

A SOCIAL NETWORK FOR NIGERIA TERTIARY INSTITUTIONS

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ABSTRACT

This paper present the development and implementation of an academic social network application for Nigeria University students using the Rational Unified Process. Java Enterprise Edition was used as the language of implementation, MySQL was used as the database System. Experimentation was done using students of the University of Port-Harcourt. The application reduces the negative impact of social networking, while using it as a tool to facilitate collaboration amongst Students. It enables students to solve academic and research problems. It has a powerful in-built app called “Gradiometer”, which keeps track of Students’ grades, plots a chart of Students’ grade points against courses and automatically calculates their Cumulative Grade Point Average. The results obtained from this work shows that social networking can be used as a tool to fix the missing link in the education sector of Nigerian Universities; which is collaboration amongst students, while reducing the negative effect of Social networking.

Keywords: *Academic Social Network, Java Enterprise Edition, Collaboration and Cumulative Grade Point Average.*

INTRODUCTION

Social networking in this information-overloaded age is blamed for the decline in students’ performances across the globe (Wang, 2011). It is accused of reducing the spelling ability of the students, while eating into their productive time. A student who is a regular user of Twitter could spell information as ‘infrmatn’. Life could be spelt as ‘lyf’ in order to make sure that his/her thoughts can be adequately expressed in the 140-character space Twitter provides. Students now depend on spell-checkers in online apps to correct their spellings. According to Browser Media, the

average College student belongs to at least two social networks and spends at least 15 hours on each in one month. (Browser Media, 2014) The above premise raises the question: “Has social networking done more harm than good to the student?” if yes, what is to be done about it?

Furthermore, in 2012, a final year Computer Science student of the University of Port-Harcourt, Choba, Nigeria was given an assignment, and because he wanted more ideas and contributions from other students, he asked the question on Yahoo Answers. But unfortunately, it was never answered

(Yahoo Answers, 2012). The reason is that he asked the wrong audience. The trend has been that Nigerian students post questions online and do not get answers. It is thus obvious that Nigerian students need a platform to collaborate, share ideas and solve academic problems, thereby maximizing social networking for academic purpose.

The aim of this research is to develop a tailored social network application for Nigeria University students to aid in the sharing of relevant, academic-oriented information; to help students share ideas and collectively solve academic problems, thus productively engaging them.

MATERIALS AND METHODS

The application uses the Rational Unified Process (RUP) (Grady Booch, 1998); which

is an implementation of the agile software development. In the first phase of the RUP; which is inception, the core project requirements, constraints and key features using a basic use case model were generated. The system requirement states, that a valid student of the University of Port-Harcourt, identified by a unique University of Port-Harcourt mail account (e.g. user@uniport.edu.ng) should be able to sign up for an account, login, interact with other students in the chat rooms, post questions and get answers in forums, have access to past questions and answers in downloadable PDFs. The application should also provide functionality to allow the student to update his/her courses, display a graphical representation of the student's grade points, compute the C.G.P.A (University of Port-Harcourt, 2008/2009) and finally end the session (log out).

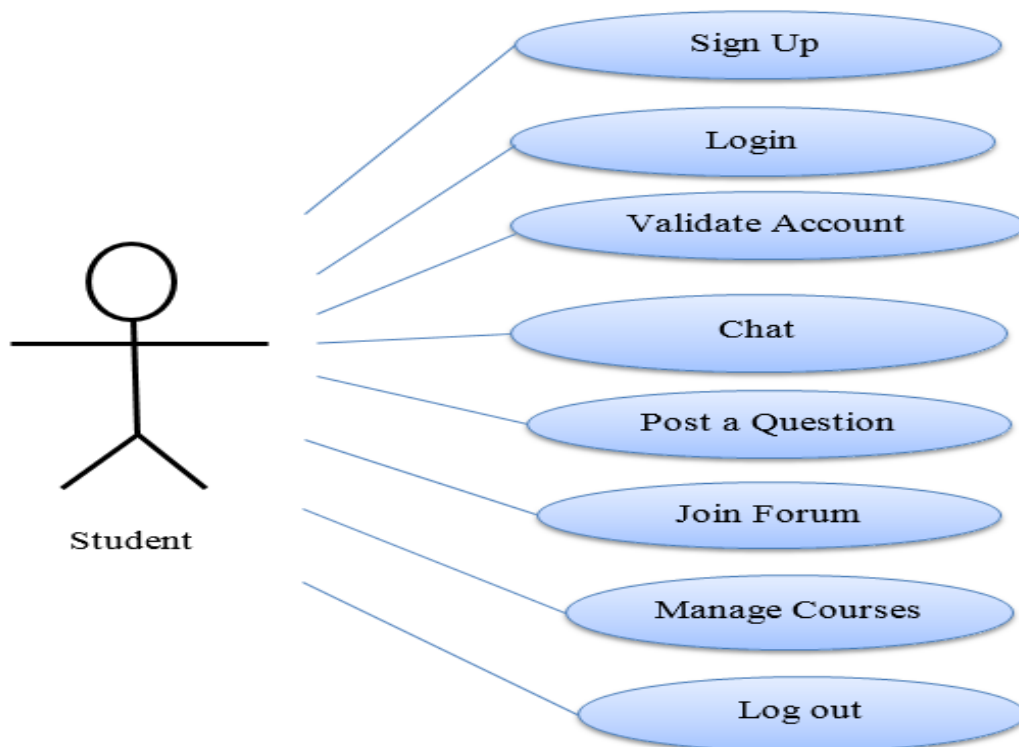


Fig. 1: Use Case Diagram for the Proposed System

Fig. 1 shows the use case diagram for our academic social networking system. The stick figure represents an actor. The actor is a student who can sign up, validate his/her account, login, post a question, chat with other students, join a forum, manage his/her

courses and log out. The student is not an actual person, but instead comprises the roles that a real person can play while interacting with the academic social network as a student.

