



# Count Me In

IT 497: Graduation Project Report  
Product Release-2

Prepared by  
Raghad Saad Al-Shamrani, 441200994  
Ghadah Al-Tuwaym, 439200286  
Kayan Al-Shehri, 441201132  
Noura Marzouq Al-Qahtani, 438202370  
Reem Al-Mutairi, 437201303

Supervised by  
Dr. Amani Al-Ajlan

Second Semester 1444  
2022/2023



# Table of Contents

1	Introduction	8
1.1	The Problem	9
1.2	The Solution	9
1.3	Product Objectives	10
1.4	Scope	11
1.5	Product Vision	11
1.6	Approach	12
1.7	Project Main Contribution	12
2	Background	14
2.1	Extracurricular Activities and Opportunities	14
2.2	Recommender System	15
3	Literature Review	18
3.1	Competitive Product Analysis	18
3.1.1	Findcourses.co.uk	18
3.1.2	Marquette.edu	19
3.1.3	Career explorer	20
3.1.4	Enjoy Saudi	21
1.1.1	Faaliat	22
3.2	Comparison Table	24
3.3	Summary	25
4	System Design and Development	26
4.1	Methodology	26
4.2	System Requirements	27
4.2.1	System Users	27
4.2.2	Requirements Elicitation and Analysis	27
4.2.3	User Interactions	29
4.2.4	Roadmap and Product Backlog	31
4.3	System Design	45
4.3.1	Architectural Diagram	45
4.3.2	Class Diagram /DFD	47
4.3.3	Component Level Design	48
4.4	Data Design	51



4.4.1	Data Models	51
•	ER Diagram	51
•	Non-relational data model	52
4.4.2	Data Collection and Preparation	53
4.5	Interface Design	54
4.6	Implementation	58
5	System Evaluation	68
5.1	User Acceptance Testing	68
5.1.1	Demographics of Participants	68
5.1.2	Questionnaire/Interview Results	70
5.2	Quality Attributes (NFR testing)	71
5.3	Discussion	73
6	Conclusions and Future Work	74
6.1	Local and global impact	75
6.2	Problems and Challenges Encountered During the Software Development	75
6.3	Limitations of the system	75
6.4	The main contribution of the project	75
6.5	Future work	76
7	Acknowledgments	77
8	References	78
9	Appendix A: Survey Questions and Answers	80
10	Appendix B: Interview Questions and Answers	90
11	Appendix C: UAT Questions and Answers	95



# Table of Figures

Figure 1 - The difference between collaborative and content-based recommender system .....	16
Figure 2 - findcourses.co.uk quiz interface and results. ....	19
Figure 3 - Marquette.edu "choose your major quiz" interface and results. ....	20
Figure 4 - Career Explorer quiz interface and results .....	21
Figure 5 - Enjoy Saudi Interface .....	22
Figure 6 - Faaliat Interface.....	23
Figure 7 - Student Use Case Diagram.....	29
Figure 8 - Admins Use Case Diagram .....	30
Figure 9 - Product Roadmap .....	31
Figure 10 - MVC architecture.....	45
Figure 11 - "Count Me In" MVC architecture. ....	46
Figure 12 - Class Diagram .....	47
Figure 13 - Content-based Flowchart .....	48
Figure 14 - Model-based Flowchart.....	49
Figure 15 - Enrollment Flowchart.....	50
Figure 16 - ER Diagram.....	51
Figure 17 - Non-relational Data Model .....	52
Figure 18 – Student Application Navigation Diagram .....	54
Figure 19 - Activity Admin Application Navigation Diagram .....	55
Figure 20 - Super Admin Application Navigation Diagram.....	56
Figure 21 - System user Survey Question (1) Results 1 of 2.....	80
Figure 22 - System user Survey Question (1) Results 2 of 2.....	80
Figure 23 - System user Survey Question (2) Results .....	81
Figure 24 - System user Survey Question (3) Results 1 of 7 .....	81
Figure 25 - System user Survey Question (3) Results 2 of 7.....	82
Figure 26 - System user Survey Question (3) Results 3 of 7.....	82
Figure 27 - System user Survey Question (3) Results 4 of 7 .....	83
Figure 28 - System user Survey Question (3) Results 5 of 7.....	83
Figure 29 - System user Survey Question (3) Results 6 of 7 .....	84
Figure 30 - System user Survey Question (3) Results 7 of 7 .....	84
Figure 31 - System user Survey Question (4) Results .....	85
Figure 32 - System user Survey Question (5) Results .....	85
Figure 33 - System user Survey Question (6) Results .....	85
Figure 34 - System user Survey Question (7) Results .....	86
Figure 35 - System user Survey Question (8) Results .....	86
Figure 36 - System user Survey Question (9) Results .....	87
Figure 37 - System user Survey Question (10) Results .....	87
Figure 38 - System user Survey Question (11) Results 1 of 3.....	88
Figure 39 - System user Survey Question (11) Results 2 of 3.....	88
Figure 40 - System user Survey Question (11) Results 3 of 3.....	89
Figure 41 - UAT Question (1) Results .....	95
Figure 42 - UAT Question (2) Results .....	95
Figure 43 - UAT Question (3) Results .....	96
Figure 44 - UAT Question (4) Results .....	96
Figure 45 - UAT Question (5) Results .....	97
Figure 46 - UAT Question (6) Results .....	97



