
Design and Implementation of a Web-Based Students' Social Network Site for Nigeria University Student

¹Ashioba, Nwanze Chukwudi & ²Nwakonobi, Benjamin Chukwudi

¹Delta State Polytechnic Ogwashi-Uku

²National Open University, Asaba Study Centre, Delta State

E-mails: benjaminchukwudi0@gmail.com, ashinze2008@yahoo.com

Phones: +2348033602480; +2348131652852

ABSTRACT

The recent growth in computer technology and communication network has given rise to communications and interactions among students via the internet. Students and facilitators of Nigerian distance learning programme are always faced with the problem of face to face communication barrier. This problem has made learning frustrating and difficult. The researchers have designed and developed a web-based students' social network site for students to students and students to facilitators' communications. The researchers have adopted the object-oriented analysis and design method using the Unified Modeling Language in the analysis and design of the system. The system was implemented using the Object-Oriented programming language (PHP, MYSQL). The results obtained have showed that a web-based social network site has been designed and developed to bridge the gap of face to face communications among students and facilitators in e-learning environment. The study is recommended to the federal and state institutions that are running distance learning programme.

Keywords: social network, web-based system, communication, e-learning

1. BACKGROUND TO THE STUDY

Social network site is a web-based services that allow individuals to construct a public or semi-public profile within a bounded system, articulate a list of other users with whom they share a connection and view and transverse their list of connections and those made by others with the system (Adebiyi and Ogunlade, 2011). It is a dedicated website or application that enables users communicate with each other by posting information, comments, messages, images and videos. The recent growth in computer network, specifically the World Wide Web (WWW), has given rise to communication, socialization and interactions among individuals and members via the internet. This interaction has been used for varieties of purposes like education, business, communication and social media and network. The dramatic development of social media has shaped the interactions of people through different social media platform (Colliander and Dahlen, 2011; Cho et al., 2014); for instance, in the global social media environment, one can share information and knowledge online, join virtual communication and arbitrarily friend or de-friend a person (Curras-Perez et al., 2014). Social media also drive a new set of business models that challenges traditional business processes and operations (Hanna et al., 2011).

These newly invented social media tools and technologies allow people to read, extract and generate universal text, image, audio and video content (Akar and Topen, 2011). Social media services have made e-learning and distance learning possible over the internet. Lecturers now post their study materials and lecture notes online for students to download and read. This process of learning is not complete since there is no feedback process.

1.1 Statement of the problem

Students of the E-learning and distance-learning programme are always faced with problem of face-to-face communication barrier in the learning process. This barrier has made frustrating among students of the institutions. Students cannot submit assignments and get feedbacks after reading their materials.

1.2 Objectives of the study

The general objective of this study is to design, develop and implement a web-based social network platform for Nigeria University students-students and students-lecturers interaction.

The specific objectives are:

- 1.) To analyze the requirement of the existing and the proposed system
- 2.) To design interfaces for the proposed system
- 3.) To develop a web-based social network platform for the system
- 4.) To implement the developed web-based social network platform

2. LITERATURE REVIEW

Social networking sites (SNSs) on the web are becoming increasingly popular during the last decade and their use has become a habit for a large amount of the population between the age of 15 and 35years. Today on the web there is a huge number of famous online social networks that offer many and different means of communication and interaction of its users. Facebook, Twitter, MySpace, Delicious, Blog and wiki are few of the social networking websites that are used by various groups to stay in touch with friends.

2.1 Facebook.

The most popular social networking sites to date are Facebook (Rainie, Smith and Duggan, 2013), followed by Twitter (Brenner and Smith, 2013) and LinkedIn (Duggan and Brenner, 2012). Facebook allows users to set up a profile and post updates, links, photos, conversations, and the like. Sponcil and Gitimu (2007) reported that 88.5% recognized Facebook as their preferred social media site. Wang, Chen, and Liang (2011) reported that students spend roughly 100 minutes per day on Facebook. In 2007, 92% of college students reported that they had a Facebook account. By 2008, 99% of students had an account on Facebook. Williams and Merten (2008) found that university students are often obsessed with their Facebook and Twitter profile. A study by Pempek, Yermolayeva, and Calvert (2009) showed that students spend an average of 118 minutes a day on Facebook. Student researchers from the Whitmore School of Economics and Business found that younger students tend to use Facebook more frequently than older students to keep in touch with friends from high school or from their hometown (Pempek, Yermolayeva, and Calvert, 2009). Many individuals use social network sites to feel popular, trying to add as many “friends” as possible so they appear to be more admired. Young adults reported an average of 358 Facebook friends (Pempek, Yermolayeva, and Calvert, 2009). Quan-Haase and Young (2010) found that 82% of college students reported logging into Facebook several times a day.