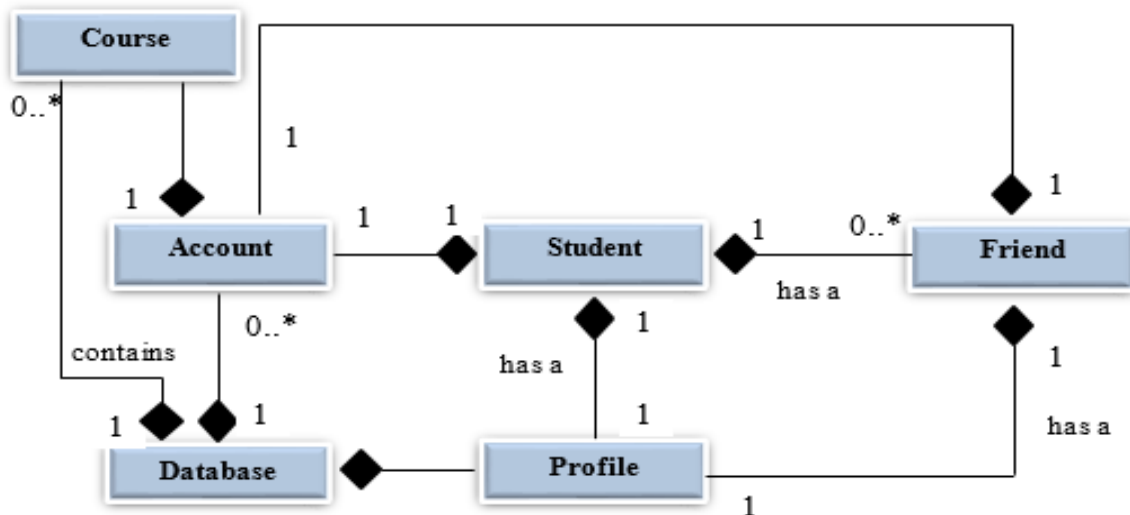


Fig. 2: Class Diagram for Academic Social Network System

Fig. 2 shows relationships between classes and the kinds of relationships. Each rectangle with a name inside it represents a class and its name. Association and Composition relationships can be seen in the class diagram. The lines represent associations. But the lines having solid diamonds at one end represent composition relationships. The solid diamonds attached to some of the classes' association lines indicate that they have a composition relationship with the classes. Composition is a whole or part relationship. For example, a student has an Account, a student has a friend, and a student also has a profile. The classes that have the solid diamond on their end represent the whole class, while the classes on the other end of the composition lines are the parts. The system also uses multiplicity in representing the class relationships. Classes Student and Account have a one-to-one relationship. In other

words, one object of the student class will have exactly one account. It also shows that classes Student and Friend have a one-to-many relationship: one object of the student class can have zero or more friends, indicated by the multiplicity 0..*. The "has a" clause on the composition lines explicitly tells the kind of association it is. For example, there is a "has a" clause on the association line between Student and Friend. And the solid diamond is on the student class, it means that one student has a profile. We also see that sitting between a student and a database object is the account class. We see that the database contains zero or more accounts at any point in time. The essence of the account class sitting between the student and the database is to authenticate a student. The database object has to authenticate a student account, to ensure that he/she is a valid student.

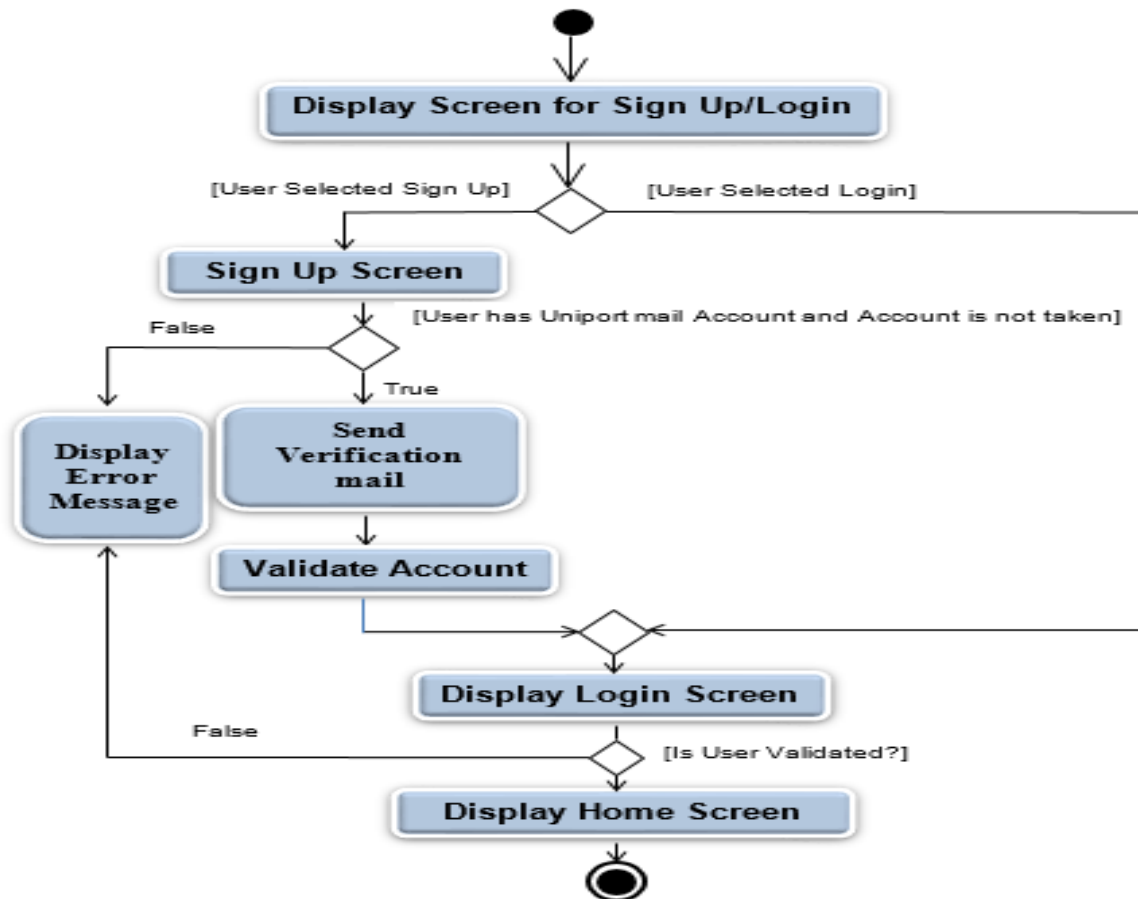


Fig. 3: Activity Diagram for Sign Up and Log in

Fig. 3 shows the activity diagram for sign up and Login. It models the actions that objects will perform in the system and in what order. The activity diagram begins by assuming that the user is at the first page of the application. The user is presented with a choice of either to sign up or to log in. In the case where the user selects sign up, the system requests some details to proceed with the sign up: one of which is a valid University of Port-Harcourt mail address. Once provided, an object of the database is instantiated and used to check that the mail address is not already taken. When confirmed that the mail address is a valid University of Port-Harcourt mail address and that address is not already taken, the

system proceeds to the next component of the diagram. The system then sends a verification mail to the University of Port-Harcourt mail address the user provided. Next the system validates the user's account: the user is required to enter the validation code sent to his/her mail address. The system simply changes the user's account status from "pending" to "active" if the code matches the one sent to the user. Otherwise, an adequate error message is presented to the user. The essence of account validation is to ensure that only valid students are users of the network, so as to prevent unwanted users from invading the network.

