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DESIGN AND IMPLEMENTATION OF ONLINE COLLEGE FEES PAYMENT SYSTEM FOR STUDENTS OF ABIA STATE COLLEGE OF EDUCATION (TECHNICAL), AROCHUKWU

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Abstract

Presently, Students of Abia State College of Education (Technical) Arochukwu have to go to bank and pay their school fees. This mode of payment makes students to waste time that they could have used in engaging in meaningful academic activities. To this end, the researchers set out to develop an online school fees payment system that will solve this problem and more. The online school fees payment was designed and developed after data collection and analysis .The developed online school fees payment system will enable Students to pay their school fees in their comport homes through an e-payment gateway(Remita). The Online school fees payment system was implemented using html, PHP, CSS and Javascript web technologies. Admin using the developed online payment system can add, view, update, delete and print students' payment records. Students on the other hand can view and print their payment receipts. Visitors however can only view information about the College and contact information respectively. The developed system was tested by some staff of the College using real data. Thereafter, a questionnaire designed to measure user's satisfaction with the use of the developed online payment system was administered to the staff of the College. The data was then collected and analyzed. The result of the analysis shows that the evaluators are satisfied with the performance of the developed online school fees payment system. Furthermore, the evaluators recommended that the developed school fees payment system can be used by the College for purpose of school fees payment.

Keywords: School fees, School fees payment, Online payment, Payment gate ways, Abia State College of Education (Technical) Arochukwu

1.0 Introduction

Students of Abia State College of Education (Technical) Arochukwu (ASCETA) pay school fees on yearly basis. Students' school fees payment is therefore part and parcel of the College activity. The mode of payment of College fees such tuition fee, examination fee, accommodation fee among others in ASCETA involves students paying fees into designated banks and thereafter they bring their tellers to the College for conversion into official receipts. Although this mode of payment is effective, but students waste time during payment of school fees in bank as well as during the conversion of their bank tellers into official receipts that could have been used in pursuing other academic activities. With the present mode of payment, students cannot pay their school fees from anywhere and at anytime. Furthermore, the College spent some money in printing papers related to school fees payment. It is these reasons and more that many educational institutions are now turning to online school fees payment system.

Online payment is a paperless monetary transaction conducted over internet where electronic money is debited from buyer's account and then transfer into Sellers's account for exchange of goods or services. Lowry, Wells, Moody, Humphreys and Degan (2006) defined online payment system broadly "as the means and processes involved in conducting transactions online; however, this description can be expanded to include the online monetary connections between sellers, buyers, financial institutions, and intermediaries". This definition implies that online payment system is associated with five major actors, namely, buyer, buyer's bank, seller, seller's bank and intermediary. The intermediary is a third party responsible for debiting money from customer's account and crediting merchant's account. The debiting, transferring and payment process is done in real-time by third party interface between the two banks. Third parties are also referred to as *e-payment gateways*. Nira Academy (2017) describe payment gateway as a software application that

payment service providers use to process payments for online purchases, originating on a merchant's website. It acts as an interface between the merchant's website and a payment- processing bank, known as an acquirer.

There are numerous types of third party payment processing agencies (e-payment gateways). This includes Net Bank, PayPal, Google Wallet**,** Amazon Payment, Authorize.Net, Wechat Wallet, Stripe, WorldPay, and AliPay among others. Nigerian e-payment gateways on the other hand include Interswitch, Voguepay, Paystack, GTpay, SimplePay, PayU, E-Transact, Paga, GlobalPay and Remita among others**.** These online payment gateways are trustworthy, effective, efficient and reliable.

There exist several electronic (or online) payment systems. Such systems (methods) are classified in different ways by different scholars. However, this project adopts the classification made by Anderson (1998). Anderson according to Sumanjeet (2009) classified electronic payment systems into online credit card payment system, electronic cheque system, electronic cash system and smart card based electronic payment system. In credit card payment system, credit cards are used as online payment tools. Electronic cheque contains all the information that is found on an ordinary cheque, but it uses digital signature for signing and endorsing and has digital certificate to authenticate bank account (Kaur & Pathak, 2015). In electronic cheque system, electronic cheques are used as tools for making online payments such shopping payments. E-Cash or Digital cash is an example of a digital currency, where it allows people who do not have credit card to shop online (Acosta,2008). Smart cards according to Sumanjeet (2009) are essentially credit card sized plastic cards with the memory chips and in some cases, with microprocessors embedded in them so as to serve as storage devices for much greater information than credit cards with inbuilt transaction processing capability.

Online payment systems have advantages as well as disadvantages. Yang (2017) stated that online payment systems are more convenient, fast, efficient and economical when compared with the traditional payment system. Ogedebe and Babatunde (2012) posited that e-payment or online payment eliminate opportunity for corruptive tendencies and improve quality of reporting system in the Nigerian public sector. However, despite the advantages of e-payment and online payment systems, they are not effective and efficient in Nigeria due to numerous challenges facing their operators. Such challenges according to Ogedebe and Babatunde (2012) include , lack of uniform platform by Banks and MDAs, lack of adequate infrastructures , lack of seriousness by Banks, resistance to changes in technology among customers and staff and security in terms of platform, hackers and virus attacks. However, Government and private sector are making concerted efforts in addressing these challenges. Such efforts have yielded positive results as volume of e-payment and online payment is witnessing exponential growth. E-payment and online payment are now ubiquitous in Nigeria. Online payment system is now use as part of electronic banking system, electronic commerce (e-commerce), online shopping payment and as a platform for payment of school fees in Universities and Colleges.

