

DEVELOPMENT OF EDUCATE: A SOCIAL NETWORK WEB APPLICATION FOR E-LEARNING IN THE TERTIARY INSTITUTION

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ABSTRACT

In this paper a web application that integrates social network functionalities into e-learning platform is presented. The web application named *Educate* has functionalities that include among others; sharing files, sharing updates, creating courses, adding courses, participating in discussions, submitting assignments and participating in surveys. The targeted users are students and lecturers in tertiary institutions. Notably, *Educate* is developed to take advantage of the increasing adoption of social network across the globe and in Nigeria as well. The results of the survey carried out in the project shows that all correspondents agree that social networks are beneficial to education. However, sixty-seven (67) % of correspondents rarely use these networks in an educational capacity. Also, seventy-three (73) % of respondents think Educational institutions in Nigeria do not make the most of social networks. These results show that there are huge opportunities for improving the use of social networks for educational purposes in Nigeria. Also from the results of the survey, Seventy-three (73) % of respondents rated *Educate*'s user friendliness as good while thirteen (13) % rated it as being excellent. All respondents think *Educate* would actively engage students in the learning process. All respondents also think *Educate* would create an avenue for online collaboration and knowledge sharing. With the results of the survey, it is believed that the developed web application (*Educate*) would assist in solving problems of collaboration, distance learning, as well as being a connection and knowledge sharing platform for students and tutors.

Keywords: E-learning, learning management systems; Social Network Site (SNS) ; Education Supporting System ; tertiary education; Web Application; incremental software development methodology.

INTRODUCTION

Over the last few decades, social networking websites have continued to add value to information sharing and collaboration (Wates, 2014; Bott and Spillius, 2014 ; Wrzu, Hänel, Wagner and Neyer, 2013). Social Network Site (SNS) is a web-based service that enables individuals to 1) create a public or semi-public profile within a bounded system, 2) form relationships with other users of the system, 3) view their connections and the connections of other users of the system, and 4) create and distribute content within the system (Boyd and Ellison). Particularly, SNSs which were developed to support learning, allow learners to participate in the creation of content, and they also facilitate collaboration and interaction among students and between students and staff. However, the popular generic social networking sites are not particularly suitable to educational process, and they expose students to negative tendencies and dangerous activities prevalent in such sites (Them, 2009; Hargadon, 2009). In this paper, a niche social networking web application, termed 'Educate', is presented. *Educate* is an educational networking web application which basically utilizes social networking technologies for educational purposes. *Educate* allows its users to connect,

interact and receive various educational services and supports aimed at improving on the quality of education offered to the students. It includes functionalities like file sharing, communication (chat and discussion forums), online community and social networking technologies (profiles, connections). In addition, it includes facilitated innovative learning services that enable customized learning processes suitable for the students. Educate also aims at offering a solution to the imbalance in the student-to-staff ratio that is prevalent in most developing countries. With respect to the students, Educate improves on the level of availability and accessibility to the teachers.

REVIEW OF RELATED WORKS

Basically, a social network is a map of the relationships between individuals, indicating the ways in which they are connected through various social familiarities ranging from casual acquaintance to close familial bonds (Leinhardt, 2013; Burt, Kilduff and Tasselli, 2013); Kwak, Park and Moon, 2010 ; Ellison, 2007). Sites like Facebook and MySpace allow users to build and customize their own profile sand communicate with friends (Tiggemann and Slater, 2014). Social networking sites typically let users develop a list of friends and they can be applied to address some of societal challenges including eliminating of barriers to quality education resources and services.

As regards social network for education, Junyi (2012) proposed a modular design with which he developed network education platform that has four modules (fig 2.1).

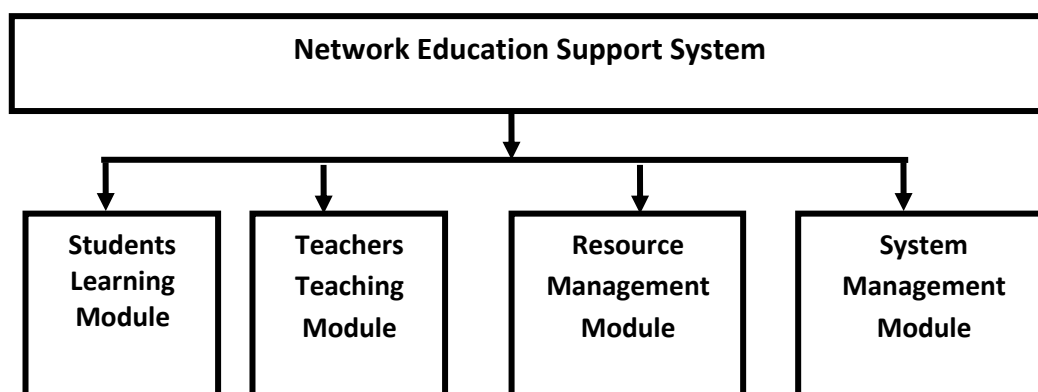


Figure 2.1 Overall Structure Of Network Education Supporting System (source: Bouras, et al. 1998)

The four modules connect and co-operate with each other to form a complete network education system. In the network education system, learners can achieve personalized settings of personal learning space in the learning system, which includes skin settings of the space, modules' priorities in space. These functions are achieved using ASP.NET 2.0, xml and AJAX. The modules include: Learning module for students; Teaching module for teachers; Teaching resources management module and System management module.

In addition, Bouras et al (1998) proposed a session design. A session was defined as a Computer Supported Collaborative Learning/Work (CSCL/W) activity. The participant who creates a session (the leader) has full permissions and manages that session. Other participants (except from the leader participant) have the permissions that the leader participant has given to them. The advantages of this model are interactive communication

with the use of video and audio; independence from the operating platform and user friendly and familiar user interfaces.

Furthermore, Hargadon (2009) proposed that an educational networking website should have functionalities which are useful for learning and teaching. He suggests the functionalities should include among other things; profile page, friending, forums, photo/video/audio/document uploading, directory, event calendars, groups and chat (Them, 2009; Hargadon, 2009). However, in spite of the fact that these network sites are focused on education, they differ in their online community policies, the mix of functionalities and their strategies for facilitating the creating and sustenance of online connection, interaction, collaboration and community building as they relate to educational processes. As such, in this paper, a niche social network with a unique mix of functionalities and strategies that can address the challenges to education in the developing countries is presented.

METHODOLOGY

Educate is a software system; as such an iterative and incremental software development methodology is used to develop the *Educate* social networking web application. Focused group discussion with low fidelity prototyping, brain storming, interview and questionnaire are the techniques used for the requirement elicitation. Top down functional decomposition and stepwise refinement approaches are used in the design stage. Three tier architecture is used to accommodate the client (browser), the web server and the database components of the *Educate* social networking web application.

FUNCTIONAL DECOMPOSITION OF THE WEB BASED EDUCATIONAL NETWORKING AND MANAGEMENT SYSTEM (EDUCATE)

The *Educate* web application contains three major modules; Student Module; Tutor Module; Administrator Module. The student module has the following functionalities: educational networking; forum; adding and removing courses; submission of assignments; participating in surveys; sharing of documents including books, videos and audio files; viewing results on the various added courses. The tutor module is used by activated tutors; the tutors create courses which are added by the students. The functionalities included in the tutor module include: Educational networking; Forum; Creating and deleting courses; Viewing the result of surveys; Management of submitted assignments; Deleting of irrelevant posts on courses and Create courses. The administrator's module is designed to manage the users and their activities on the web application. The administrator could perform the following functionalities: activating students; activating courses created by tutors; activating tutors; adding departments and assigning head of departments and course representatives.