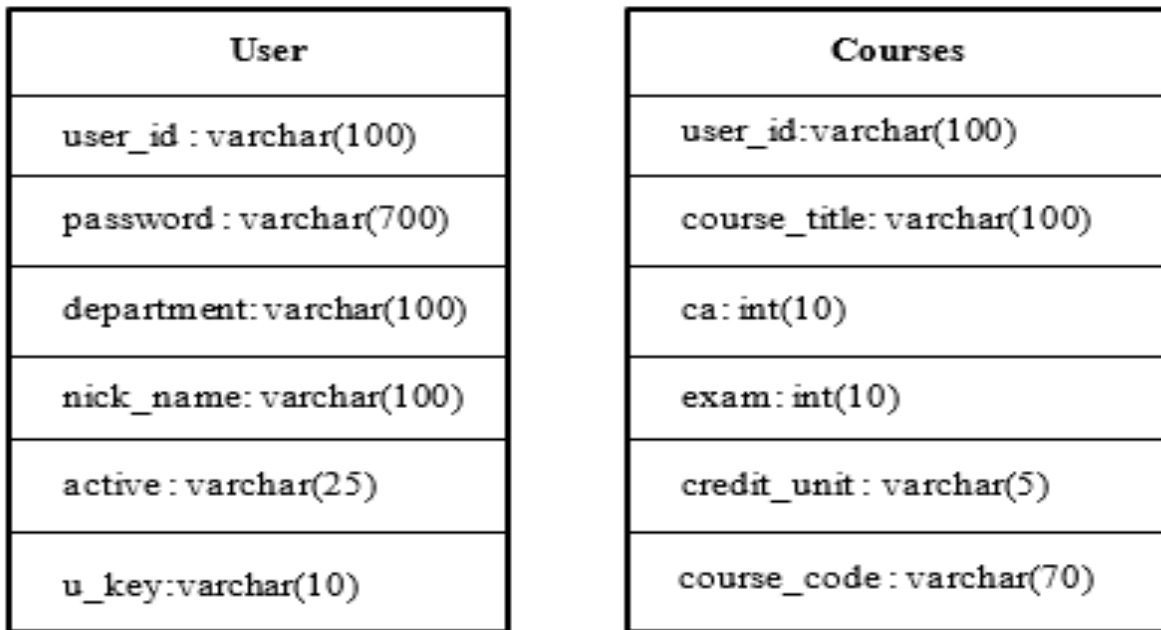


Fig. 4: Database diagram of tables in the Social Network Database

Fig. 4 shows two database tables in our system, their fields, data types and constraints. The diagram in Fig. 5 shows

two database tables “Question” and “Answer” and the relationship between them.

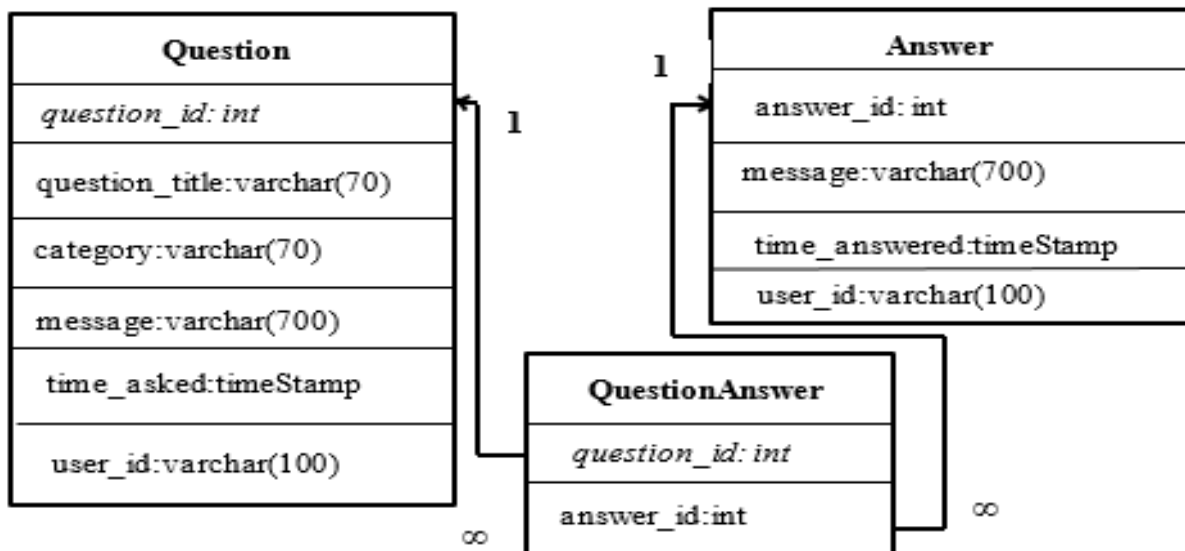


Fig. 5: Table relationships in the academic social network database

DISCUSSION

The application was tested with students of the University of Port-Harcourt. It keeps track of all courses a student takes by

plotting a chart of his/her grade points against the course title; thus showing a graphical representation of the student’s academic progress, grant the student access

to past-questions with credible answers in downloadable portable document format (pdf), provides a medium for a student to meet with other students who have similar academic interests in forums and groups allow students to chat and interact, while constraining them to the use of full spellings; thus ensuring mastery of correct spellings. The chat portal refuses the use of short words like “LOL” and incorrect spellings; this will improve the students’ spelling ability.

With the growing use of social networking sites like Facebook and Twitter, the methodology of education for students is finding a new course. Students can now collaborate with their colleagues, enhance their skills and access a variety of academic tools and resources.

Marc Prensky described today’s students as Digital Natives. He says “they spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age. According to him, “If we use these tools (social network sites) wisely and integrate them in teaching process, we can leverage student technology skills for learning purposes (Prensky, 2001).

According to a study carried out by Anjugu on the impact of social media on students’ academic performance using students of the University of Abuja, Nigeria, a great amount of time is spent on social networking sites than in academic activities by the students of University of Abuja. She also found that due to the large number of hours spent on social networking activities, the academic performance of students suffer setbacks, which leads to poor performance.

Anjugu recommended that sites should be created for educational purposes to avoid setbacks in the academic performance of the students (Ndaku, 2013).

Youmei Liu in his work, examined the benefits of integrating social media tools like Facebook and YouTube into the current educational system. However, he raised a salient point, stating that caution is to be taken when integrating existing social media in education. According to him, “not every tool is equally efficient for every subject area” (Liu, 2010). In other words, these social sites were not custom built for educational purposes. So trying to use them for education will have too many constraints and might have adverse effect. Silus et al, built a social network site for college students aimed at enhancing collaborative study and social interaction amongst students. Their study reveals that making social media tools a part of traditional learning is attractive to students and can motivate their participation in the learning process (K. Silius, 2010). Similar studies involved using a blogging platform (Nelson, 2008), and a social bookmarking tool (Waters, 2010) to engage students in projects that require collaboration and encourage content creation, editing and sharing.

In their work, Na Li, Sandy El Helou and Denis Gillet investigated the acceptability of using social media for collaborative learning in the context of higher education. A social media platform, Graasp, was used to support students’ learning activities in a project-based course. Graasp is a Web 2.0 application developed at Swiss Federal Institute of Technology in Lausanne (EPFL in French). It can serve simultaneously as an aggregation, contextualization, discussion,

and networking platform, a shared asset repository, or an activity management system (Na Li). They evaluated Graasp regarding its usefulness as a collaboration platform. Their results showed that students were satisfied with using Graasp to enhance knowledge management and collaboration.

Haven examined meticulously works by other scholars, this research developed a tailored social network for Nigerian Universities, with the intent of enhancing collaboration amongst students, while reducing the known negative effects of social networking on students.

The social network application is called “Uniport Konnect”. The name is just

another way of saying “Connect University of Port-Harcourt”. The software required for a client computer to run the application is an operating system and a web browser. The system is implemented with the Java Enterprise Edition 7 (Java EE 7) platform and MySQL relational database management system was used as the database. Glassfish Server Open Source Edition 4 was targeted as the build and runtime environment for Uniport Konnect. The system uses ajax (Asynchronous JavaScript and XML) to do the partial processing of the user’s input.

Fig. 6 shows that the user entered ernestagbewhe@yahoo.com as username. The system checked and displayed that the username is free to be used.