Development of online platforms for payment of school fees in Universities, Colleges and Schools in Nigeria and around the world in general is receiving greater attention in the past three decades. Computer Scientists have developed a number of e-payment or online payment systems for students' school fees payment and other related matters in Universities, Colleges and Schools. For example, Umoh, Ele, Ele and Obono (2018) developed an enhanced e-payment system that enables students of the University of Calabar, as well as their sponsors to securely pay fees online using valid credit and debit cards. Lwanga (2014) developed online fees payment system for Makerere University. Rachitha, Aishwarya, Gupta, Kumar and Parasher (2018) developed an Android-based college fees payment application. These fees payment platforms remove delays and stress associated with manual systems of school fees payment.

In view of the numerous advantages of online payment system mentioned above and the effectiveness of the online school fees payment systems developed in various Universities, Colleges and Schools , the researchers set out to developed an online payment system with which student can use to make school fees payment at anytime and at anywhere.

2.0 Problem Statement

Presently, fresh and continuing students of Abia State College of Education (Technical) Arochukwu pay school fees by first making payment into College bank accounts and there after bring the bank teller to the bursary department for conversion of the teller into official receipt. With advent of corona-virus, students

stand risk of contacting corona-virus during making payment in the bank. The process of payment of school fees in banks consume student's time that could have been used for other academic activities and endeavours. Although with the present mode of payment in the college, student can pay school fees from any branch of the banks selected by the College for students' school fees payment, but payment of school fees cannot be completed until student visit the bursary department and convert the bank teller into College official receipt which also consume students valuable time. Furthermore, with the present mode of school fees payment, student can only make school fees payment within official working days and working hours as banks and the College services are not available on certain days and times within days. In addition, the present mode of payment is stressful as students pass through many stages before completing school fees payment process. Furthermore, students have to pay transportation money when going to the bank for school fees payment. To reduce the stress, save students valuable time and reduce the risk of contacting corona-virus, the researchers proposed an online platform that will enable students to pay school fees from their comfort homes thereby reducing the problems enumerated above.

3.0 Objectives of the Study

The objectives of the study are as follows:

1. Determine the online payment system requirements
2. Design the online payment system
3. Develop the online payment system
4. Test the developed online payment system
5. Determine students' satisfaction with the performance of the online payment system

4.0 Literature Review

This section first discusses types of payments, namely physical and electronic. The section also describes online payment system as well as some Nigerian payment gateways. The section ends with review of some online payment platforms developed for payment of school fees.

Online Payment Systems

The concept of payment existed for several centuries. Saxena (Udated) defined payment in commercial context as "any exchange of value between two parties, where usually Party A offers a form of currency in exchange for a good or service provided by Party B". Payment is heart of any commercial activity. Payment system according to Ojo (1998) in Nedozi and Omoregie (2019) can be viewed as an arrangement consisting of institutions, instruments, organizations, operating procedures, and information and communication systems, usually within a nation's financial system, used to initiate and transmit payment information from payer to payee and to settle payment or discharge financial obligation among economic units. Payment system can be physical of electronic. Physical payment system in commercial context involves customer paying cash directly to merchant in exchange of goods. Physical payment system is the traditional method of payment and proved to be effective. However, it requires the presence of the customer, merchant and paper money for transaction to take place. In this sense, physical payment system could be stressful, time consuming and costly in terms of the cost of printing paper money as well as the papers use in transaction. It is also risky as the customer carry cash to merchant for transaction. It is for these reasons and more that electronic payment (e-payment) and online payment systems were introduced.

Online payment system is a type of payment in which business transaction take place on internet between business to customer (B2C) or business to business (B2B). For online payment system to be effective and complete, it requires a third party (Payment gateway) who will debit customer's account and later credit merchant's account. The process of online payment is shown in figure 1.