2.2 Twitter

Twitter allows users to send out short messages or “tweets” about what they are doing or links to resources of interest. People can choose to “follow” selected users’ tweets and they can retweet or repost someone’s tweet for others to see. It is an online version of text-messaging with the capability of sending the same message to several thousand people all at once (Ezumah, 2013).

2.3 LinkedIn

LinkedIn is targeted at professionals interested in professional networking. Each user sets up a profile similar to a resume and then can link to other people that they know. Having been created in 2003, LinkedIn is one of the oldest social networks. However, this particular site is relatively new to younger generations. Facebook, Twitter and LinkedIn are being joined by a complete new line of competitors in the social media business. The social network platforms Snapchat, Instagram, Pinterest, and YouTube have become the new gateway for the expression for today’s college generation.

3. METHODOLOGY

Research methodology represents the strategies involved in collecting and analyzing data collected, in order to have meaningful interpretations of the research findings. According to Asika (2004), research methodology is a systematic rules and procedures upon which a research is based against which claims for knowledge and assumptions are proved in favour of a decision. Esene (2004) defined research methodology as a systematic process of collecting, presenting, analyzing and interpreting data for the purpose of arriving at a dependent solution to human problem.

3.1 Analysis of the proposed system

The proposed system uses the Use case diagram to describe and model what the system does from the users’ standpoint of an external observer (Nayak et al., 2012). The use case diagram shows how the user, new user and the administrators interact with the system. The use case diagrams of the proposed system are illustrated in Figures 1 and 2 respectively.