Fig. 6: Sign up Page Showing Partial Processing of User’s email

Upon clicking the sign up button, the system processed a validation mail and sent it to user’s email address provided and displayed

a message stating that validation mail has been sent to user email as shown in Fig. 7.



Fig. 7: Sign up page, showing Ajax message indicating that validation key has been sent to user's mailbox

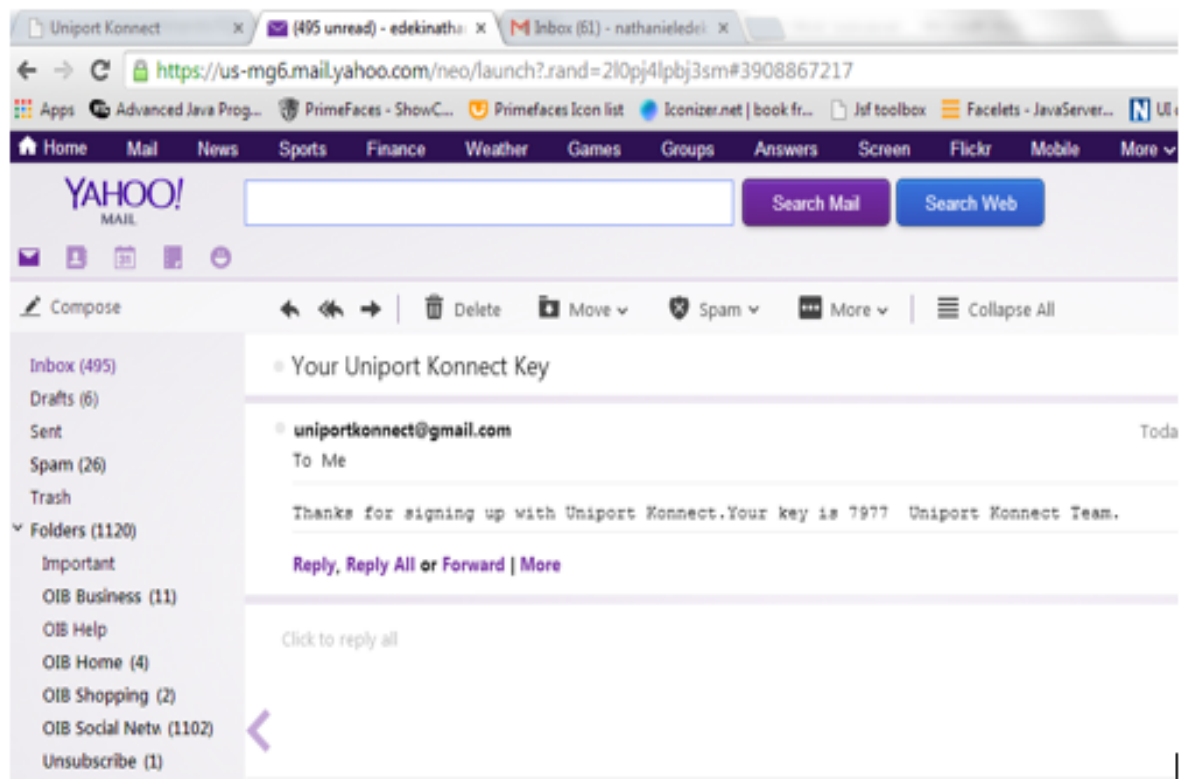


Fig. 8: Yahoo mail message showing content of validation mail sent from Uniport Konnect

Fig. 8 shows a Yahoo mail Message sent from Uniport Konnect automatic mail sender. The user is required to use the key in validating his/her account. Uniport Konnect

emulates most web applications which requires you to validate your account by sending a link or a key to the email address you provide.

This is a standard way of ensuring that only users who meet a particular requirement are allowed access to the application. Uniport Konnect has a robot-email-sender class,

which automatically generates random keys and sends the keys based on the current system time in milliseconds. The robot-sender is configured to send the keys using a Gmail Account.

The screenshot shows the Uniport Konnect activation interface. At the top, there is a blue header with the text "Uniport Konnect". Below the header, there is a "Sign In" button. A red error message box with a white 'X' icon contains the text: "The key you entered does not match the one sent to you." Below the error message, there are two input fields: "Username*" with the value "edekinathaniel@yahoo.cc" and "Key*" with the value "10023". Below the input fields is a blue "Activate Account" button. At the bottom of the form area, there is a link that says "Proceed to Login. [Click here](#) to Log in". At the very bottom of the page, there is a light blue footer with the text "Powered by: Nathaniel Concepts © 2014".

Fig. 9: Page showing partial update after user enters wrong activation code

Once the system displays the message shown in Fig. 7, stating that a validation key has been sent to user's mailbox, the user is required to open the message in his/her mailbox. This is shown in Fig. 8 where the key "7977" is sent to the user's Yahoo mail address.

The user inputs the key as shown in Fig. 9 in order to validate the Account.

The system saves a copy of the activation code sent to the user in the database. When the user enters the key and clicks the

"Activate Account" button, the system performs a check to ensure that the key entered by the user matches the one in the database. If there is a mismatch, the system displays the appropriate message.

Where the key entered by the user matches the one saved in the database, the system displays an appropriate message and ask the user to proceed to login. This is shown in Fig. 10. The essence of validation is to ensure that only valid students can have an account.

Fig. 10: Page showing Partial Update after User enters correct activation code

#	user_id	password	department	nick_name	active	u_key
1	alexonine@yahoo.com	a9986cd93224d17ddc61c...	aeb	alex	active	2001
2	amaebong@uniport.edu.ng	a9986cd93224d17ddc61c...	bch	ama	active	7035
3	edekinathaniel@yahoo.com	a9986cd93224d17ddc61c...	computerScience	Nath	active	7977

Fig. 11: Database view showing user details

In the sign in page, the user is required to enter a username and password. If the username, password combination is

incorrect, the system displays the appropriate error message as shown in Fig. 9.

Fig 11 shows that the database stores passwords in hexadecimal format. If a user enters a password, say “ama56kip”, the system uses SHA-512 hashing to convert the password to a 64-bit Hex code like “a9986cd93224d17ddc61c7de66e158bc35397799b149e06b4456dc3dd20900849611218db6076fcc8df4ec5ee32cff2b3f23a1d868a9ba2a5176c746e22eec8c”.

This is a way of ensuring that passwords are not stored as text in the database.

Once logged in, the user is presented with various options as shown in Fig. 13. The user can click any of the following tabs: Gradometer, Courses, Post Questions, Chat Rooms, Past Questions or Answer Hub.

The screenshot displays the Uniport Konkect interface. At the top, there is a blue header with the text 'Uniport Konkect'. Below the header, a navigation bar contains several tabs: 'Gradometer', 'Courses', 'Past Questions', 'Chat Rooms', 'Post Questions', and 'Answer Hub'. A notification box in the top right corner shows 'Course Added' with an information icon and a link to 'Edit Profile'. The main content area features a 'New Course' section with a plus icon and a minus icon. Below this, there are five input fields, each with an asterisk indicating it is required: 'Course Title*' (containing 'General Chemistry I'), 'Course Code*' (containing 'CHM 130.1'), 'C.A. score*' (containing '9'), 'Exam score*' (containing '25'), and 'Credit Unit*' (containing '3'). A 'Save' button is located below these fields. At the bottom of the form area, there is a 'My Courses' section with a plus icon. The footer of the page states 'Powered by: Nathaniel Concepts © 2014'.