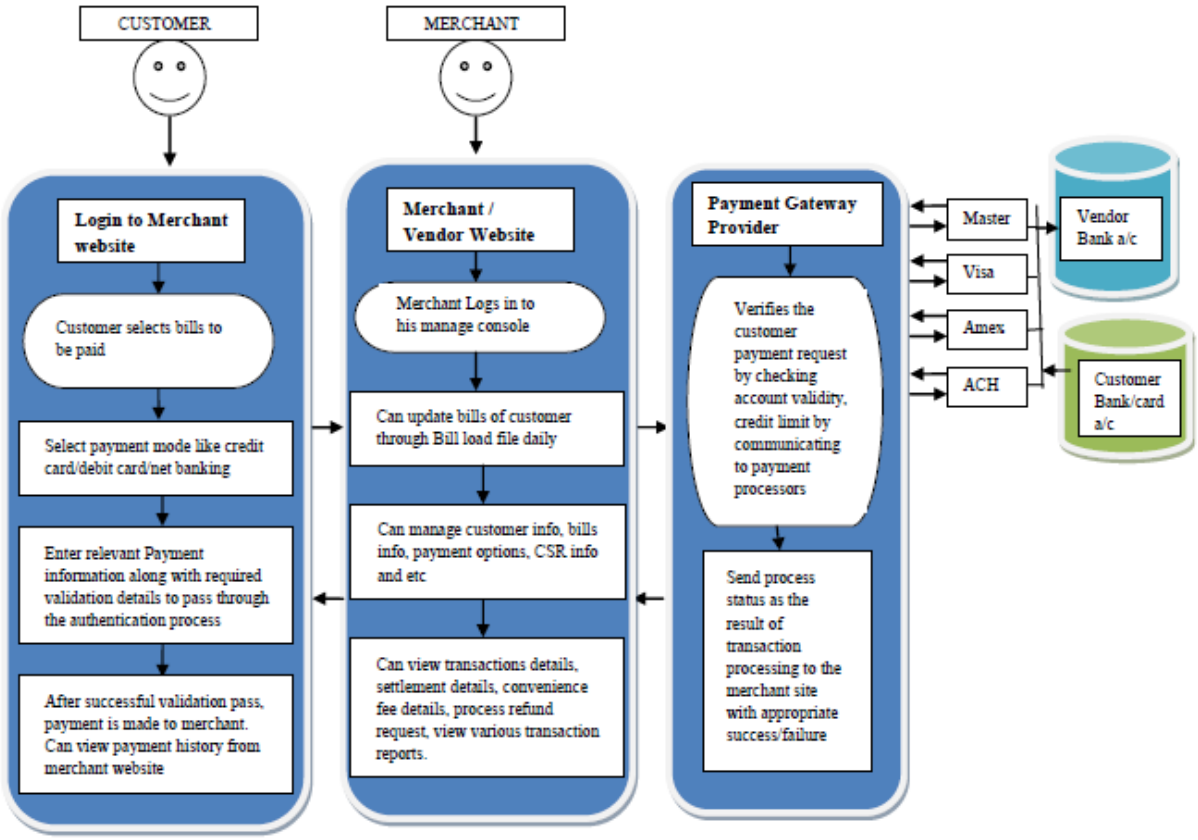

Figure 1: Online Payment System Adapted from Nagasubramanian and Rajagopalan (2012)

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Advantages and Disadvantages of Payment Gateways

Below are some advantages and disadvantages of payment gateways.

Advantages of Online Payment Gateway

- Payment Gateways are time saving:
- Payment Gateways help in controlling expenses
- Payment Gateway reduces the risk of theft and loss
- Payment Gateways are convenient
- Can be used anytime and anywhere. All that it requires is are liable internet connection.
- Payment Gateways have low commissions compare to expenses of going to banks

Disadvantages of Online Payment Gateway

Payment gateways have many limits regarding the number of transactions per day, maximum amount in the account and the amount of output.

- High risk of being hacked

If the company is broken and if all the personal data on cards is leaked, then it can be involved in many scandals.

- Payment Gateways highly depend on internet connectivity

Without internet, payment gateways become dummy and can't be used at all. One cannot even get into your account without internet connectivity.

- Payment Gateways lack Anonymity

(NIRA,2017).

Some Payment Gateways in Nigeria

Nigeria like other countries of the world engages in online payment. Below are some of the Nigerian payment gateways

1. Interswitch is an Africa- focused integrated digital payments and commerce company that facilitates the electronic circulation of money as well as the exchange of value between individuals and organizations on a timely and consistent basis. A web merchant can receive online payment from cardholders via Interswitch WebPay or Webpaydirect.

Setup Fee

N150, 000(One Hundred and Fifty Thousand Naira).

Charges

For every subsequent successful transaction, a fee of 1.5%of the value of the transaction subject to a cap of N2,000 is charged.(i.e. for transactions belowN133,333,a fee of 1.5% applies),and N2,000flat fee(for transactions above N133,333).

2.Voguepay

VoguePay is a unique online payment processor whose vision is to offer buyers and sellers a secure and easy-to-use means of transacting business online.

3.Paystack

New, but fast overtaking others, Paystack is amazing.

Paystack as a payments platform makes online payments process seamless for both the consumers and the businesses they are trying to pay for.

Setup Fee: **Free but** You'll need a Certificate of Incorporation and a Corporate account with matching names.

4. GTpay

GTPay is an GTBank internet payment gateway developed to facilitate payments online using debit Cards issued by banks on the Interswitch Network. GTPay plugs in seamlessly with the existing websites of customers and acts as abridge between the customer's website and financial institutions (Banks).The payment solution:

•Provides a convenient alternative payment channel to all customers.

•Enables cardholders to pay merchants (our customers) for internet purchases of goods and services from the comfort of their offices/homes by supplying details of their local debit/credit cards.

•Ensurestransactionamountisdeductedfromcardsinstantlyandmerchant'saccountcreditedwithin24hours.

Setup Fee

N75,000(Seventy Five Thousand Naira)

Charges

MasterCard/Visa(local)–TRANSACTIONFEE:1.5%oftransactionamount(subjecttoamaximumofN2,000)
InterswitchVerve(local)–TRANSACTIONFEE:1.5%oftransactionamount(subjecttoamaximumofN2,000)
MasterCard/Visa(International)–TRANSACTIONFEE:3%oftransactionamount;nocap
InternationalGatewayMonthlyCharge–N5,000

5.SimplePay

Simplepay ,payment gateway utilizes international acceptability of Zenith Globalpay to allow their customers accept payments online using their local and international Visa Card, Master Card and Interswitch cards.

***Setup Fee*:**N300 per bank account verification

Charges Deposit Funds:

VerveCard/NairaMasterCard–1.5%

Etranzact Card/Web–1.5%
Visa (Vpay)integration–1.5%
InternationalPayments:Debit/Credit CardVisa and Master Card (ZenithBankTransfer)–5%
Withdraw Funds:
Transfer money to your linked bankaccount–N300.00pertransaction.
SMSCharges–N2
Receive Money–1.00%plusN10.00per transaction

5. ***PayU***

PayUOnline Payment Gateways offers basically the same thing as the others listed above, but in tiers, so go check them out and see if you like what they offer.
There are other Online Payment Gateways in Nigeria that didn't make the list, but are worthy of mention such as:

6. ***E-Transact***
7. ***Paga***
8. ***GlobalPay***
9. ***Remita.. etc***.

NIRA Academy (2017)

Some E-payments Developed for Payment of school Fees

Umoh, Ele, Ele and Obono (2018) developed an enhanced e-payment system that enables students of the University of Calabar, as well as their sponsors to securely pay fees online using valid credit and debit cards. Object oriented Analysis and Design was employed in the design of the proposed System. The system was implemented using Apache web server, MySQL database server, Hypertext Preprocessor (PHP), and the Laravel framework. System testing and validation was also done by allowing users of the system to interact with it using several test data. Figure 1 shows the class diagram for the system.