Figure 47 - UAT Question (7) Results.....	98
Figure 48 - UAT Question (8) Results.....	98
Figure 49 - UAT Question (9) Results.....	99
Figure 50 - UAT Question (10) Results.....	99
Figure 51 - UAT Question (11) Results.....	100
Figure 52 - UAT Question (12) Results.....	100



# Table of Tables

Table 1 - Recommender System types Comparison .....	17
Table 2 - Competitors Comparison Table.....	24
Table 3 - Product Backlog Details .....	31
Table 4 - Product Backlog Table .....	32
Table 5 - Content-based recommendation system code .....	59
Table 6 - The Model based (collaborative) recommendation system code .....	61
Table 7 - API implementation code .....	66
Table 8 - Demographics of Participants.....	69
Table 9 - NFR Testing .....	71
Table 10 - Interview 1 Outline .....	90
Table 11 - Interview 2 Outline .....	91
Table 12 - Interview 3 Outline .....	92
Table 13 - Interview 4 Outline .....	93
Table 14 - Interview 5 Outline .....	94



# Count Me In

Raghad Al-Shamrani<sup>1</sup>, Ghadah Al-Tuwaym<sup>2</sup>, Kayan Al-Shehri<sup>3</sup> Noura Marzouq Al-Qahtani<sup>4</sup> and Reem Al-Mutairi<sup>5</sup>

<sup>1</sup>Information Technology Department, College of Computer and Information Sciences, King Saud University, Riyadh, Saudi Arabia; 441200994@student.ksu.edu.sa

<sup>2</sup>Information Technology Department, College of Computer and Information Sciences, King Saud University, Riyadh, Saudi Arabia; 439200286@student.ksu.edu.sa

<sup>3</sup>Information Technology Department, College of Computer and Information Sciences, King Saud University, Riyadh, Saudi Arabia; 441201132@student.ksu.edu.sa

<sup>4</sup>Information Technology Department, College of Computer and Information Sciences, King Saud University, Riyadh, Saudi Arabia; 438202370@student.ksu.edu.sa

<sup>5</sup>Information Technology Department, College of Computer and Information Sciences, King Saud University, Riyadh, Saudi Arabia; 437201303@student.ksu.edu.sa

## Abstract (English):

Extracurricular activities have played a crucial role in the educational experience of students, offering benefits such as improved academic achievement, enhanced social skills, and better physical health and emotional well-being. However, students face a significant challenge in keeping up with the extracurricular activities provided by the university. This report examines "Count Me In", a software system designed to help King Saud University students overcome the challenge of finding extracurricular activities and opportunities. The system uses a hybrid recommender approach to suggest suitable activities to users. Users confirm the practicality and importance of this proposed solution, and "Count Me In" aims to support students in discovering their interests, honing their skills, and making the most of university resources.