DESCRIPTION OF THE FUNCTIONALITIES IN THE *EDUCATE* SOCIAL NETWORKING WEB APPLICATION

- i. **EDUCATIONAL NETWORKING:** This functionality allows students and tutors to post, update , share documents and comments on any content pertaining to any course and these documents or contents can be accessed by other registered users who have added such courses to their *Educate's* portfolio.

- ii. **COURSE CREATION:** Users who registered as tutors in Educate are able to create and delete courses. Student users can add to their *Educate's* portfolio those courses that are created by Educate tutor members.
- iii. **ADDING AND REMOVING COURSES:** Student users in Educate are able to add courses that have been created by tutors. After adding courses, they can make updates, share documents and participate in discussions on their added courses.
- iv. **FORUM:** The forum functionality in Educate allows students to collaborate and share knowledge. It is called a discussion corner. Students or tutors could ask questions and receive answers from other members of the course. Answers to questions could also be improved by other users.
- v. **ASSIGNMENT SUBMISSION:** This functionality allows students to submit assignments to the course tutors who are able to download submitted assignments for review. Assignments to be submitted are added by tutors with deadlines, after such deadlines, students are not able to submit assignments.
- vi. **SURVEYS:** Surveys can be carried out by students based on the courses they have added. The results of these surveys can then be viewed by the course tutors.

FLOWCHART FOR VARIOUS FUNCTIONALITIES IN THE EDUCATE WEB APPLICATION

Educate has many modules and their functionalities some of which include:

1. User Registration and Activation Module
2. Student Module
3. Student Home Page Functionalities
4. Student My Courses Page Functionalities
5. Tutor General Module
6. Tutor Home Page Functionalities
7. Tutor Courses Page Functionalities
8. Discussion Module

The flowchart for the user registration and activation module is presented in figure 3.1.

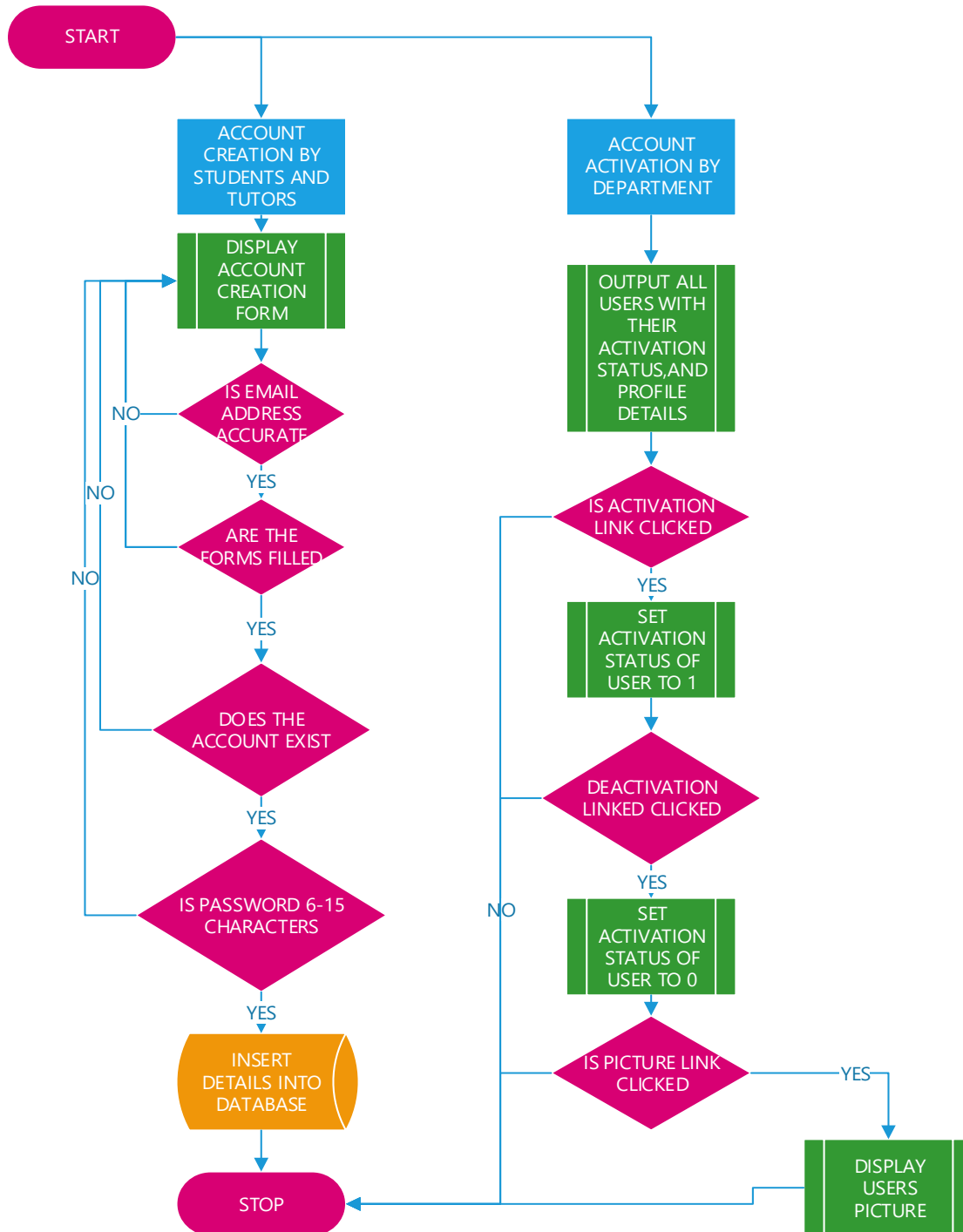


Fig 3.1 User Registration and Activation Flowchart

To sign up on the site, the user goes to the sign-up page where the account creation form is displayed. The user has to fill the sign-up form and submit it. On submission, if any of the required fields are empty or do not have the required information, the user is alerted with an error message indicating the fields that need to be re-filled. Figure 3.1 also presents the account activation process. The account activation is done by the site administrator. The account activation page contains user’s information. The site administrator could activate or deactivate users by clicking on the activate or deactivate link respectively.

Figure 3.2 presents the functionalities available in the student module.