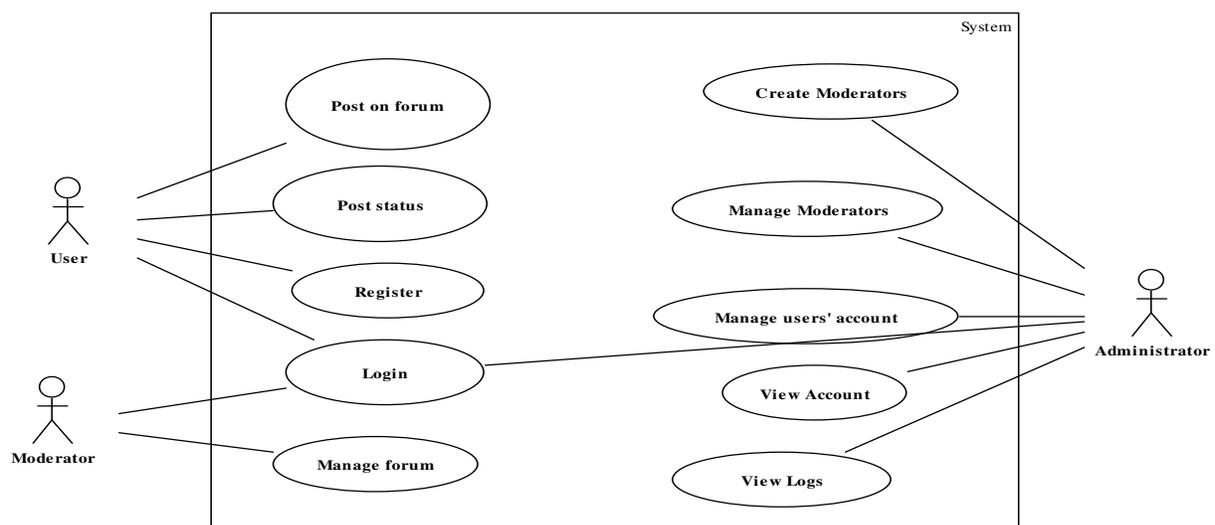


Figure 1: Use case diagram of the proposed system

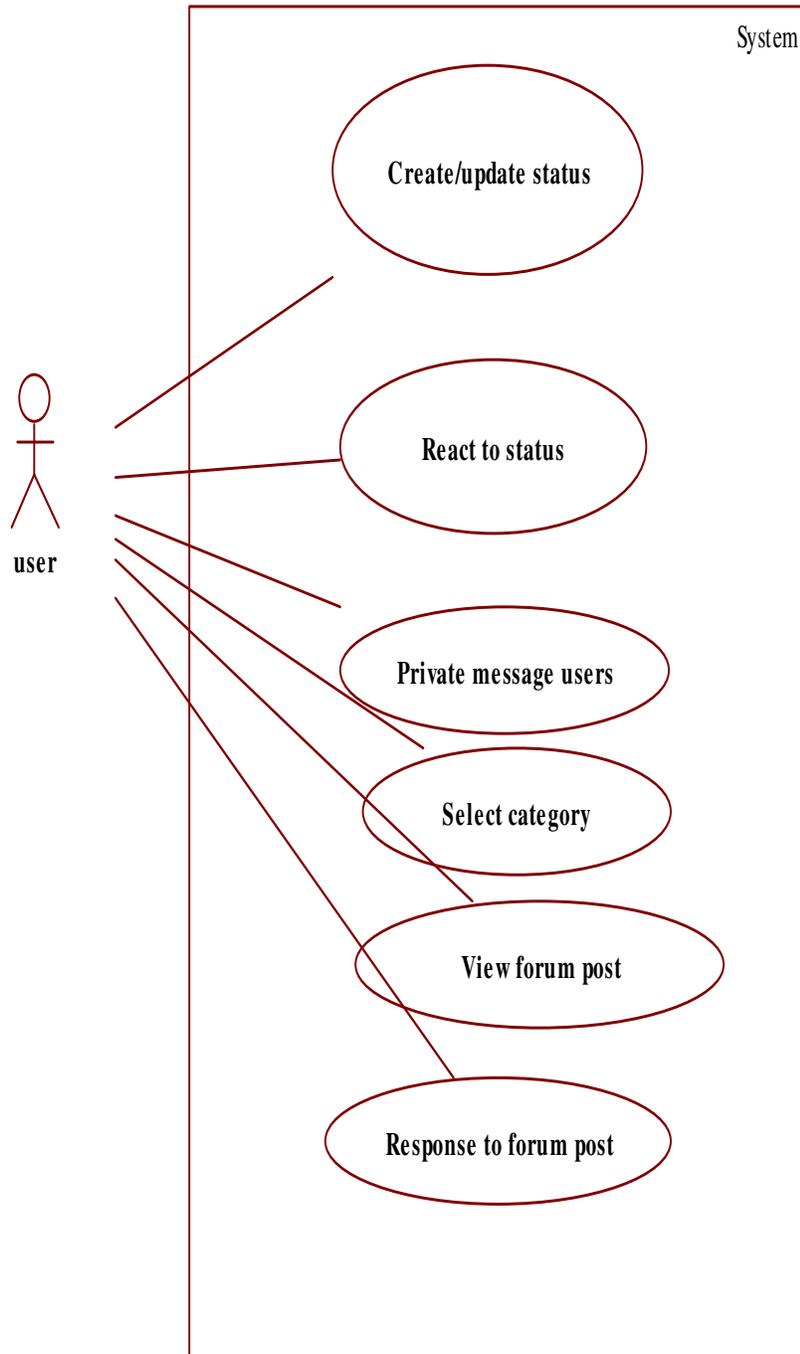


Figure 2: Use case diagram for user interaction

3.2. Activity Diagram

The activity diagram depicts the workflow of activities within the system. It graphically represents the flow of performance of various actions by the system entities. The activity diagram of the proposed system is represented in Figure 4.