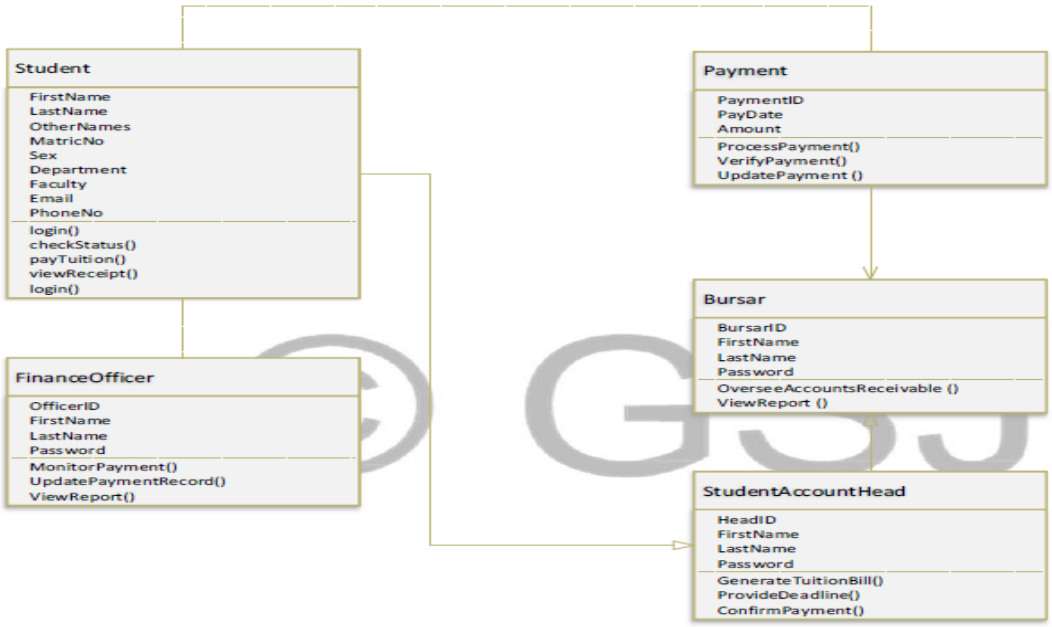


Figure 1: Class Diagram for the Payment System

Lwanga N. K. (2014) designed and implemented an online fees payment system for Makerere University (MUK-OFPS). The system was implemented using Apache web server, Mysql database server, Hypertext Preprocessor, Hypertext markup language, Cascading style sheets and JavaScript. System testing and validation was also done by allowing users of the system interact with it using test data. Findings showed

that most of the students were unsatisfied with the current modes of paying fees to the university and agree that an online fees payment system can improve the process of fees payment. The result of the project was an online fees payment system for Makerere University (MUK-OFPS) and researchers recommend the university to implement the system that provides relief of the long endured problems of the current modes of payment at the University. Figure 2 depicted the snapshot of the imputing student details page.

Figure 2: Snapshot of student inputting details page for the system

Rachitha, Aishwarya, Gupta, Kumar and Parasher (2018) developed an Android-based college fees payment application. The 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. Figure 3 shows the screenshot of the login page for the system.

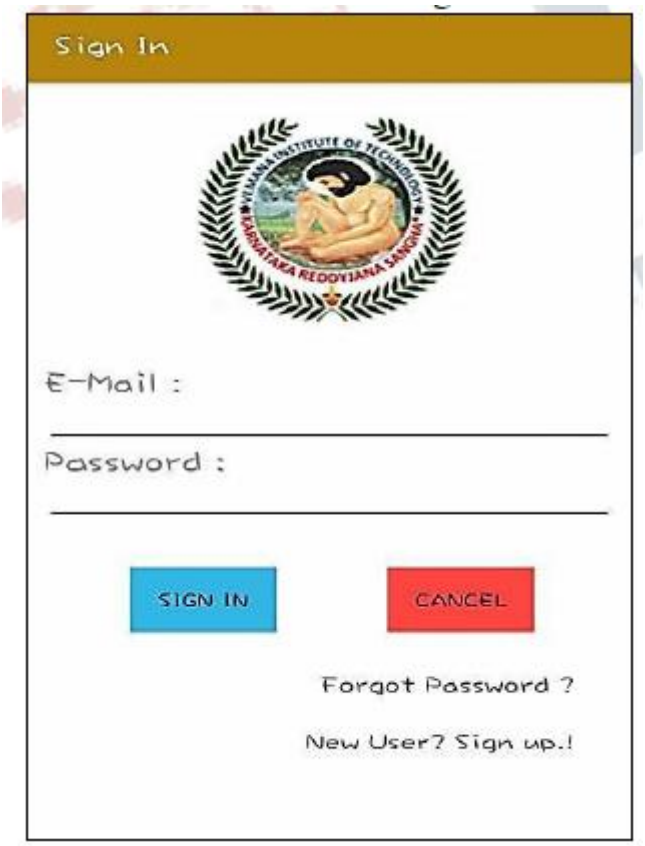


Figure 3: Screenshot of Login Page for the Payment System

5.0 Methodology

This study adopted Model Driven Development (MDD) methodology. MDD methodology is suitable for the online payment system. The Model Driven Development (MDD) methodology consists of seven phases like investigation phase, analysis of problem, requirement phase, decision analysis, Designs, Construction phase and implementation phase. The MDD methodology plays an important role in the success of the payroll project (Onyia, 2018).