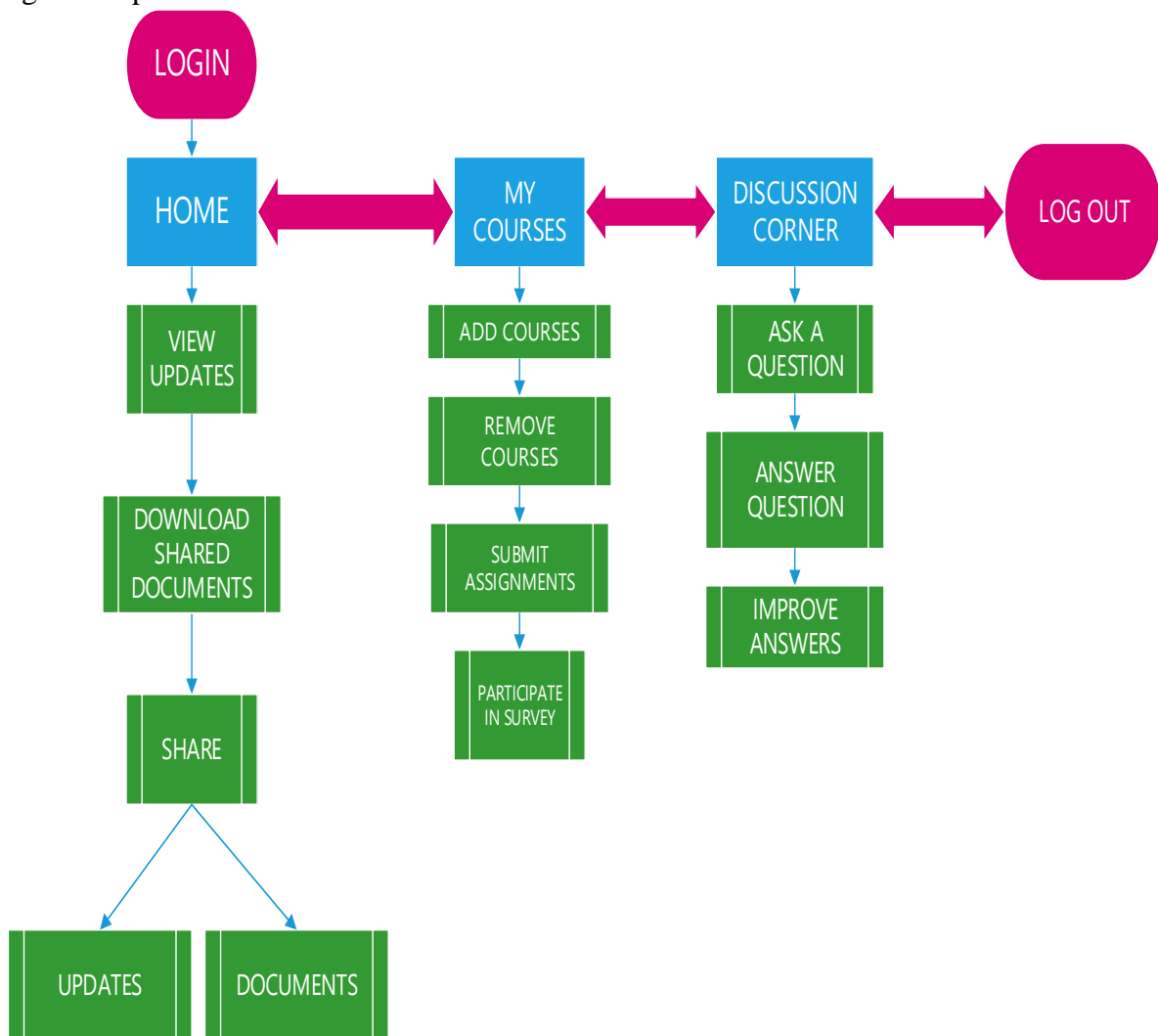


Fig 3.2 Functionalities In The Student Module

On the student’s Home page, the user can view updates, download shared documents and share updates or documents. On the My Courses page, the user can add courses, remove courses, submit assignments and participate in surveys. The process flowchart for the student home page is presented in figure 3.3. The user needs to add courses through the add course process to be able to use the available functionalities.

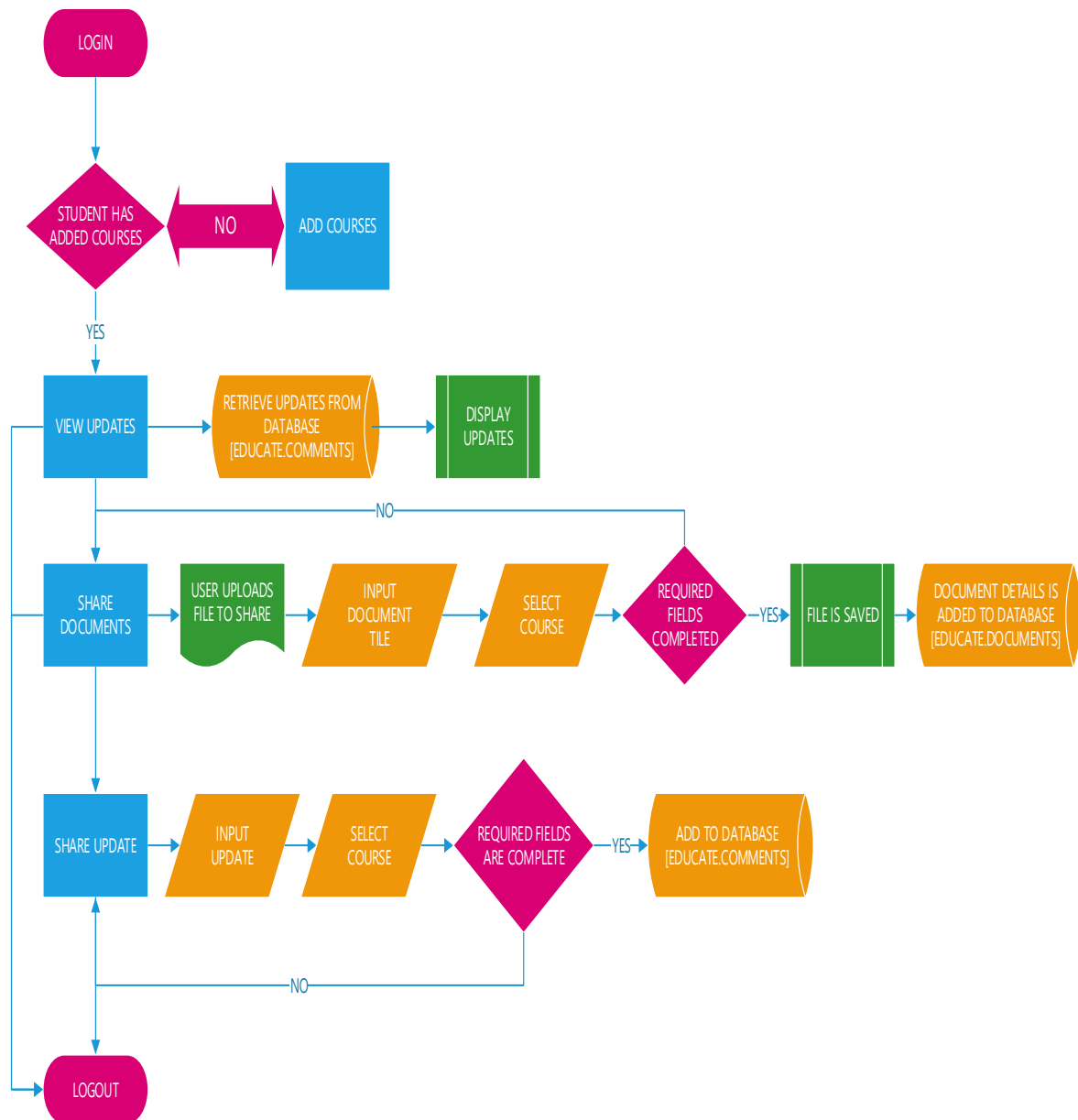


Fig 3.3 Student Home Page Functionalities

Figure 3.4 presents the process flow chart for the student’s *My Courses* page module. The functionalities available in this page include adding courses, removing courses, submitting assignments and participating in surveys.