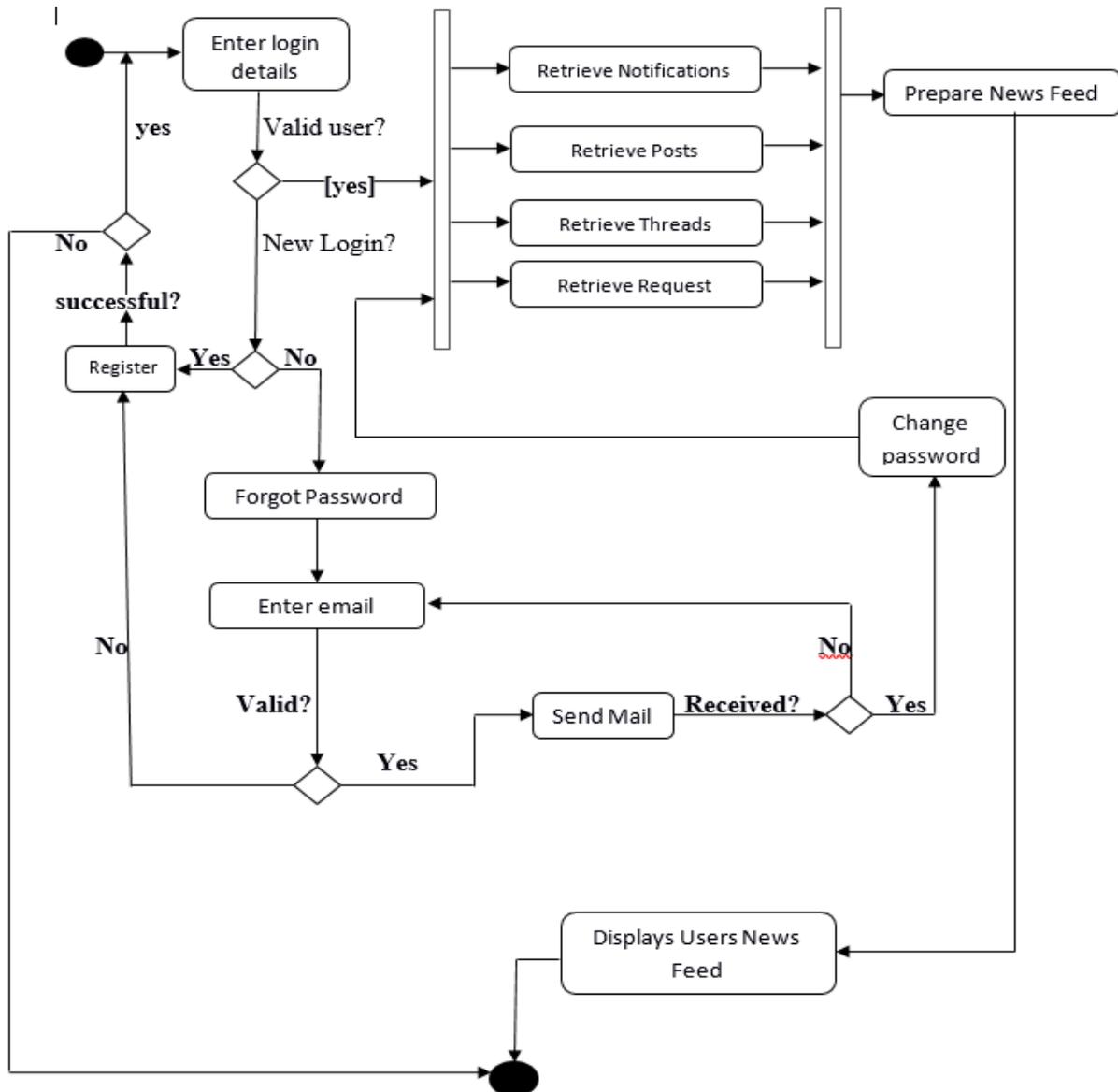


Figure 1: Activity diagram of the proposed system

3.3. Architectural Framework of the proposed system

The software architecture of this application represents its software (logical) implementation and deployment processes. This software architecture comprises of three (3) main layers under the server-side logic and one separate Layer: Presentation, Business and Data Layers and the cross-cutting concerns. The conceptual framework of the proposed system is illustrated in Figure 5.

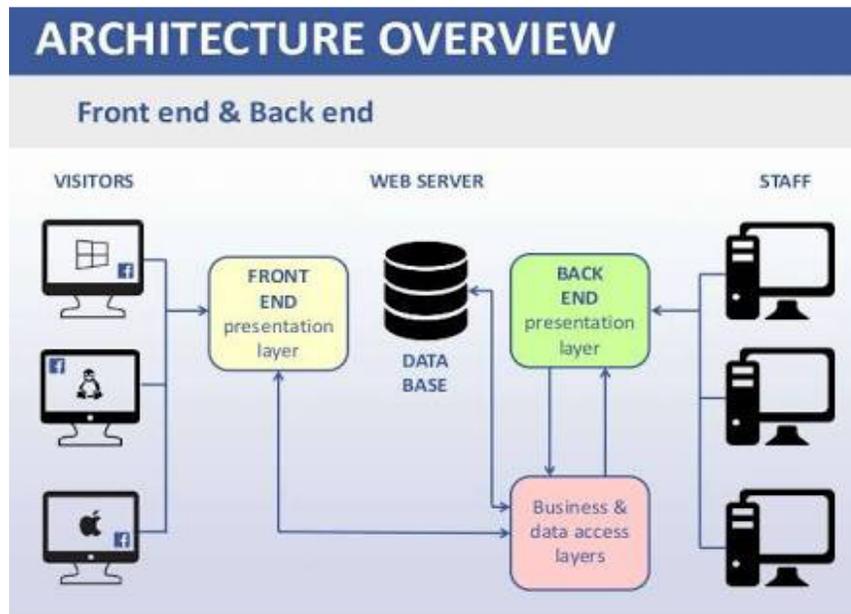


Figure 2: Conceptual framework of the proposed system

The FRONT END Presentation Layer represents components that will aid user's interaction with the system. Here, different components like desktop computers, smart phones, tablet computers and laptops will be used as a bridge into the core business and data layers.