5.1.1 Hardware Requirements

(a) RAM: 1 GB or above
(b) Hard disk: 4 GB or above
(c) Processor: 2.4GHZ or above

5.1.2 Software Requirements

The following specification are needed

(a) Window 10
(b) MySql
(c) Microsoft visual studio
(d) XAMPP
(e) phpMyAdmin

5.1.3 System Users

1. Admin
2. Student
3. Visitors

5.1.4 Functional Requirement Specifications

Admin

1. Login and logout
2. Add username and password

3. View, add, delete, update and print student records

Student

1. Login and logout.
2. View payment records
3. Print payment receipt

Visitors

1. View information about the College
2. View College contact information

5.1.5 Non-Functional Requirement Specifications

1. Provide data security
2. Be efficient during operations
3. Be portable
4. Be reliable
5. Accommodates more than 10,000 records
6. Be Scalable
7. Be robust
8. Maintainable

5.2 Design

5.2.1 System Architecture

The project adopted client-server architecture with three layers; the presentation, application and the database. The presentation layer consists of the browser. The application layer is the, Graphical User Interface (GUI) while the database layer serves as the database system (MySQL). The system architecture is shown in figure 4.

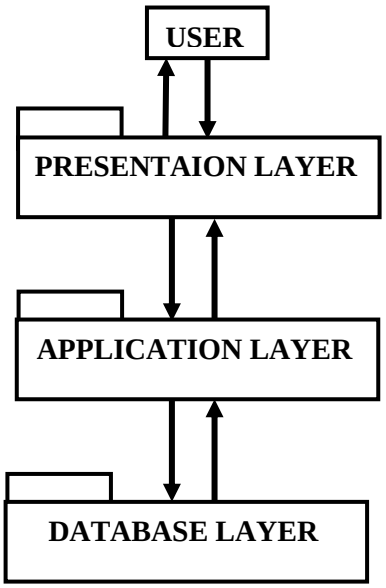


Figure 4: Three Layer Architecture

5.2.2 Use Case

The Use case diagram that shows the major functions of the users using UML (Unified Modelling Language) is shown in figure 5.

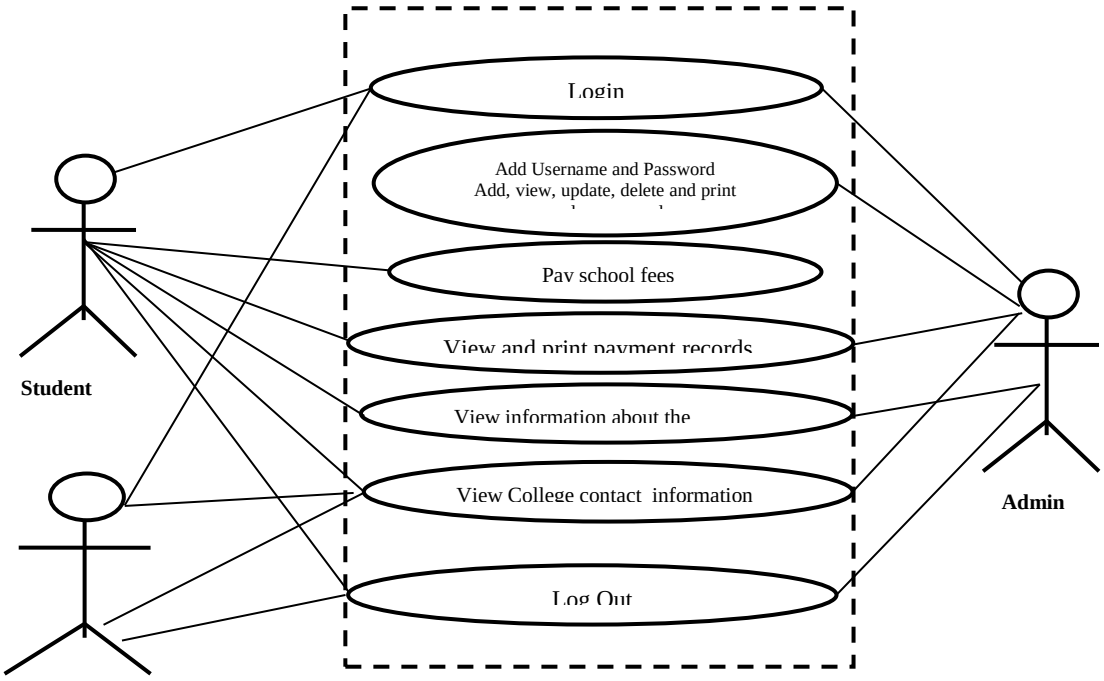


Figure 5: Use case

5.2.3 Home Page

The home page consists of four navigation buttons, namely, About Us, Contact Us, View Records and Admin respectively. The page also contains the picture of the College library to depict the nature of the College. Finally, the page contains a footer that contain names of the developers and the copy right information as shown in figure 6.

5.2.4 Input Forms Design

The system consists of four input forms, namely, student school fee payment record form, student payment record view form, login form and username and password form.

The Student' Payment Record Form

The Student payment record management form consists of text boxes, labels and buttons as shown in figure 7. The text boxes enable the admin to input employee data while the buttons enable the data transfer and data manipulations.

5.2.4.1 The Student Payment Record View Form

The Student payment record view form as shown in figure 8 consists of a text box where a Student can enter his or her payment number number while the search button enable display of an individual student payment record when clicked. The print button is for printing of the payment record (receipt) displayed in html table while the reset button is for resetting text box data.

5.2.4.2 The Login Form

The login form contains two textfields; username and password and two buttons, the login and reset. The username and the password field enable admin to input his or her username and password. The login button

enables admin to login into the employee record management form. The reset button on the other hand let admin to clear input fields as shown in figure 9.

5.2.4.3 The Username and Password Form

Username and Password form is designed to enable admin to enter username and password. It simply consists of fields and buttons as shown in figure 10.

5.2.5 Database Design

. This project made use of MySQL database to store all the information required by the system to function. The database named employee_db contain two tables. Figure 11 shows the two tables. The database and its tables were created using *phpMyAdmin* . Figures 12 and 13 shows two tables containing testing data.