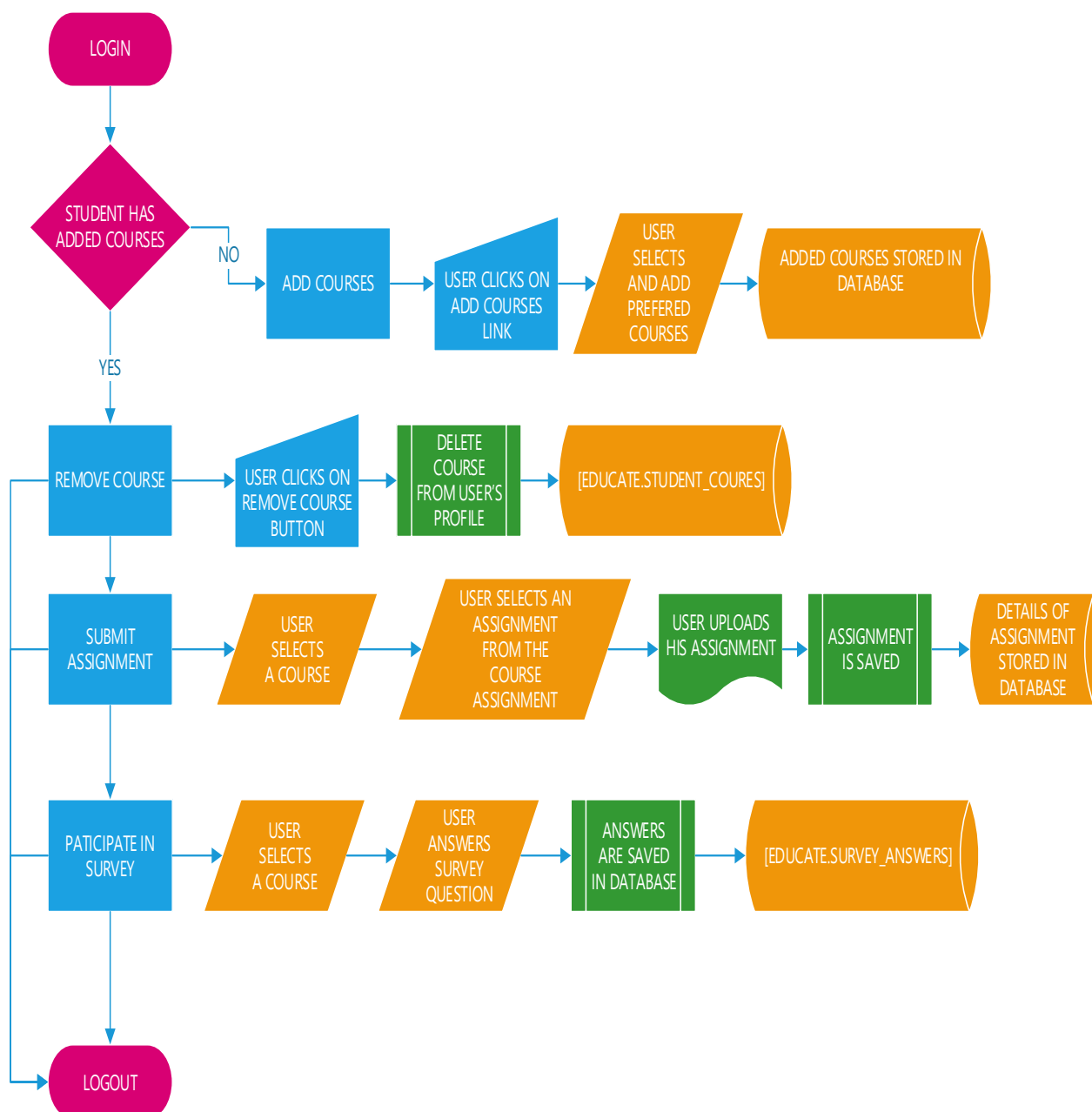


Fig 3.4 Student My Courses Page Functionalities Flowchart

From figure 3.4, to add a course, the user clicks on the “*add courses*” link. The user then selects and adds the preferred courses and the users preferred courses are stored in the database. The process for submitting assignments is also presented in figure 3.4. The user selects a course from the list of added courses and then selects an assignment from that course. The user then uploads the document to be submitted and clicks on the submit button. As presented in figure 3.4, to participate in a survey, the user selects a course, and then goes to the page showing the survey questions on that course. After answering the survey questions, the user then clicks on the submit button. The survey answers are then stored in the Educate database. The functionalities available to in the tutor module are presented in figure 3.5. The tutor can view updates, delete updates, download shared documents and share updates and documents on the home page. On the tutor’s *My Courses* page, the tutor can create courses, delete courses, view survey results and manage assignments. Figure 3.5

displays the processes in the tutor's *discussion corner* page. This includes asking a question, answering a question and improving on the answers by updating their contents.

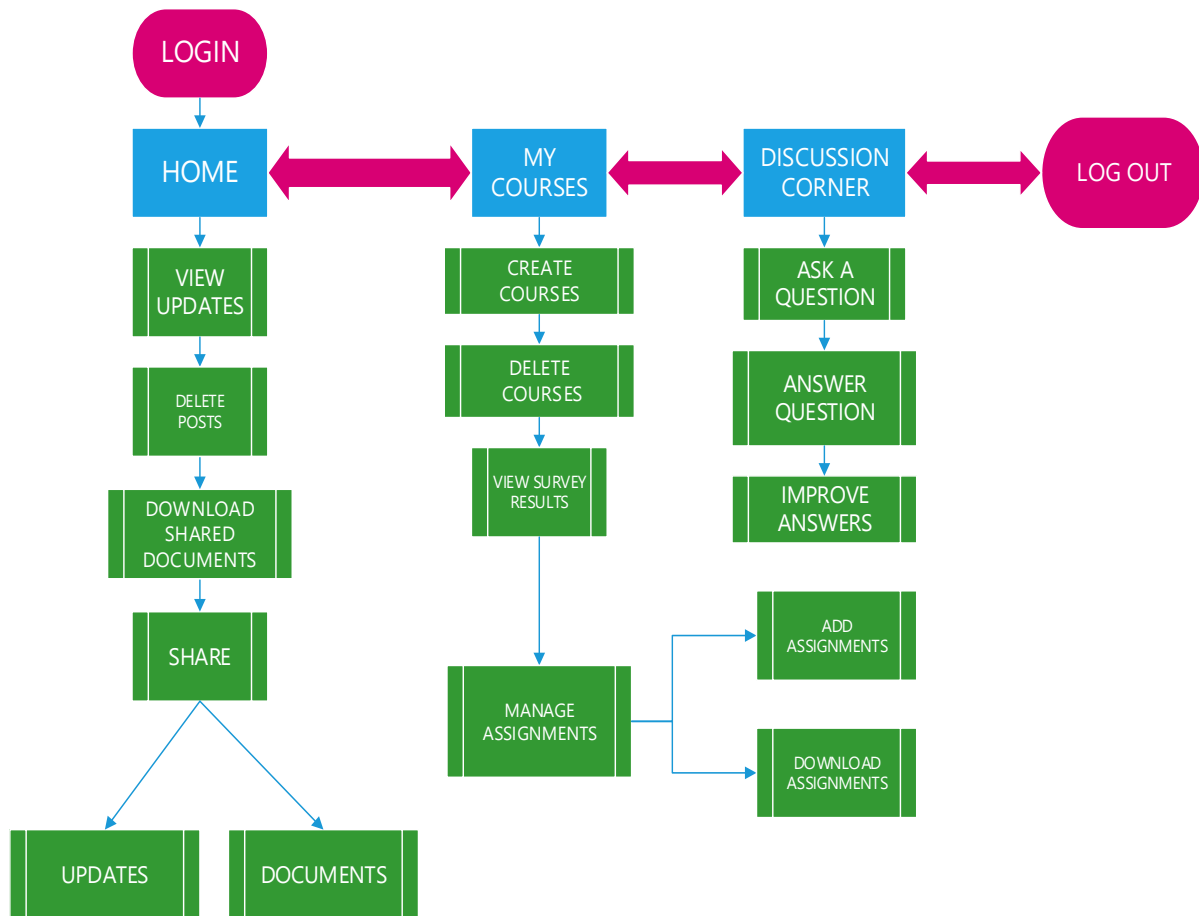


Fig 3.5 Functionalities in the Tutor Module

Figure 3.6 presents the process flow chart for the tutor home page. The processes for the functionalities are similar to those of the student home page.