The Business Layer represents the core functionality of this web application working with some development tools and environments to build applications. In this Layer, languages like PHP, Java, Python, etc. are supported. For this work, PHP programming language will be implemented using the Laravel and JavaScript frameworks.

The Data Layer represents access to data hosted within the boundaries of the web application using a relational database management system (RDBMS). This work will be implemented on the MySQL database.

3.4. System interface design

The system interface design shows the design of the various interfaces used in the development and implementation of the proposed system. The system interface design of the proposed system contains the login interface design, student registration page interface design, and the form interface design.

3.4.1 The Login Page

The login page is the first user interface displayed. It enables the user to provide his e-mail address and password. The login interface page is illustrated in Figure 6.



The figure shows a login interface design. It consists of a central box with a title 'Login' at the top left. Below the title, there are two input fields: 'E-Mail Address' and 'Password'. Below the 'Password' field, there is a checkbox labeled 'Remember Me'. At the bottom of the box, there is a 'Login' button.

Figure 3: Login interface design of the proposed system

3.4.2 Registration Interface Page

This screen enables students to register. The data needed here are: Username, Gender, E-mail address, Birth Date, Institution, Department, Course, etc. The registration interface page is shown in Figure 7

Coolmates Login Register

Register

Username

Gender ↓

E-mail Address

Birth Date ↓

Institution ↓

Department ↓

Course ↓

Password

Confirm Password

Figure 7: Input Design for Registration

5.4.3. Output Design

Data entered into the system from the input designed screen are collected to generate the users profile page, which consist of the user information, such as the name, school of study, course of study, department, friends, etc. The page is shown in Figure 8

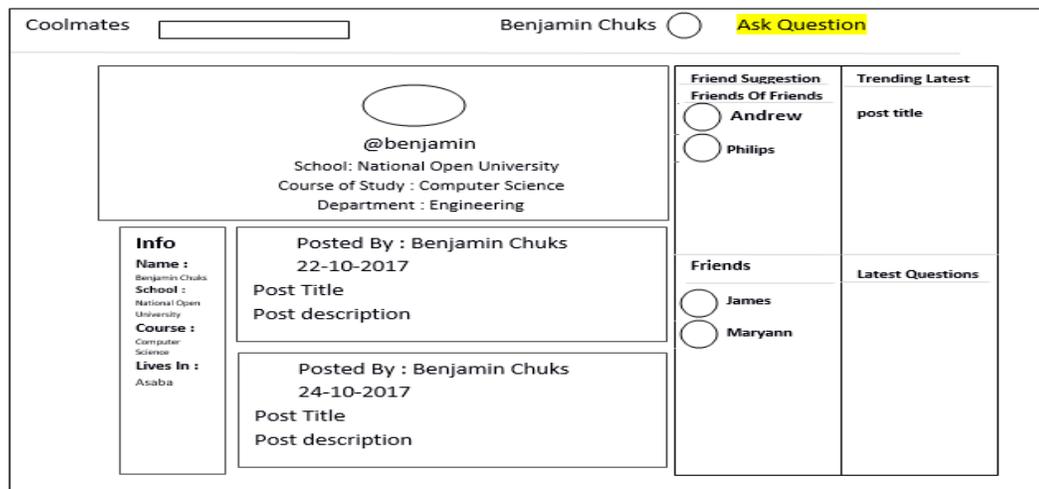


Figure 8: Output design (users' profile)

3.5 Database Design

A database is a mechanism that is used to store and manipulate data to produce meaningful information. This can be implemented using a database management system (DBMS). A DBMS is software that allows the storage and access of data to a user. The database design is geared towards stating the purpose of the database of this system. The relational database design was implemented and tested using a local MySQL. The database Tables include: Users table, Posts table, Friendships table, Categories table, Tags table, Comments table, Courses table, Password reset table, Likes table, Posts categories table, Post tag table, Profiles table and Notifications table

3.6 Tables

Table 1 Users Table

Field	id	name	email	avatar	slug	gender	Password	birthda y	remember_t oken	created_ at	updated_ _at
Datat ype	int(p k)	varcha r	varchar	varchar	varchar	tinyint	Varchar	date	varchar	timestam p	timesta mp
length	11	191	191	191	191	1	191		100		

The users table is the table in the database that stores user's information on registration, and enables the user to login using an email and password

Friendships table

The friendship table holds friendship information in the database. It holds the friendship requester id, the requested id, user_requested, status, created_at and updated_at attributes. Table 2 illustrates the Friendship table.