## Abstract (Arabic):

الأنشطة اللامنهجية تلعب دوراً حاسماً في التجربة التعليمية للطلبة منذ فترة طويلة، حيث توفر فوائد مثل تحسين الانجاز الأكاديمي، وتعزيز المهارات الاجتماعية، وتحسين الصحة البدنية والنفسية. ومع ذلك، يواجه الطلاب تحدياً كبيراً في مواكبة الأنشطة اللامنهجية المتاحة من قبل الجامعة. يتناول هذا البحث الحل المقدم، وهو تطبيق مصمم لمساعدة طلاب جامعة الملك سعود على التغلب على تحدي العثور على الأنشطة والفرص اللامنهجية. يستخدم النظاماقتراح الهمجيين لاقتراح الأنشطة على المستخدمين. أكد المستخدمون مدى صلاحية وأهمية هذا الحل المقترن، ويهدف تطبيقنا إلى دعم الطلاب في اكتشاف اهتماماتهم وتحسين مهاراتهم، والاستفادة القصوى من موارد الجامعة.

**Keywords:** Hybrid Recommender system; Mobile Application; Extracurricular Activities; Courses; Workshops; Events; Opportunities.



## 1 Introduction

Universities provide various activities and opportunities outside the scope of the curriculum which are important for the student's future, skill development, and careers. However, students lack knowledge of these activities and opportunities and are unaware it is taking place at their university. Therefore, they do not get the full experience and advantages of college and are not able to take advantage of the opportunity to make professional connections and get involved in a bigger society.

At King Saud University, students are provided with numerous activities and opportunities. College students tend to focus only on getting good grades and performing the required academic work [1]. However, the college experience involves more than tackling the curriculum, it also involves meeting new people, contributing to the larger community, taking on a new journey, learning more about oneself, and enhancing skills. Professionals have deemed extracurricular activities to be the gateway to achieving those skills and have described them as “an essential element of the university experience” [2].

Students usually miss out on these activities and opportunities because they are not aware of them or think of the searching and enrolling process as a burden and a waste of time. Therefore, they miss out on the great potential and benefits of enrolling in extracurricular activities, i.e., courses, workshops, and opportunities, i.e., volunteer work and research which can affect the students' future greatly. The root of this problem is the lack of a platform that neatly gathers and displays extracurricular activities and opportunities.

So, technology will guide students and help them find their interests easily and enroll in any activity they want. We aim in this project to supply university students with a platform where they can take part in any activity and opportunity provided by their university, summarize the activity's information, and ease the process for the student to be a participant, keeping students well informed.



## 1.1 The Problem

King Saud University students have a significant problem in keeping up with and finding extracurricular activities and opportunities provided to them by the university such as courses, workshops, events, volunteer work, and research groups. The current lack of a clear unified platform makes it time and effort-consuming for students to learn about them, other than through the many social media accounts, platforms, and channels that display them. This problem caused many students to miss the chance in enrolling and attending in these activities.

Additionally, there is a risk and a possibility that opportunities such as volunteer work and taking part in research are not fairly advertised to all students. Some know about the opportunities through friends or through an announcement made by a mentor verbally. Those will get the chance to apply to it while others who had not been present when it has been talked about or announced, unfortunately, will never know of it. Being unaware of such activities and opportunities will make students miss the chance of having an invaluable edge that can benefit them in the job market [3].

## 1.2 The Solution

The solution consists of developing a mobile application that helps the students view all the extracurricular activities as well as the opportunities in one single platform. The application will resolve the existing problem of the lack of a platform that helps the students easily learn about the various activities and opportunities provided to them as well as eliminate the risk of unfairness in enrolling in activities like courses and workshops and applying for opportunities. Our application will provide a hybrid recommender system, that recommends extracurricular activities for the students (system users) based on the similarity between the activities (content-based), and the similarity across profiles (collaborative filtering) so that the students can fully benefit from the university experience. The recommender system will improve the process of finding and participating in extracurricular activities and save the students' effort and time. Our aim is to enrich the academic experience for college students, encouraging them to explore their interests and talents, refine their skills and make benefit from the university resources to better help them and their future. All the students will be up to date on the activities and opportunities, be able to apply for opportunities, enroll in extracurricular activities, and be able to add the activity or opportunity to their personal



calendar through a click of a button to help them manage their days better. Additionally, it will encourage the authorized personnel (admin user) to manage their activities and opportunities within the platform and get feedback from the students (system user) through ratings, it will also ease the task of reaching the targeted students [4].