Fig. 12: Gradometer form allowing user to register Course details

Clicking on Gradometer, user can add a new course and save as shown in Fig. 12. When the user clicks save, the system displays an appropriate message stating that course has been added. The user can also expand the “My Courses” panel shown in Fig. 13 to

view, edit or delete a course. Five fields are required: Course Title, Course Code, C.A. score, Exam Sore and Credit Unit. If any of these fields is empty, the system displays an appropriate error message; stating that the field is required.

Course Title	Course Code	Credit Unit	C.A.	Exam	
Communication Skills in English	GES 100.1	3	20	33	<input type="button" value="⌵"/>
Algebra and Trigonometry	MTH 110.1	3	25	55	<input type="button" value="⌵"/>
Calculus	MTH 120.1	3	22	50	<input type="button" value="⌵"/>
Mechanics and properties of Matter	PHY 101.1	3	15	25	<input type="button" value="⌵"/>
Descriptive Statistics	STA 160.1	2	20	25	<input type="button" value="⌵"/>
General Chemistry I	CHM 130.1	3	9	25	<input type="button" value="⌵"/>
Laboratory Practise I	PHY 102.1	1	12	10	<input type="button" value="⌵"/>
Linear Algebra	MTH 210.1	3	23	20	<input type="button" value="⌵"/>
Introduction to Probability and Statistics	STA 260.1	3	25	55	<input type="button" value="⌵"/>

Fig. 13: Form showing Courses to be used for plotting Grade Chart

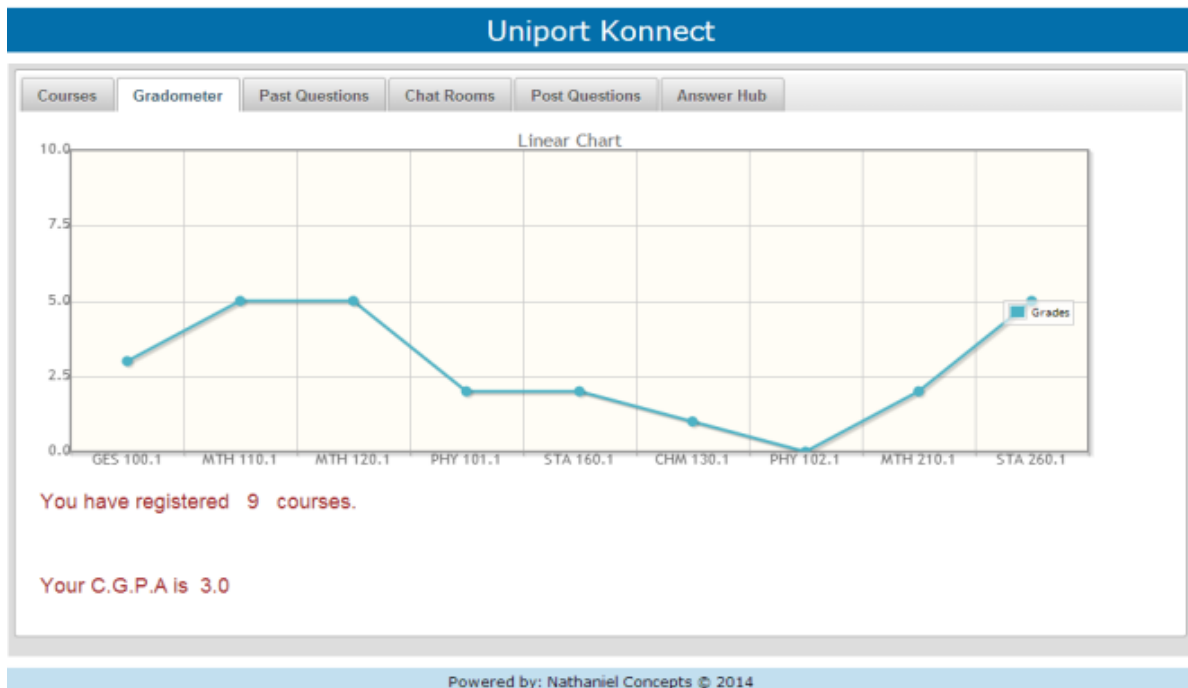


Fig. 14: Grade Chart showing Grade Points against Course Codes

Fig. 14 shows the grade chart of the logged in user. The system computes the grade points of the following user course codes: “GES 100.1”, “MTH110.1”, “MTH 120.1”, “PHY 101.1”, “STA 160.1”, “CHM 130.1”, “PHY 102.1”, “MTH 210.1” and “STA 260.1”. The grade points are: 3, 5, 5, 2, 2, 1,

0, 2 and 5 respectively. The grade points correspond to C, A, A, D, D, E, F, D and A respectively. The system also computes and displays the total number of courses the user has registered and the user’s C.G.P.A, which is 3.0.

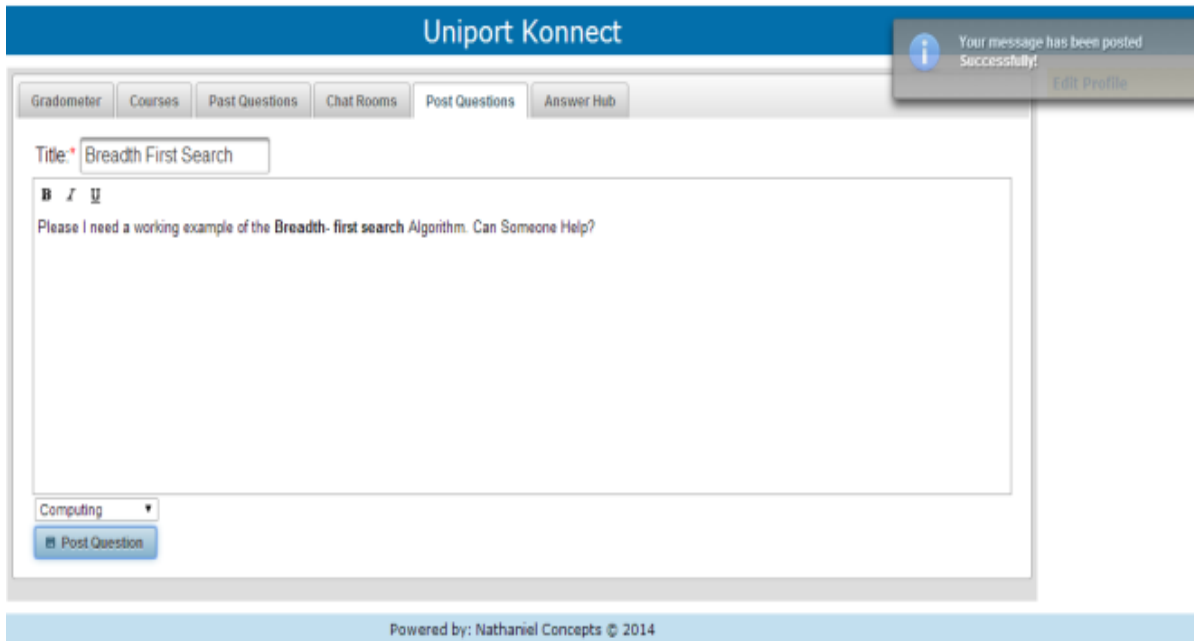


Fig. 15: Form allowing User to post a Question

Fig. 15 shows the form displayed when the user clicks the “Post Question” tab. The user is then able to enter a question and post it for other users to answer. The required fields are title, message and category. The title of the question is “breadth first search” and the category is computing. After the user clicks the “Post Question” Button, the system adds the question to the

database pool of questions. Once the question has been added, the system displays a message to indicate that the question was posted successfully. The user is able to view questions posted and rate the answers given in the answer hub tab of the app, as shown in Fig 16.