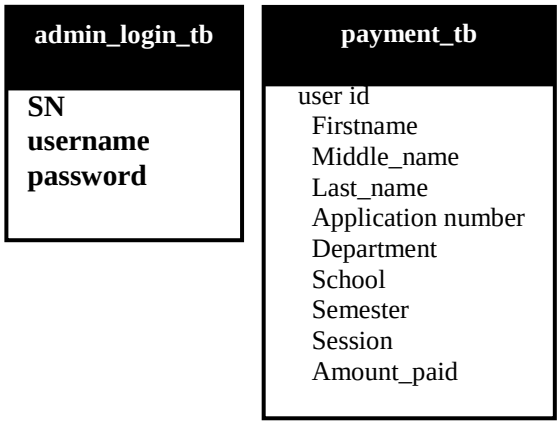


Figure 11: Database tables

5.3 Implementation

5.3.1 Writing Program Code

The project was implemented using PHP and javasript programming languages. The database and its tables were constructed using *phpMyAdmin* The codes were written under Microsoft visual studio.

6.0 Sample Outputs

The following are a sample of the outputs of the system when running.

Figure 6: Home Page

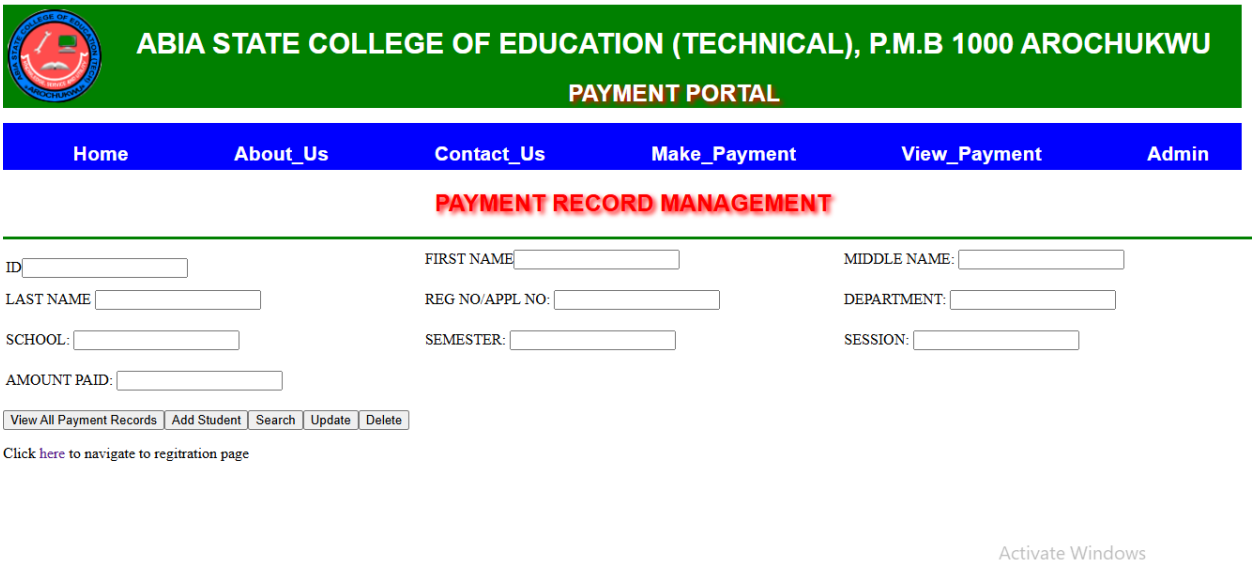


Figure 7: Student payment record manipulation

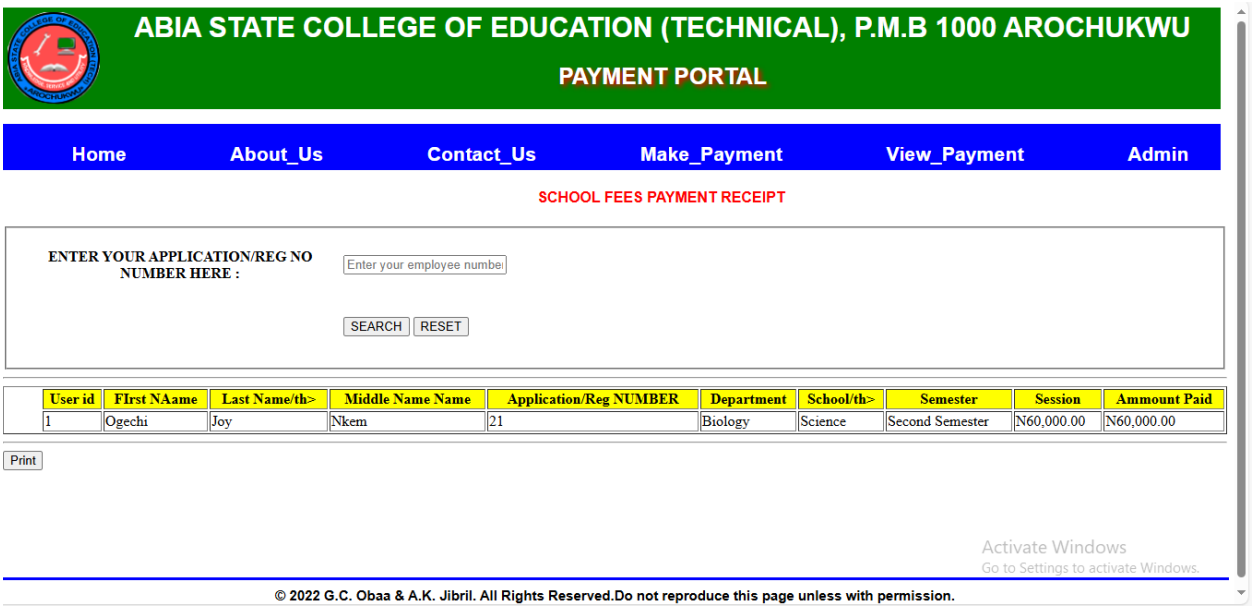


Figure 8: A sample of school fees payment receipt

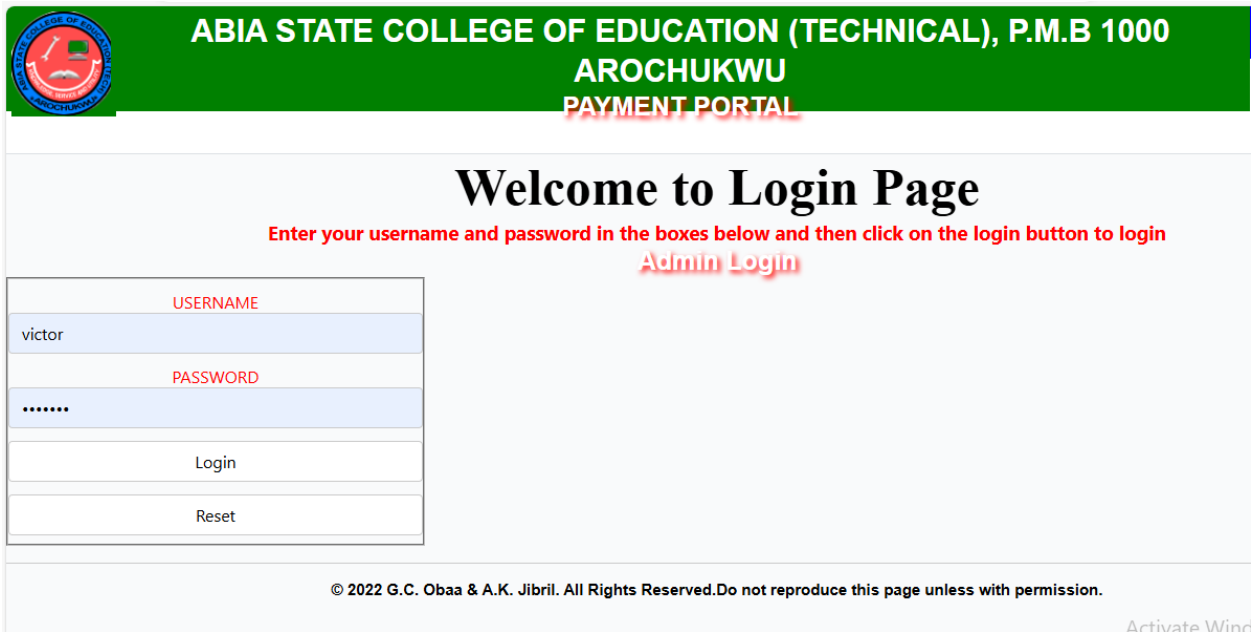


Figure 9: Login form

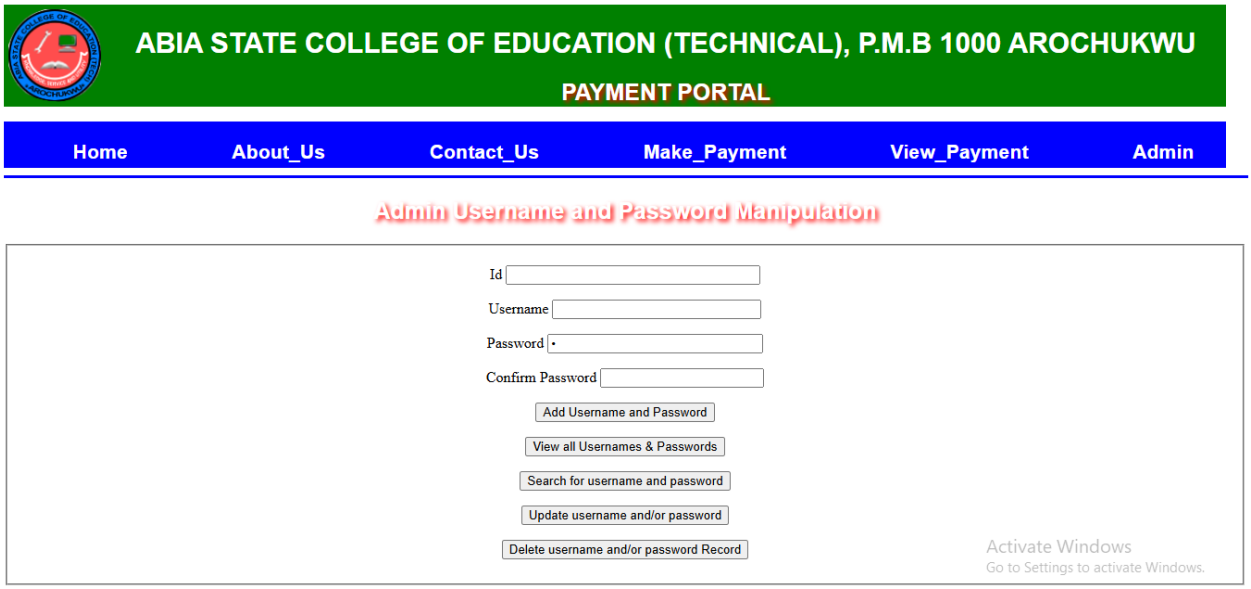
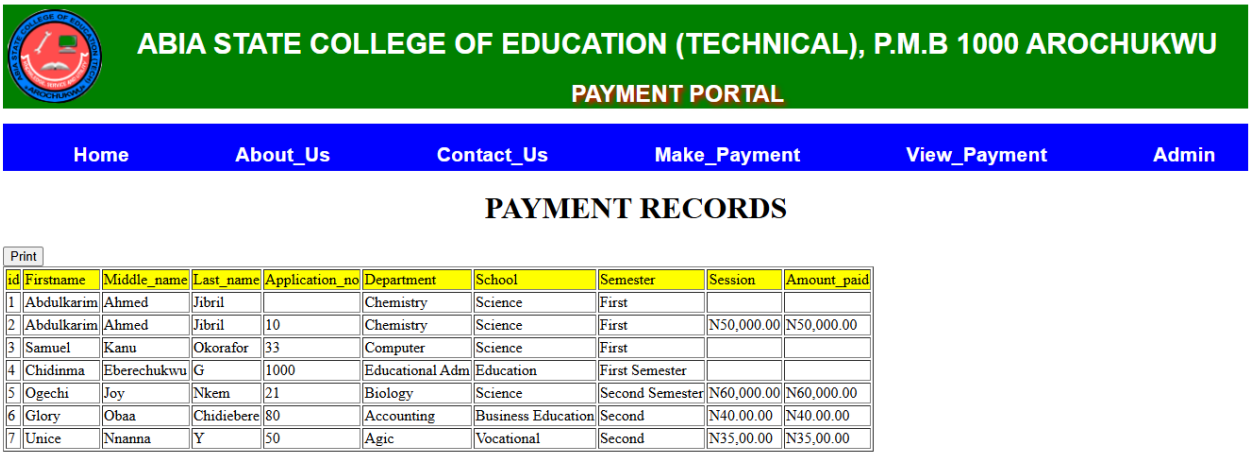