### 1.3 Product Objectives

#### Product (customer focus-value):

- Assist the students in learning about opportunities and extracurricular activities by providing them with a single platform.
- Enrich the academic experience for the students and encourage them to explore their interests and benefit from university resources.
- Save the students time and effort by making enrolling in activities and applying for opportunities through the application.
- Allow the students to add the activity/ opportunity to their mobile calendar to help manage their time.
- Provide the students with a hybrid recommendation system to provide a personalized user experience.
- Help the students expand their professional connections.
- Allow activity admins to reach their targeted audience easier.
- Encourage activity admins to provide more extracurricular activities and opportunities by making the process easier.

#### Project (solution focus-plan):

- Collecting data from club leaders and event organizers at the university, cleaning the data, and then importing it into the database.
- Building applications using Flutter to allow the end user to interact with the recommendation system.
- Test the application to ensure a smooth, obstacle-free experience.



### Learning (student focus):

- We will learn how to program an Android application by using Flutter and Dart as well as Python.
- We will learn how to use a firebase.
- We will improve our skills in implementing UX guidelines.
- We will learn about the methods of developing and implementing the recommender system.

### 1.4 Scope

“Count Me In” is an Android mobile application that supports the Arabic language. It aims to help the students at King Saud University at different levels to view, enroll in, and apply to the recommended courses, workshops, events, and opportunities, and to improve the college experience for the average student. There are three types of users in “Count Me In”: student, activity admin, and super admin and each user has unique features and interface, students and activity admins share an application while the super admin has another application. For example, activity admin features include signing up, setting up a profile, requesting to upload extracurricular activities and opportunities with the necessary information, editing/deleting activities, logging in and out, viewing feedback, and accepting/ declining students’ applications to opportunities. Super admin can do everything an activity admin does as well as approving/declining activity admin’s requests to upload activity/ opportunity. Student features also include signing up, logging in, viewing extracurricular activities, setting up the profile, setting preferences, applying to an opportunity, enrolling/disenrolling in activities, syncing activities/opportunities to the calendar, enabling push notifications, and rating activities.

### 1.5 Product Vision

For the students **who need** to keep up with the extracurricular activities and opportunities to develop their skills and get full college experience. “**Count Me In**” is a mobile application that recommends extracurricular activities that are most suitable for them. **Unlike** other applications and websites, that are not dedicated to students to help them benefit from their



university's resources **our product** is tailored for KSU students to keep them well informed about the activities and opportunities giving everyone an equal chance of enrolling in extracurricular activities and applying to opportunities.

## 1.6 Approach

Our agile approach in developing “Count Me In” consisted of several steps, first we identified all the information and data we needed to develop the application that is accurate to the users' needs, afterward we collected the data from several resources like acquiring Excel worksheets from club leaders of previous activities, cleaned the data to ensure consistency and draw more accurate conclusions. Then we proceeded to build our recommender system as well as accomplish the goals set for each sprint which included many tasks such as developing a user-friendly interface, importing data into the database, analyzing and fully comprehending recommender systems, then developing the most suitable one for our application, deploying the API and connecting it to our flutter application. Finally, we made sure to continuously document the procedure in order to provide a thorough report. And to guarantee that users have a seamless experience using our application, we tested the deliverables on a regular basis.

## 1.7 Project Main Contribution

“Count Me In” will contribute to making the students' college experience more convenient and enjoyable. It will help students save time and effort by displaying all the information they need in one clear unified platform where they can find and participate in all the extracurricular activities and opportunities they desire with a click of a button, making it easier for them to enjoy their university's resources.

In addition, our application will help make the process of submitting opportunities and activities more structured and make it simpler for activity administrators to reach their intended audience, The admins have to fill out the “add opportunity” form or the “add activity” form with the necessary information about the activity or opportunity they wish to present to the students and wait for the approval, once it is approved all application users will be able to view it in a neat and organized matter, which will encourage admins to present more for the students



and encourage the students to take part of the bigger society now that it is not a time-consuming process.

Globally, this novel solution and the existence of such an application will inspire universities worldwide to start coming up with solutions to ease the students' experience outside of the curriculum or adapting this one, ensuring that the students are satisfied across the globe.