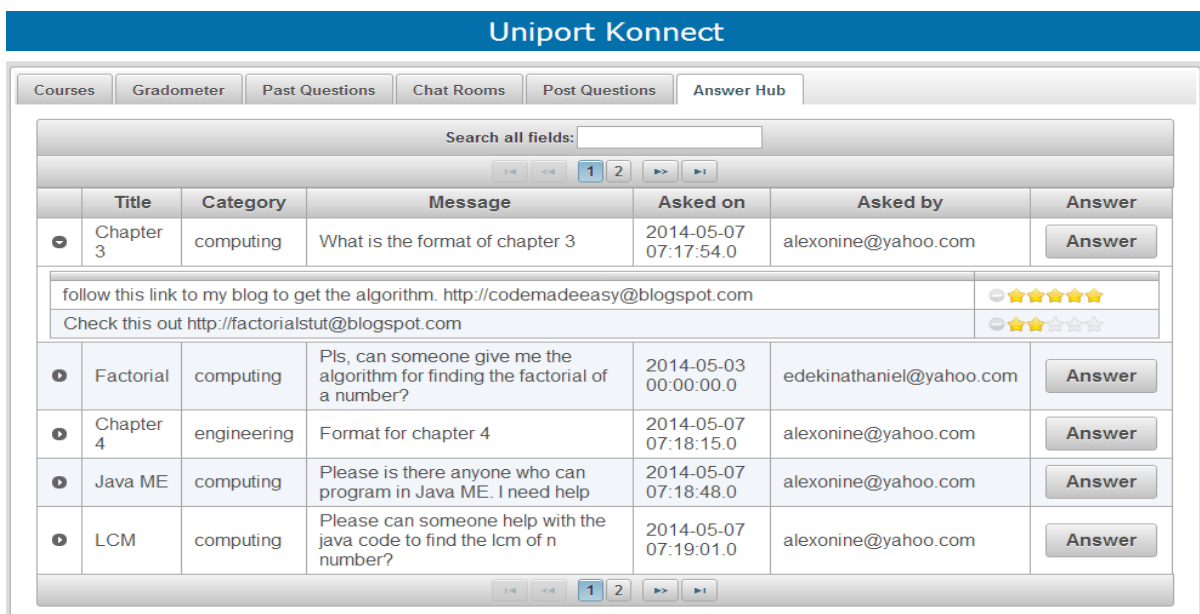


Fig. 16: Answers to questions with ratings

The “Answer Hub” can be seen; which contains all questions asked by Users together with the answers other users have given. It contains the title, category, message, asked and asked by fields. Clicking on the small toggle button on the left of each question allows all the answers given to be shown in a drop down. A user can rate a particular answer by clicking on the rating stars towards the right of each

answer. A 5 star is the highest, while a 1 star rating is the lowest rating. Answers with higher ratings are displayed first before answers with lower ratings. This is to ensure that the best answers get the credit. The current user of the system might decide to provide an answer to the question. This can do this by clicking the answer button towards the right of a question. This pops up a dialog to allow the User enter an answer.