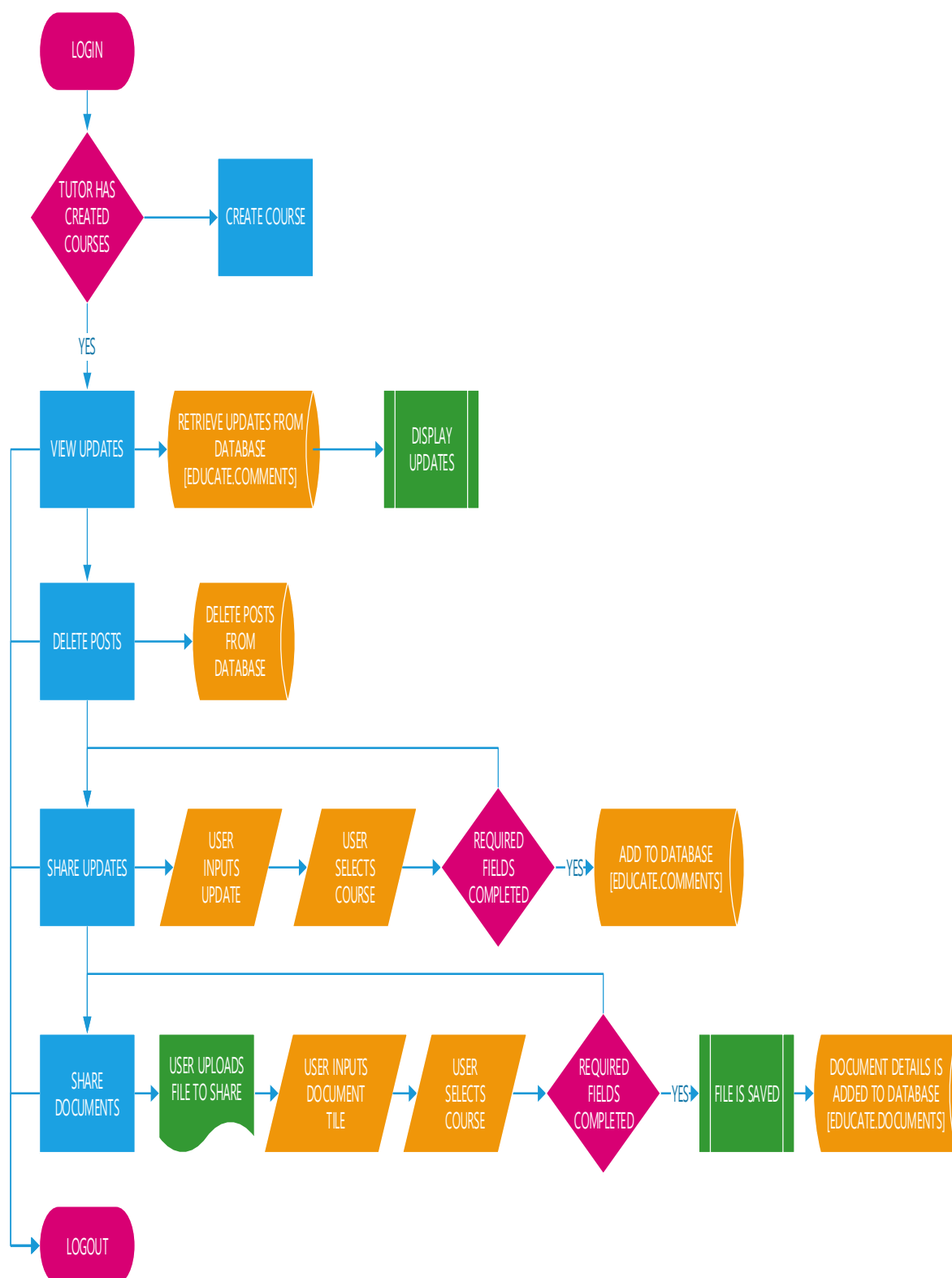


Fig 3.6 Tutor Home Page Functionalities

To delete irrelevant posts from students, the tutor clicks of the delete link and the post is deleted from the database as shown in figure 3.6. The process flow chart for the tutor's My Courses page is presented in figure 3.7. On login, the tutor has to create course(s). To create a course, the tutor selects the department handling the course and inputs the course title and course code; if the course code already exists, an error message is generated to inform the

tutor of duplication of a course, otherwise the course is created and the details are stored in the Educate database. Furthermore, in figure 3.7, if a tutor deletes a course it is deleted from the Educate database.

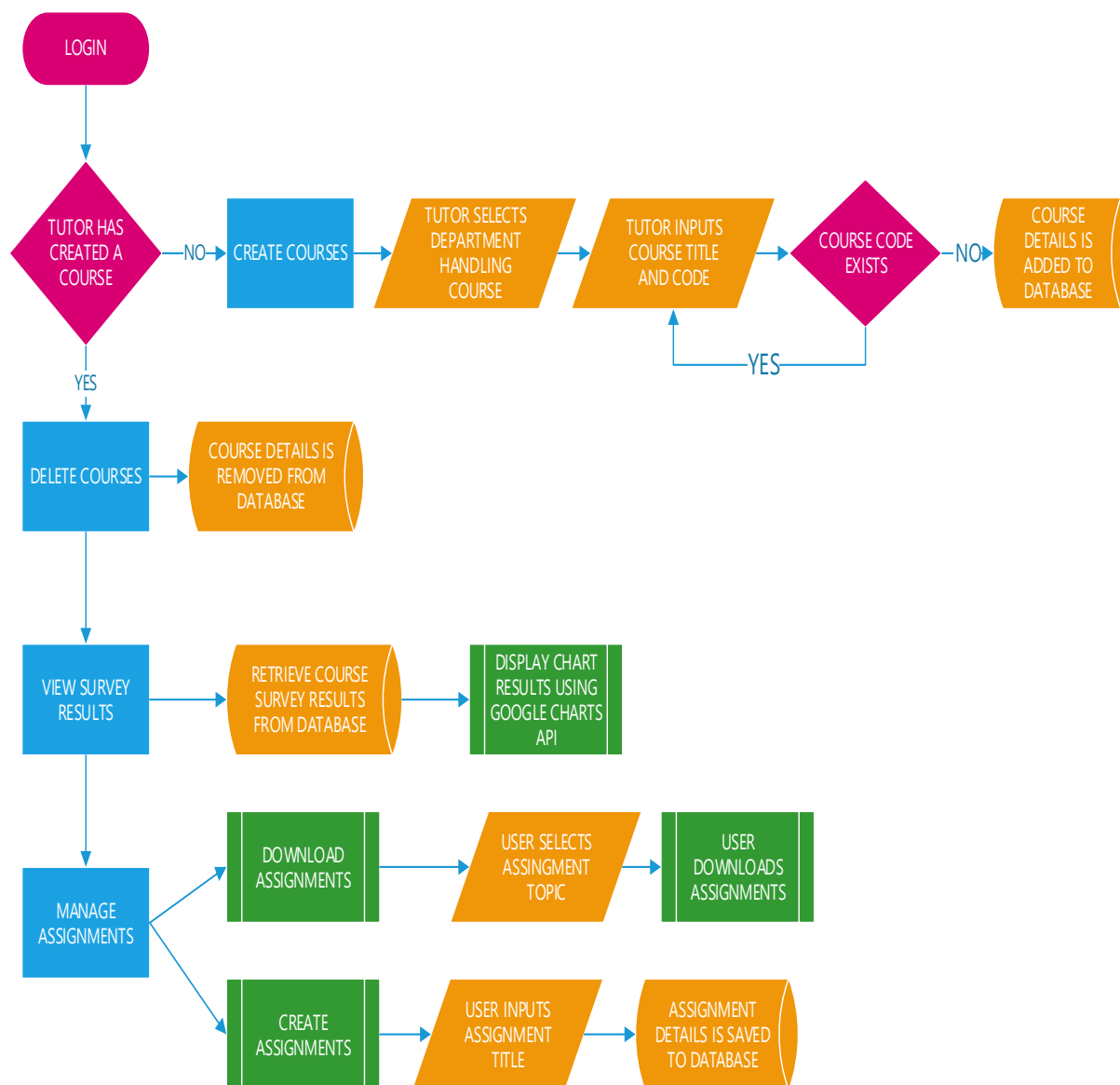


Fig 3.7 Functionalities of My Courses Page In the Tutor Module

The process by which tutors are able to manage assignments is also presented in figure 3.7. Tutors could either create assignments or download submitted assignments. To create an assignment, the tutor inputs the assignment title and submission date into the assignment creation form. If the required fields are completed, the assignment is added to the applications database. Tutors are also able to download submitted assignments. The tutor selects an assignment topic and all submitted assignments are displayed. The tutor can then download the assignments for each student.