Figure 10: Username and Password form



id	Firstname	Middle_name	Last_name	Application_no	Department	School	Semester	Session	Amount_paid
1	Abdulkarim	Ahmed	Jibril		Chemistry	Science	First		
2	Abdulkarim	Ahmed	Jibril	10	Chemistry	Science	First	N50,000.00	N50,000.00
3	Samuel	Kanu	Okorafor	33	Computer	Science	First		
4	Chidinma	Eberechukwu	G	1000	Educational Adm	Education	First Semester		
5	Ogechi	Joy	Nkem	21	Biology	Science	Second Semester	N60,000.00	N60,000.00
6	Glory	Obaa	Chidiebere	80	Accounting	Business Education	Second	N40.00.00	N40.00.00
7	Unice	Nnanna	Y	50	Agic	Vocational	Second	N35,00.00	N35,00.00

Figure 12: A Table containing tested data

id	username	password
1	jibril	a0bfcbd7c5a65907c2207a8c87dcdfa9
2	samuel	d8ae5776067290c4712fa454006c8ec6
3	glory	db2545515c456c8ff5d2ba3c474838e3
4	unice	6e2c1c309043d2e54a86dc3838b945a0

Figure 13:A view of username and password table containing username and password hashed

7.0 Testing and Evaluation

The researchers tested each newly created file and make necessary correction(s) before creating another one. Thereafter, one of the researcher issued copies of questionnaire to evaluators(staff of the College) for evaluation, particularly their satisfaction with the performance of the developed online school fees payment

system. The data collected from the questionnaire were then analyzed, The result of the analysis is shown in table 1.

Table 1:Mean and Standard Deviations of the responses of the staff n=10

S/N	Item	$\overline{X}$	SD	Remark
	Functional Software Requirements			
	Admin			
1	The software enables admin to add username and password	3.80	0.42	Agree
2	The software enables admin to login	3.70	0.48	Agree
3	The software enables admin to logout	3.60	0.52	Agree
4	The software enables admin to add student payment record	3.70	0.48	Agree
5	The software enables admin to view the records of all students payments	3.70	0.48	Agree
6	The software enables admin to update the record of a student	3.60	0.52	Agree
7	The software enables admin to delete the record of a student	3.20	0.42	Agree
8	The software enables admin to print student records	3.70	4.80	Agree
	Student			
9	The software enables student to make school fees payment	3.60	0.52	Agree
10	The software enables student to view his or her payment records	3.60	0.52	Agree
11	The software enables student to print his or her records(receipt)	3.30	0.48	Agree
	Visitor			
12	The software enables a visitor to view information about the College	3.40	0.52	Agree
13	The software enables a visitor to view the Colleges contact information	3.40	0.52	Agree
	Non-Functional Software Requirements			
14	The software is well organized	3.30	0.48	Agree
15	The Software window environments are attractive	3.30	0.48	Agree
16	The software buttons are responding to mouse click quickly	3.40	1.18	Agree
17	The feedback massages provided by the software are self-explanatory	3.10	0.32	Agree
18	The software has data security	3.60	0.52	Agree
19	I felt comfortable when using the software	3.20	0.42	Agree
20	It is easy to navigate to different parts of the software	3.30	0.48	Agree
	Recommendation			
21	The developed software can be used for students school fees payment in the College	3.50	0.53	Agree

N=Number of respondent SD=Standard Deviation $\overline{X}$ ***=Mean***

The data from table 1 shows the means and standard deviations of the questionnaire items. A close look at the values of the means indicated that all the means have values not less than 2.50 which is the cut-off point. This implies that the respondents are satisfied with the performance of online school fees payment system. Another close look at the table shows that the values of the standard deviations (SD) are small, implying that the respondents' opinions on the items were very close. Finally, the mean value of item 21 (3.50) indicated that evaluators agreed that the developed online school fees payment system can be used for online school fee payment for the College.

8.0 Conclusion/Recommendation

Presently, payment of school fees in Abia State College of education (Technical) Arochukwu requires students to go to the bank and makes payment. This mode of payment is not only stressful but also makes students to waste useful time that they could use to engage in other academic activities. To mitigate problems associated with school fees payment, the researchers designed and developed an online school fees payment system. With this payment system, students can pay school fees at anywhere and at anytime. In addition, students can print their school fees receipt without going to the bursary department. Performance evaluation concerning the developed online school fees payment system shows that it is effective and efficient. The evaluators then recommended the use of the developed online school fees payment system for the College.

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