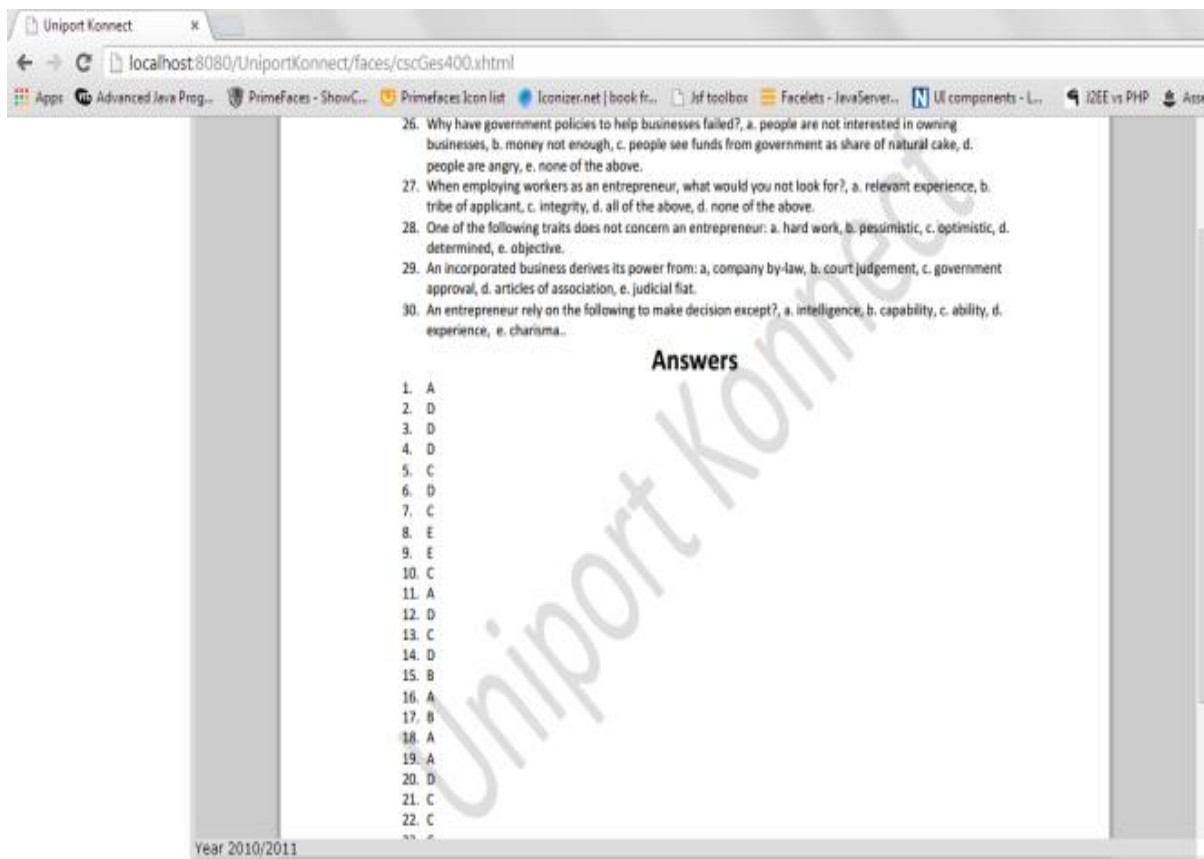


Fig. 17: Past question in PDF

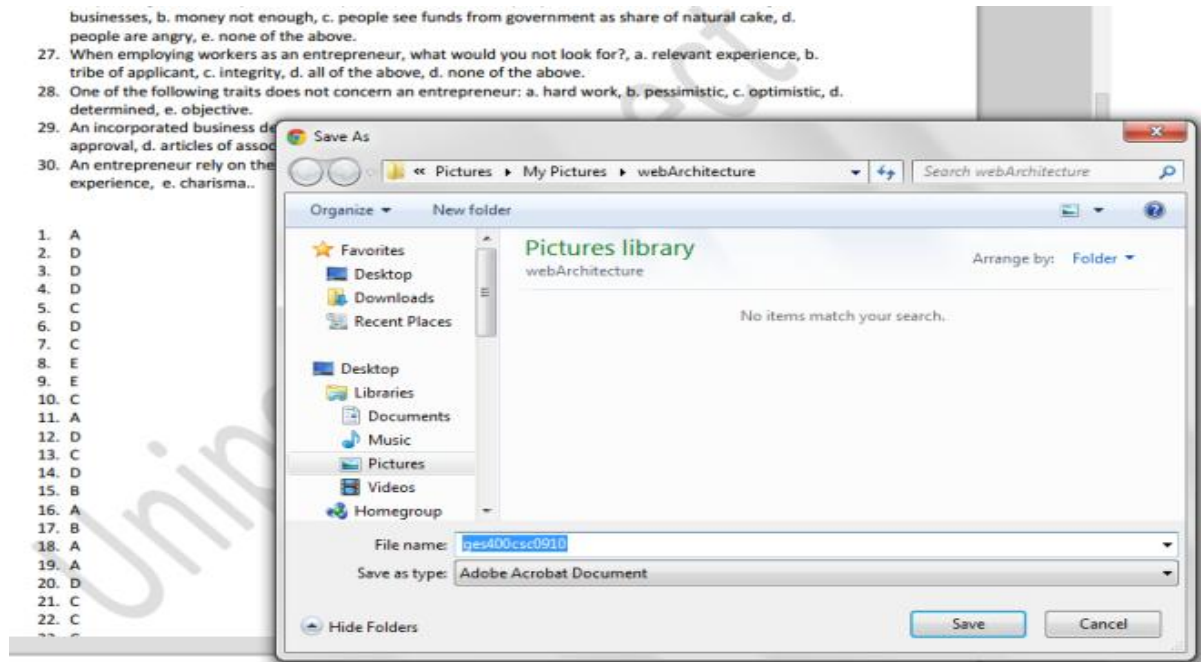


Fig. 18: Save dialog showing options for user to download past question

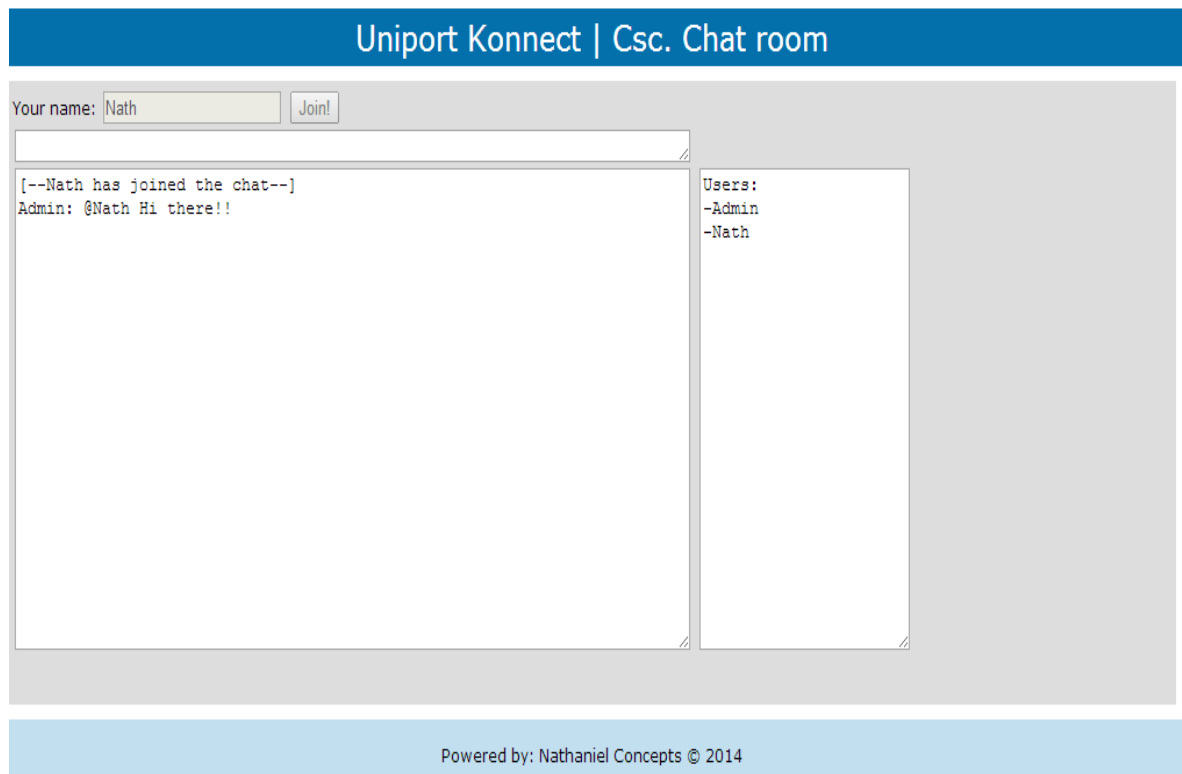


Fig. 19: chat room

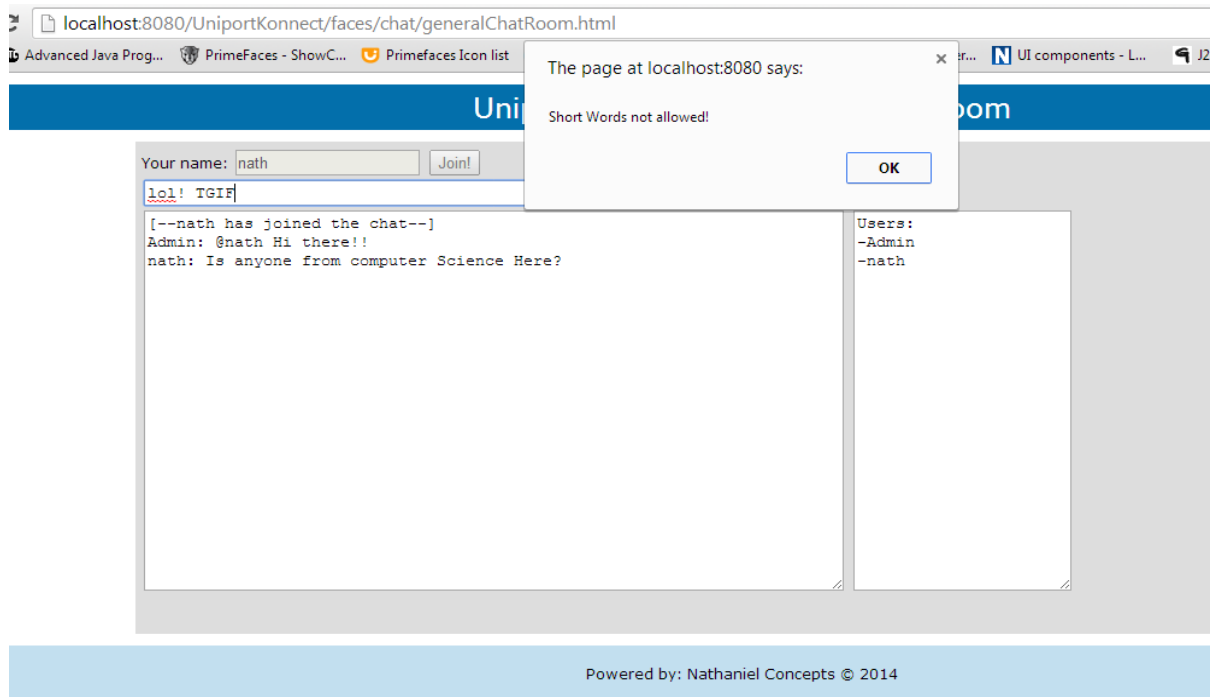


Fig. 20: Chat portal refusing short words



Fig. 21: Page to allow user to report another inappropriate activity

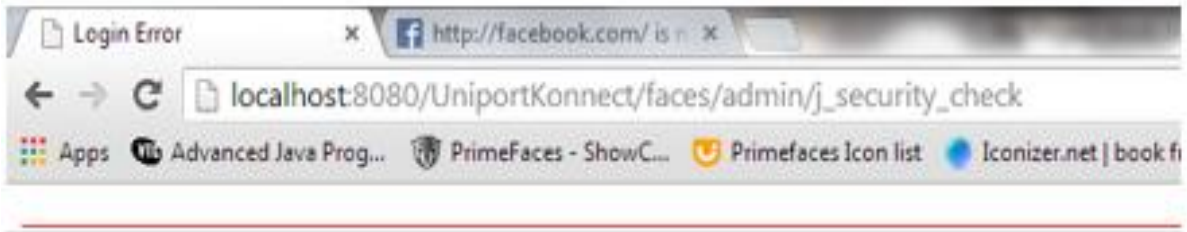


Uniport Konnect Admin Console

Username

Password

Fig. 22: Admin login



Invalid Username or Password

Sorry! You do not have Access to this page.

Fig. 23: Admin user entered invalid login details

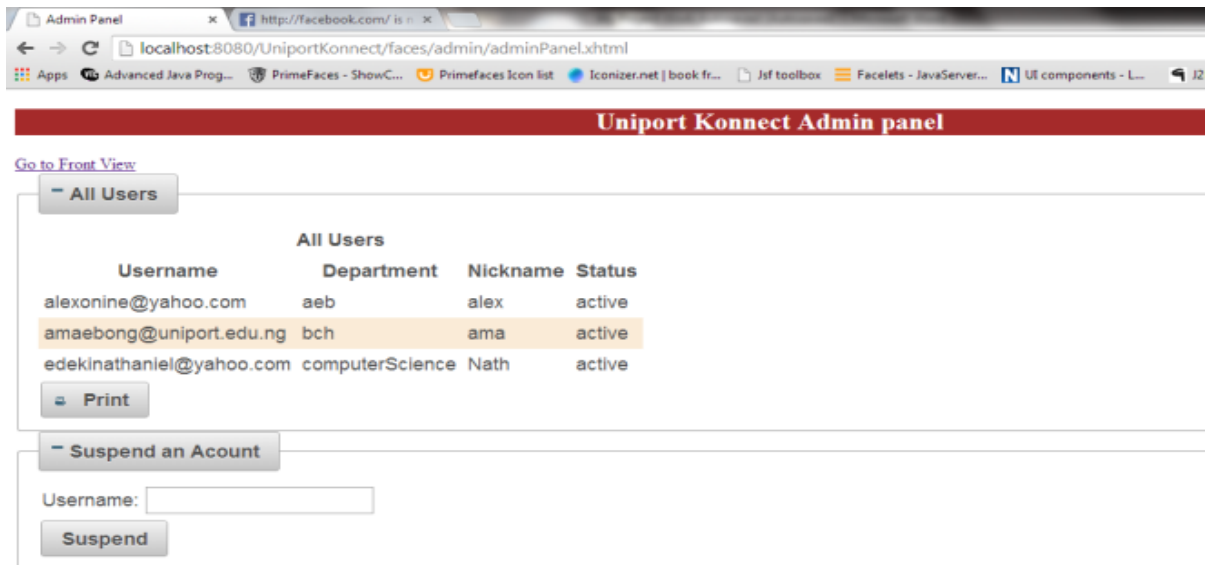


Fig. 24: Admin console view

In Fig. 17, the system displays the past question the user requested in PDF. The user is presented with the choice of selecting a department and a course. Once the user selects a course, the past question is displayed year after year. To ensure that only the correct answers to questions are available to users. The past question section is handled by the site administrators alone. The answers to the questions are displayed immediately after the questions.

The user is able to download and save the past question as shown in Fig. 18. Once the user clicks the save button at the bottom of the PDF reader, a save dialog opens and the Past Questions Page can be downloaded after entering a file name.

The system has chat rooms, which allow users chat with one another. Fig. 19 shows a user in computer science chat room. As soon as he enters, he is greeted by the admin. The right section shows a list of all the users present in the chat room. Only two Users are present; Admin and Nath. Students can fix meetings in their chat

rooms and discuss course issues. When more users join the chat, the right section; which shows the list of all users increases to reflect the additional users. At any point a user decides to stop chatting, returning to the home page removes the user from the chat room. The users list at the right corner of the chat page also gets updated to show that the user has left the room.