Table 2 Friendships table

FIELD	Id	Requester	user_requested	Status	created_at	updated_at
DATATYPE	int(pk)	Int	Int	Tinyint	timestamp	timestamp
LENGTH	10	11	11	1		

Categories Table

The Categories Table holds the different categories of the coolmates. The categories Table is illustrated in Table 3.

Table 3: Categories Table

field	id	name	Slug	created_at	updated_at
datatype	int(pk)	int	Int	timestamp	timestamp
length	10	11	11		

Tag Table

The tag Table holds the tags for thread filter according tags, this enables users to search for posts according to tags.

Table 4: Tag Table

field	id	name	forum_id	slug	created_at	updated_at
datatype	int(pk)	int	int	int	timestamp	timestamp
length	10	11	11	11		

Comment Table

The comment table holds all comments (both thread comments and status comment) on coolmates.

Table 5: Comments table

field	id	user_id	comment	commentable_id	commentable_type	created_at	updated_at
datatype	int(pk)	int	varchar	Int	int	timestamp	timestamp
length	10	11	191	11	11		

Course Table

The Course table holds all the courses offered in Nigeria high institution and the faculty of those courses.

Table 6: courses table

field	id	name	Slug	faculty	created_at	updated_at
datatype	int(pk)	varchar	Varchar	varchar	timestamp	timestamp
length	10	191	191	191		

Password_reset Table

This Table holds the entire password reset email and tokens, it enables users that have lost their password to request for password reset.

Table 7: Password_reset Table

field	email	token	created_at
datatype	varchar	varchar	timestamp
length	191	191	

Likes Table

This table holds all the users likes (both post, status and comments). The system has likes functionality and each time a post is liked, it's been stored in likes table

Table 8: Likes table

Field	id	user_id	likeable_id	likeable_type	created_at	updated_at
datatype	int(pk)	int	Int	int	timestamp	timestamp
length	10	11	11	11		

Posts Table

The Posts table is a table in the database that contains the details of every post made on the platform.

Table 9: Posts Table

FIELD	DATATYPE	LENGTH
Id	int	11
user_id	int	11
Title	varchar	191
Slug	varchar	191
Content	text	
File	int	11
video_url	varchar	191
image_url	varchar	191
Type	varchar	191
Solution	int	11
Status	int	11
view_count	int	11
created_at	timestamp	
updated_at	timestamp	

Post categories Table

The post categories table holds each post id and associated category id, this enables the users to be able to search for post by categories and also be able to retrieve all posts associated with a particular category.

Table 10: Post categories table

Field	posts_id	category_id	created_at	updated_at
datatype	int	Int	timestamp	timestamp
length	10	11		

Post tag Table

The post tag table holds each post id and associated tag id, it enables users to be able to search for posts according tags

Table 11: Post tag Table

Field	posts_id	tag_id	created_at	updated_at
datatype	int	int	timestamp	timestamp
length	10	11		

Profiles table

The profile table is a table in the database that contains the details of the users' in this Table, the users id is used to link each user to profile.

Table 12: Profiles table

FIELD	DATATYPE	LENGTH
Id	int	11
user_id	int	11
first_name	varchar	191
last_name	varchar	191
Course	varchar	191
School	varchar	191
Department	varchar	191
Level	varchar	191
Country	varchar	191
state_of_origin	varchar	191
state_of_residence	varchar	191
City	varchar	191
About	text	
created_at	timestamp	
updated_at	timestamp	

Schools Table

The schools table holds all the high institutions in Nigeria, the type of institution, its location and the year it was founded

Table 13: Schools Table

Field	id	name	type	state	location	funding	abbreviation	founded	created_at	updated_at
datatype	int(pk)	varchar	varchar	varchar	varchar	tinyint	varchar	int	timestamp	timestamp
length	11	191	191	191	191	1	191	11		

Notifications Table

The notifications table is a table in the database that stores users' notification. A user can be notified of a friend request and can also be notified of an accepted friendship request.

Table 14: Notifications Table

Field	id	Type	notifiable_id	notifiable_type	data	read_at	created_at	deleted_at
Datatype	char	varchar	int	varchar	text	timestamp	timestamp	timestamp
Length	36	191	10	191				

Data Source

Data sources include fact-finding techniques used by researchers in carrying out the research. The fact-finding techniques include interview, document review, observation, surveys and questionnaires. In this study, the researchers have adopted the observation technique with total 100 students from the following institutions illustrated in Table 15.

