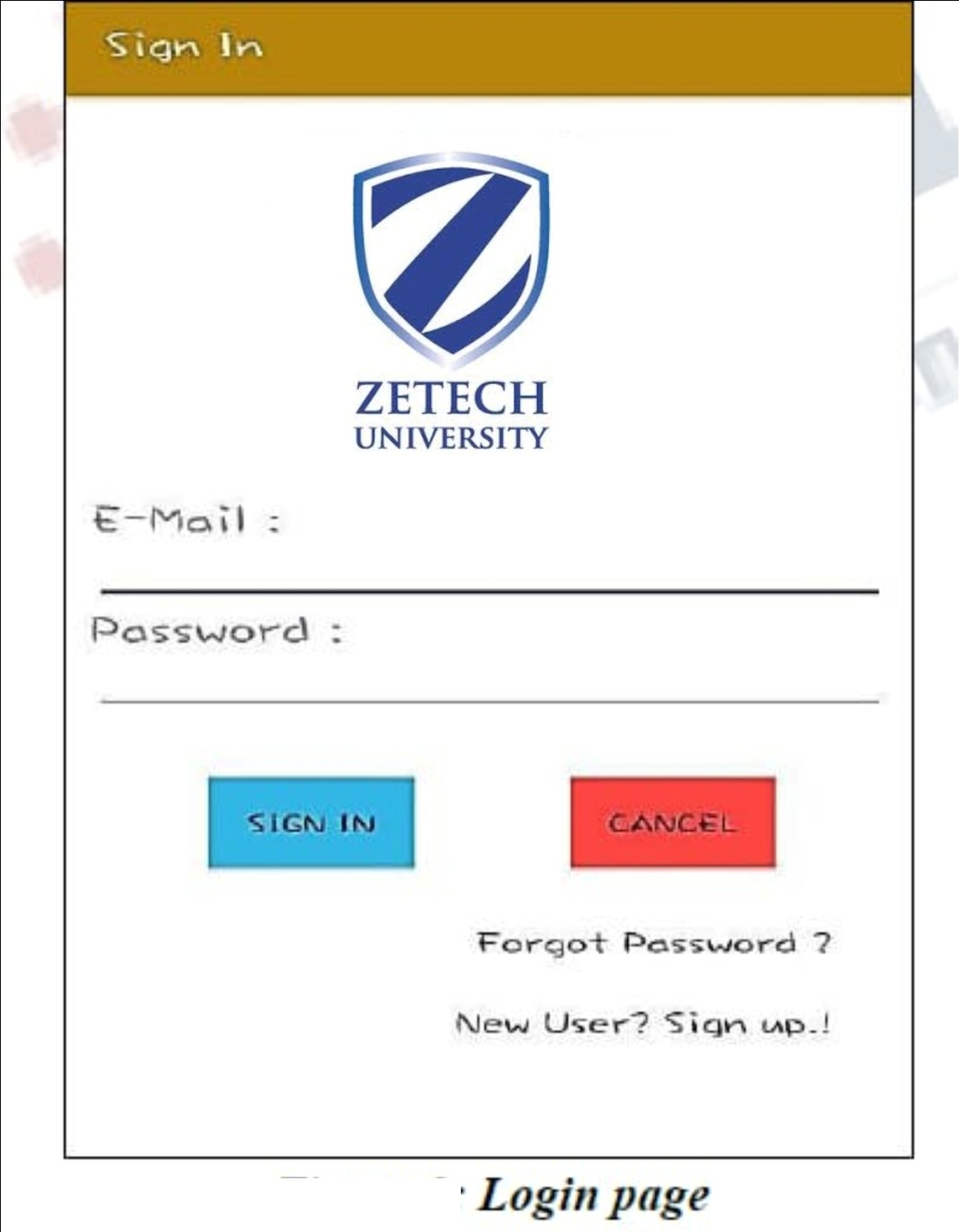
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# APPENDIX

# Appendix A: Gantt chart (Project Schedule)

|  |  |  |  |
| --- | --- | --- | --- |
| **ACTIVITY** | **SEPT** | **OCT** | **NOV** |
| **Problem Identification** |  |  |  |
| **Review of Literature** |  |  |  |
| **Preparation of Research Proposal** |  |  |  |
| **Prototyping and testing** |  |  |  |

Visual Appearance of the M-Payment App

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As shown, it is the first page of the application. The user has to enter the email id and the password in order to log in. If the user is new then they have to enter their full details in order to register.

****

When the user choses the payment option they will get the order ID and the page will get directly transferred to the payment gateway. As shown on the payment gateway page, they can choose the mode of payment and even change the language according to their comfort.

****

Through this the admin can have control over the user’s data. All the registered user’s data will be stored here.

****

The below, is the instant search which helps in finding whether the item is available in the datadase or not. This could help the users in saving time by searching for the item. ****