Figure 3.8 presents the process flow chart for the discussions module. The discussion processes are similar to those of the student's discussion page.

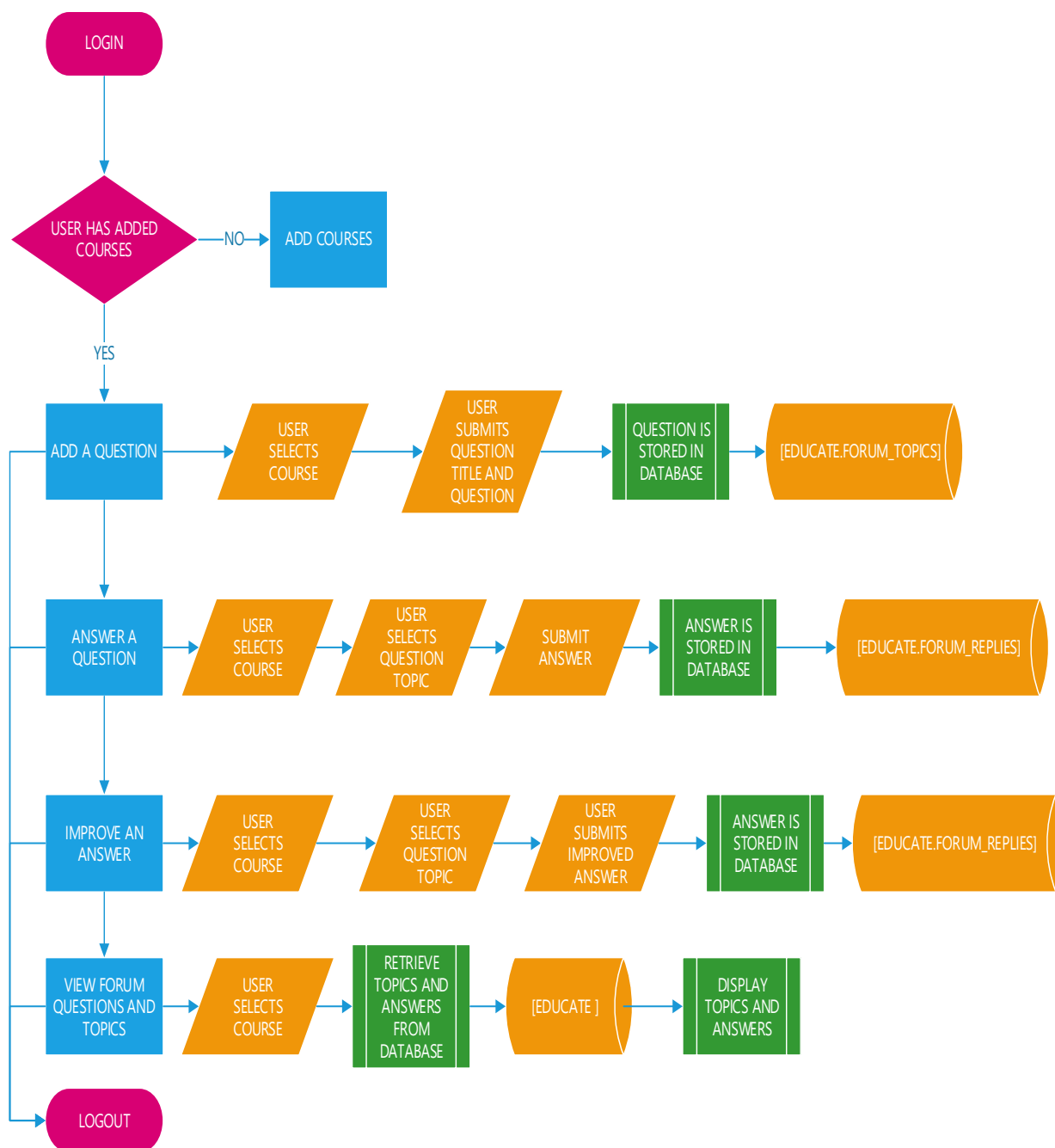


Fig 3.8 The Discussion Module Functionalities

USE CASE DIAGRAMS

This section contains use case diagrams for the users of Educate. The use case diagrams represent the user's interaction with the system. The use case diagrams are for students, tutors and administrators who are known as actors in UCD (use case diagram) terminology. They are presented in figure 3.9 and 3.10