Table 15: Sample of Data Collected

S/N	Name of Institution	No of students
1	National Open University, Asaba study centre, Asaba	25
2	Delta State University, Asaba Campus, Anwai	40
3	Delta Staete Polytechnic, Ogwashi Uku	25
4	Federal College of Education (Technical) Asaba	10
	Total	100

Implementation

The implementation phase in software development shows the processes of converting a system specification into an executable system (Sommerville, 2011). It contains the process where programmers develop a system based on the blueprint from the design phase using appropriate programming tools and languages. The sample snapshot of the developed system is illustrated in Figure 9.

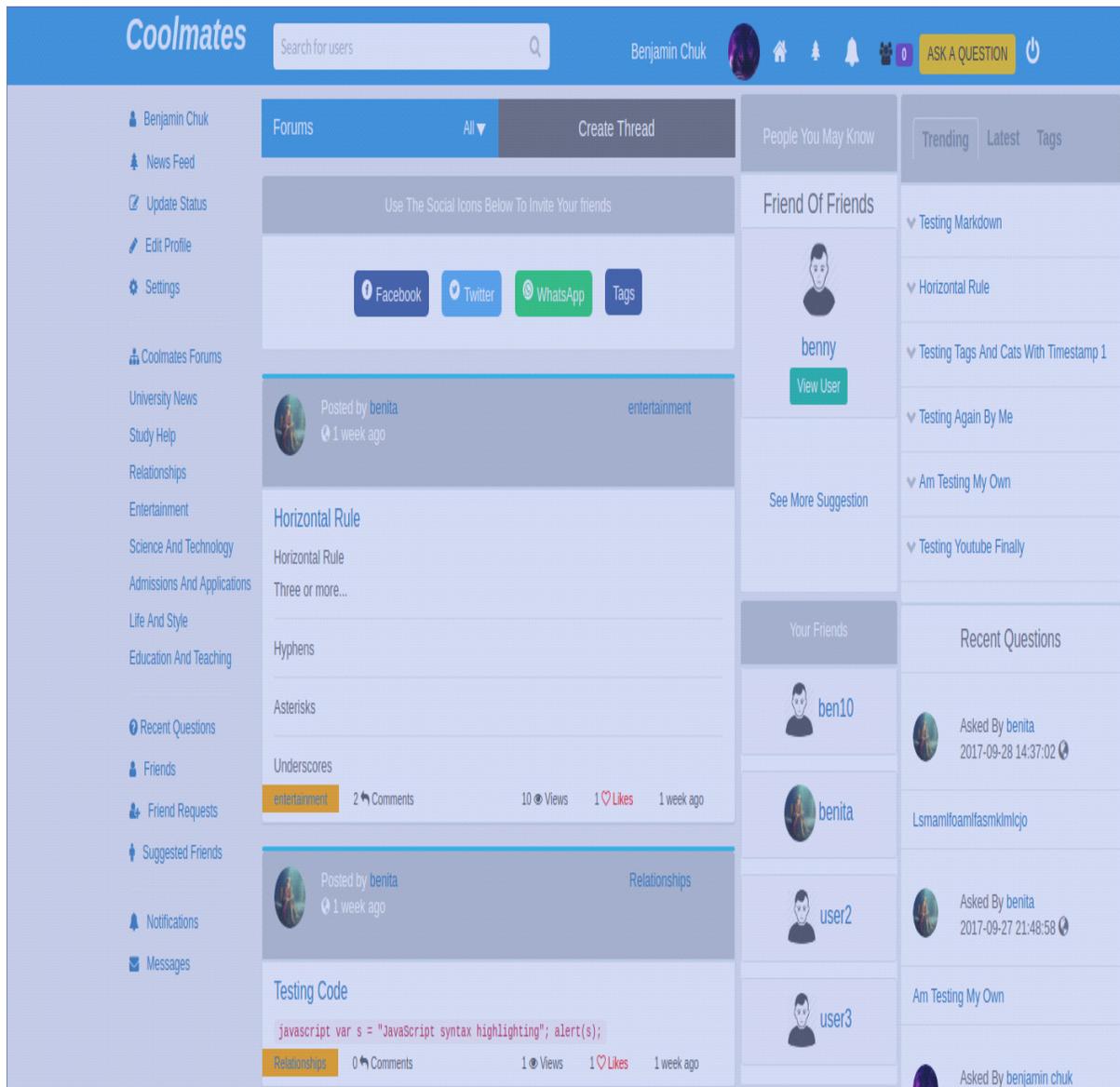


Figure 9: Sample snapshot of the developed interface

5. DISCUSSION OF RESULTS

The results obtained in this study are summarized as follows:

The researchers have analyzed the requirement of both the existing and proposed systems. Secondly, the researchers have designed the necessary interfaces required for the development of the system. Also, the researchers have developed a social network application called coolmates and Finally, the researchers have implemented the developed application.