But the system is required to block short words and incorrect spellings to force students to spell in full, thus improving their spelling abilities. This is shown in Fig. 4.18. Words like: "LOL", "TGIF", and "LWKMD", which mean "Laughing out loudly", "Thank God It's Friday", "Laugh Wan Kill Me Die" respectively are not allowed. Fig. 20 shows that such short words are not allowed, forcing students to spell in full. When a user enters a line of text containing any of these short words, the system blocks sending this text and displays. An appropriate error message, stating that such short words are not allowed.

Fig. 21 shows a section where a user can report inappropriate activities in chat rooms or answer hub. The reporting user has to specify a username of the user he/she is reporting and state the complaint, which will enable an administrator look into the complaint and take appropriate action. The only action allowable in our application is suspending a user's account. It will be detrimental to the growth of the application for an admin to permanently delete a user's account. Once a user's Account has been suspended, the admin is required to send the user an email notification to that effect.

Site Administrators are given an account that has username and a password. The administrator account is configured in the file realm of the GlassFish Server. But the username and password can also be changed from the server config node of the Server domain console.

Fig. 23 shows the admin console of the Uniport Konnect. An administrator is required to enter the admin username and password to access this portion of the application.

All pages that match the pattern

http://8080/localhost/UniportKonnect/admin/* are configured to request admin username and password.

The user will immediately be taken to the admin console to input the admin username and password. If the username and password combination are correct, user is taken to the admin page shown in Fig. 24. Otherwise the user is taken to the error page as shown in Fig. 25.

The results obtained from this research show that, social networking can be used as

a tool to enforce collaboration; which is a vital link in education. Students of Nigerian Universities require a platform to enable them share information, review past academic materials and solve problems. Social networking, when tailored to meet academic needs, proves to be a great tool in aiding collaboration amongst Students. This developed system has made it possible for students of the University of Port-Harcourt to collaboratively solve academic and research problems, while keeping them motivated towards their academic goals.

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