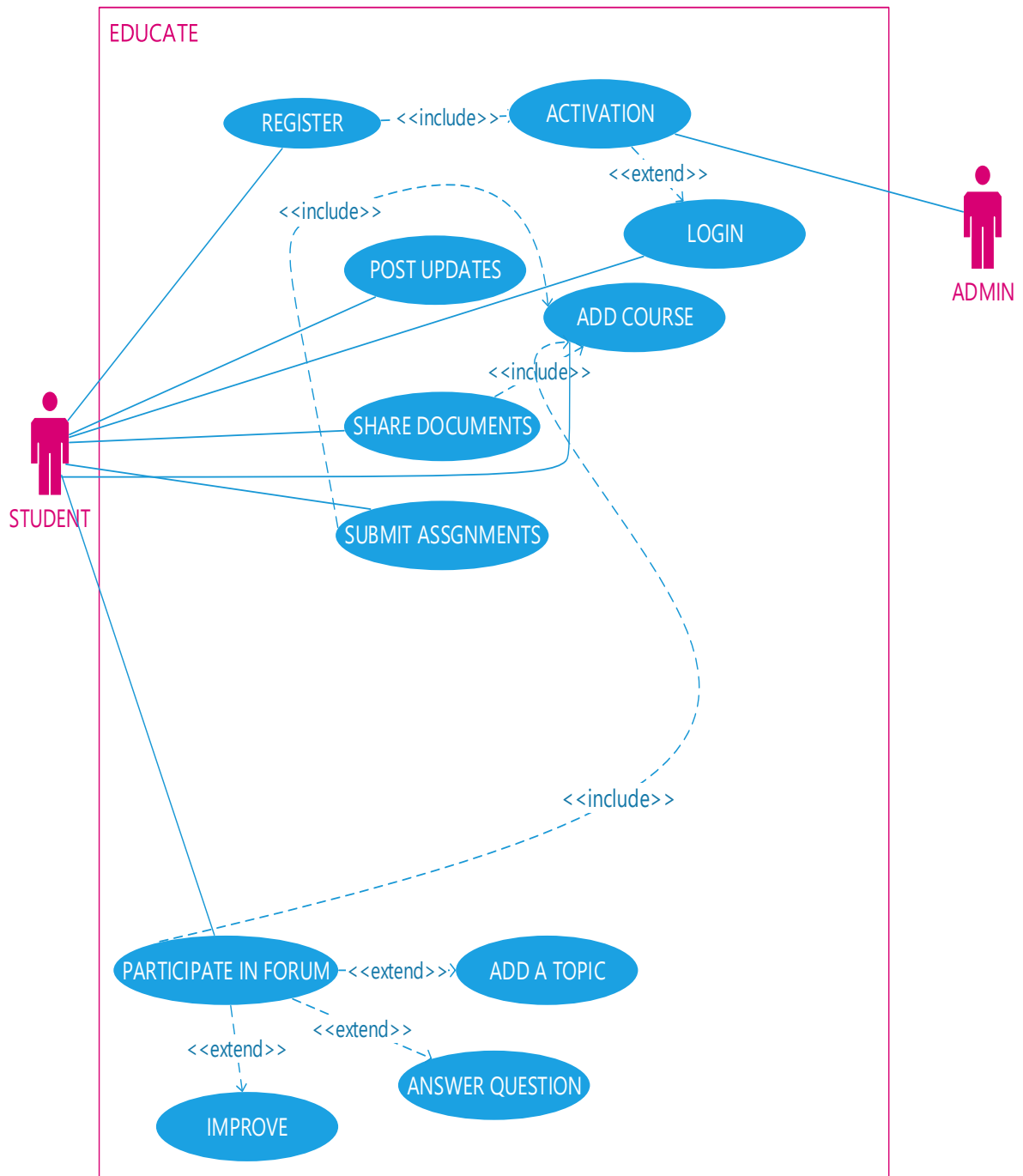


Fig 3.9 Student Use Case Diagram

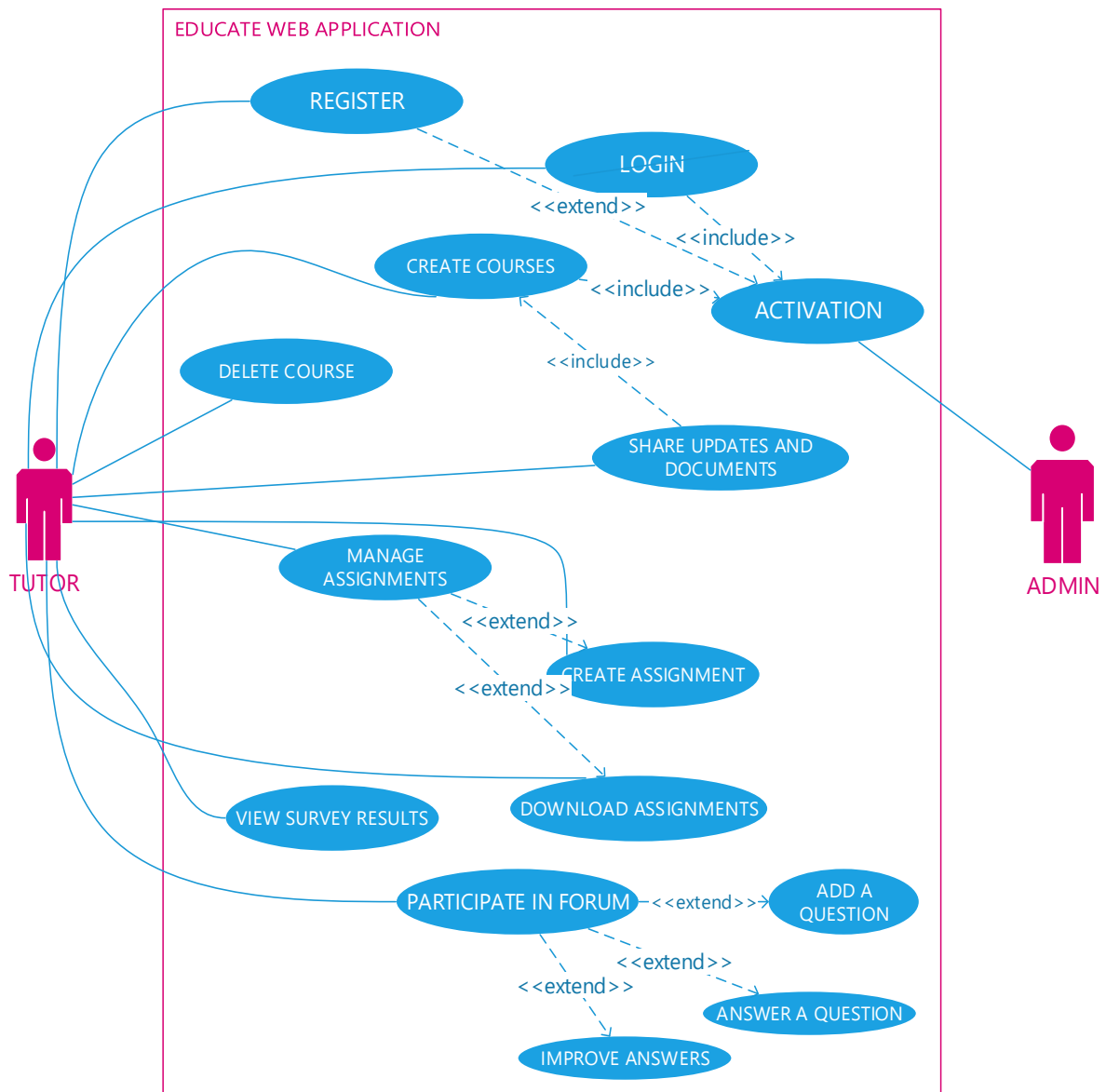


Fig 3.10 Tutor Use Case Diagram

RESULTS AND DISCUSSION
STUDENT MODULE USER INTERFACES

The user interface for the student’s home page is presented in figure 4.1. The screenshot shows the *Post Comment* and *Share File* forms. The home page also contains recent updates for each of the courses that the user has added.

Educate

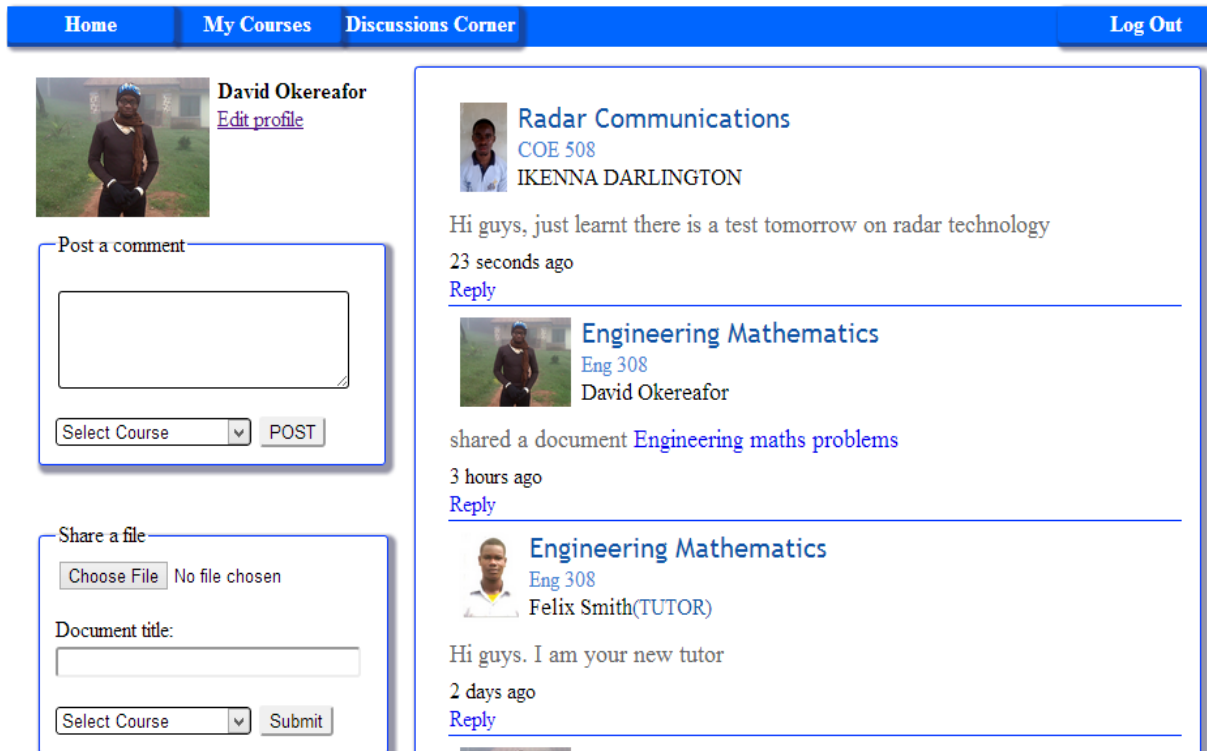


Figure 4.1 Screenshot of Student’s Home Page

The student’s *my courses* page interface is as presented in figure 4.2. The interface shows all the added courses. Users can also remove courses and add courses as they deem fit.