6. CONCLUSION

An interactive and user-friendly web-based social network forum (called coolmates) has been designed, developed and implemented using the Object-Oriented Analysis and Design Model via the Unified Modeling Language as a defector. The system enables students of the institutions to interact, share information and communicate among themselves in the forum.

7. CONTRIBUTION TO KNOWLEDGE

The study has enabled the researchers analyzed and designed an interactive and user friendly social network forum called (coolmates) that can enable students of e-learning programme get feedback to their problems.

REFERENCE

1. Adebisi, M. and Ogunlade O. (2011). Development of a Social Networking Site with a Networked Library and Conference Chat. *Journal of emerging Trends in Computing and Information Sciences*, Vol2 No 8. Pp. 396-401.
2. Akar, E. and Topçu, B. (2011), "An examination of the factors influencing consumers' attitudes toward social media marketing", *Journal of Internet Commerce*, Vol. 10 No. 1, pp. 35-67.
3. Asika, N. (2004). *Research methodology: A process approach*, Mukugamu publishers, Lagos company Limited, Nigeria.
4. Brenner, J, & Smith, A. (2013). 72% of Online Adults are Social Media Users. Pew Research Center's Internet & American Life Project. Retrieved from <http://pewinternet.org/Reports/2013/social-networking-sites.aspx>
5. Cho, I., Kim, J. K., Park, H. and Less, S. M. (2014) Motivations of facebook places and store atmosphere as moderator. *Industrial Management & Data System*, Vol 114 No. 9, pp. 1360-1377.
6. Colliander, J. and Dahlén, M. (2011), "Following the fashionable friend: the power of social media", *Journal of Advertising Research*, Vol. 51 No. 1, pp. 313-320.
7. Curras-Perez, R., Ruiz-Mafe, C. and Sanz-Blas, S. (2014), "Determinants of user behavior and recommendation in social networks: an integrative approach from the uses and gratifications perspective", *Industrial Management & Data Systems*, Vol. 114 No. 9, pp. 1477-1498.
8. Duggan, M, & Brenner, J. (2012). The demographics of social media users—2012. Pew Research Center's Internet & American Life Project. Retrieved from <http://pewinternet.org/Reports/2013/Social-media-users.asp>
9. Esene, R. O. (2006). *Business research methodology for science and researchers*, Wisdom publishers limited Ibadan, Nigeria.
10. Ezumah, B. (2013). College Students' Use of Social Media: Site Preferences, Uses and Gratifications Theory Revisited. *International Journal of Business and Social Science*, 4(5), 28-29.
11. Hanna, R., Rohm, A. and Crittenden, V.L. (2011), "We're all connected: the power of the social media ecosystem", *Business Horizons*, Vol. 54 No. 3, pp. 265-273
12. Nayak, R., Patheja, P. A. and Wao, A. A. (2012). Design of weather forecasting system through unified modeling language. *International journal of research & applied science*. Vol. 2. 1189-1194.
13. Pempek, T. A., Yermolayeva, Y. A., & Calvert, S. L. (2009). College students' social networking experiences 79
14. Quan-Haase, A., & Young, A. L. (2010). Uses and gratifications of social media: A comparison of Facebook and instant messaging. *Bulletin of Science, Technology & Society*, 30(5), 350-361.
15. Rainie, L., Smith, A., & Duggan, M. (2013). Coming and going on Facebook. Pew Research Center's Internet & American Life Project. Retrieved from <http://pewinternet.org/Reports/2013/Coming-and-going-on-facebook.aspx>, Feb. 5
16. Sommerville, L. (2011). *Software engineering (9th Edition)*, New York, Addison Wesley
17. Sponcil, M., & Gitimu, P. (2007). Use of social media by college students: Relationship to communication and self-concept. *Journal of Technology Research*, 4, 1-13.
18. Wang, Q., Chen, W., & Liang, Y. (2011). *The Effects of Social Media on College Students*. Johnson & Wales University, Providence, RI.
19. Williams, A. L., & Merten, M. J. (2008). A review of online social networking profiles by adolescents: implications for future research and intervention. *ADOLESCENCE*, 43(170), 253-274.