Educate



Welcome to Courses

[Add courses and View all the available courses](#)

Here is a list of all the courses you have Added:

Course Title	Course Code	Remove Course
PHYSICS	Phy 101	<input type="button" value="Remove Course"/>
RADAR COMMUNICATIONS	COE 508	<input type="button" value="Remove Course"/>
ENGINEERING MATHEMATICS	Eng 308	<input type="button" value="Remove Course"/>

Figure 4.2 My Courses Page Shows List Of Added Courses

Figure 4.3 presents the interface for the submit assignment page. The user selects an assignment, chooses the file to be submitted and clicks on the submit assignment button shown in the figure. The survey questions for students are presented in figure 4.4. The user selects an option for each question and submits the survey.

Educate

[Home](#)[My Courses](#)[Log Out](#)

Welcome to Courses

Submit assignment

Assignment Title:

Choose file: No file chosen

Figure 4.3 Submit Assignments Page

Educate

[Home](#)[My Courses](#)[Log Out](#)

Welcome to Courses

Survey

1. I attend class regularly.

strongly disagree
 disagree
 neutral
 agree
 strongly agree

2. Rate your level of involvement in the course

Very involved
 somewhat involved
 Enthusiastically involved
 Not involved
 Neutral

Figure 4.4 Screenshot Of Student's Survey Questions

Figure 4.5 is a screenshot of the discussions corner page user interface. The forum question is at the top corner of the figure. The responses to the question are shown below it.

Educate

[Home](#)[My Courses](#)[Discussions Corner](#)[Log Out](#)

Beta & Gamma Equations

please has any been able to solve the equation problem from the last class. I have tried different methods but i am getting a wrong answer

17 minutes ago

There is also a simpler concept in advanced Engineering by H.K Dass in page 230

Chibuzor Ekeke

5 minutes ago

[Improve the answer](#)

Thanks Ekeke

David Okereafor

3 minutes ago

I tried a method similar to that in Engineering maths (page 302).The concept is easier to understand.

IKENNA DARLINGTON

12 minutes ago

[Improve the answer](#)

Figure 4.5 Screenshot of discussions corner page

TUTOR MODULE INTERFACES

The tutor module contains some functionality similar to those of students, but there are functionalities exclusive to tutors only. Figure 4.6 presents the user interface for the page displaying details of a course. These include the course tutors, recent updates, recent shared documents and links to other activities on the course. Tutors create courses in the “*create course*” page as shown in figure 4.7. The interface contains fields for selecting departments, inputting the course title, course code and a brief description of the course.

Educate

Home My Courses Log Out

Welcome to Courses

The screenshot displays the 'Welcome to Courses' page with four main sections:

- Links:** View complaints, View Results, Upload Results, Add an assignment, View assignments, View survey results.
- Course Tutors:** FELIX SMITH (with a profile picture).
- Recent documents:** Engineering maths problems (11 hours ago, shared by David Okereafor), project questionnaire (2 days ago, shared by IKENNA DARLINGTON).
- Recent Posts:** Engineering Mathematics Eng 308 (David Okereafor) shared a document Engineering maths problems (10 hours ago) with a Reply link.

Figure 4.6 Page Displaying Details Of A Particular Course

Educate

Home My Courses Log Out

Welcome to Courses

Select departments and click on **add department** to add departments that will offer the course

Select Departments

Departments *:
 Course Code *:
 Course Title *:
 Summarized Description :

Figure 4.7 Creating Course Page

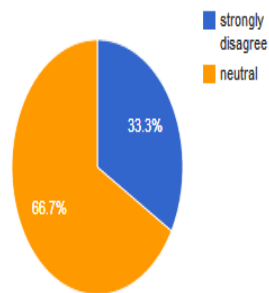
Figure 4.8 presents the interface of the *survey results* page. The page shows the results of the surveys carried out by students. The chart is drawn using Google charts API. The charts are in pie chart format. A chart is drawn for each question with the percentage for each response shown.

Educate

[Home](#)[My Courses](#)[Log Out](#)

Welcome to Courses

I attend class regularly.



Rate your level of involvement in the course

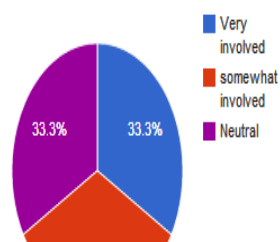


Figure 4.8 Survey Results Displayed Using Google Charts

The interface for tutors to add assignments in a course is presented figure 4.9. The tutor inputs the assignment title in the title field. The tutor also has to select the submission date and thereafter click on the add button. On completion, the assignment is visible to students that have added the course.

Educate

[Home](#)[My Courses](#)

Welcome to Courses

Add an assignment

Title:

Submission date:

Figure 4.9 Add Assignment Page

CONCLUSION AND RECOMMENDATION

CONCLUSION

In this paper a social network web application that integrates social network functionalities into e-learning platform is presented. The web application developed is named *Educate* and it has functionalities include among others; sharing files, sharing updates, adding courses, creating courses, participating in discussions, submitting assignments and participating in surveys. The targeted users of this web application are students and lecturers in institutions of higher learning. Presently, *Educate* is hosted online and accessed by only by the focused group members and the respondents to the online questionnaire on *Educate*.

Notably, *Educate* is developed to take advantage of the increasing adoption of social network across the globe and in Nigeria as well. The results of the survey carried out in the project shows that all correspondents agree that social networks are beneficial to education. However, sixty-seven (67) % of correspondents rarely use these networks in an educational capacity. Also, Seventy-three (73) % of respondents think Educational institutions in Nigeria do not make the most of social networks. This results show that there are huge opportunities for improving the use of social networks for educational purposes in Nigeria. Also from the results of the survey, Seventy- three (73) % of respondents rated *Educate's* user friendliness as good while thirteen (13) % rated it as being excellent. All respondents think *Educate* would actively engage students in the learning process. All respondents also think *Educate* would create an avenue for online collaboration and knowledge sharing. With the results of the survey, it is believed that the developed web application (*Educate*) would assist in solving

problems of collaboration, distance learning, as well as connection and knowledge sharing between students and tutors. It is also believed that *Educate* would assist lecturers in automating some of their lecturing tasks.

RECOMMENDATIONS FOR FURTHER STUDIES

Currently, *Educate* can be said to be implemented with a minimum set of functionalities. The feedback from users indicate that the following functionalities should be added to the *Educate*:

1. A direct messaging (DM) system into the web application.
2. Result management feature
3. Online quiz and grading functionality
4. News update feature
5. Links to other educational sites
6. Students' project module

Consequently, further studies are required to develop and integrate these functionalities into the existing *Educate* system.

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