The report presents the process of developing “Count Me In”, and the overall structure of the report takes the form of six chapters. The report begins with chapter One which introduces the problem, the solution, the product objectives, the methodology, and the main contributions. Chapter Two which presents the background of extracurricular activities, opportunities, and recommender systems to help clear any ambiguity. Chapter Three is the literature review where we analyzed and examined our competitors to identify their strengths and weaknesses. Chapter Four presents the system design and development in detail. Chapter Five discusses the system evaluation's findings concluded from testing. Chapter Six presents the conclusion of the report and the future work we aim to achieve. The remaining parts of the report are for all additional information that the reader might find insightful, and they proceed as follows: the acknowledgment where express our gratitude to all the individuals that supported us, then the references that allow readers to find and access the original sources that support our claims, and finally, is the appendices that includes raw data, and supporting materials.



## 2 Background

### 2.1 Extracurricular Activities and Opportunities

Extracurricular activities refer to any non-classroom activity, they are not mandatory, but they are an essential part of the student's experience to refine their skills, improve their teamwork, and cultivate their hobbies and interests [5]. Participating in such activities can benefit the student in various ways, it may contribute to the well-being of the student's mental health, having higher self-perception, developing leadership skills, and even improving their grades [6].

There are several kinds of extracurricular activities including to courses, workshops, and events:

- **Courses:** a comprehensive program that covers a particular subject in depth with a set schedule, finishing a course may grant the course taker a certificate that makes them a more competitive candidate for job opportunities, as well as lending credibility to their skills and knowledge.
- **Workshops:** a condensed learning experience that focuses on a specific topic or skill, they are often hands-on and interactive, and participants are encouraged to share their experiences and ideas with others.
- **Events:** a celebratory gathering or exhibition that revolves around a specific occasion or national/international day.

Opportunities refer to the chance to join a group of people where the participants use their skills to benefit themselves and others.

Opportunities include but are not limited to volunteer work and joining research groups.

- **Volunteer work:** a chance to help with community services or organize an extracurricular activity with the benefit of gaining experience but no monetary value.
- **Research groups:** an opportunity to join a professional like a professor or a doctor in academic research with getting credits in the research.



## 2.2 Recommender System

A recommendation system is a software tool and method for making recommendations to users based on their needs, or preferences [7]. Recommender systems help users in decision-making, such as the genres of music they want to listen to, types of items they want to buy, and categories of online news they want to read. Information overload has become a problem in recent years. The recommender system has proven to be a valuable tool as it generates recommendations based on user or item history [8]. It is an information processing system that assists users in searching through knowledge records by gathering various types of available data. It primarily targets people who have difficulty evaluating potential items from an overwhelming number of options available online. Essentially, all recommender systems go through three stages:

- (a) Phase of information collection via implicit, explicit, or feedback.
- (b) Phase of learning using various machine learning algorithms and pattern recognition.
- (c) prediction or recommendation phase [9].

There are three main types of recommender systems: content-based, collaborative, or a combination of the two (hybrid). The first type is a content-based recommendation system that is primarily concerned with two criteria: item and user. Several types of records before the system analyzes an item's attributes and a user's profile, they may reveal valuable information prior to the system analysis [7]. It considers this information and suggests more appealing items to users based on their preferences. To supply a satisfactory recommendation, there must first be enough usable data. Second, a proper learning algorithm must be used to learn about the user and the item [4]. The collaborative system, on the other hand, tries to figure out the feasibility of items for an individual. Considering not only users profile histories but also the similarities between their profiles [10]. It assumes that people behave similarly when deciding whether they have similar tastes in the past while making a purchase, rating items, or selecting items [11]. Lastly, the combination of the two systems, content-based and collaborative filtering (CF), is the hybrid recommendation systems that maximizes the advantages and reduces the limitations of both strategies. Therefore, hybrid recommendation systems work on characteristics that are related to both strategies [12]. In our application, we are using a hybrid recommender system.



Figure 1 shows the difference in filtering methods between the two types of recommender systems the collaborative and the content-based in a simple example. The collaborative recommender system takes into consideration the activity history of the user so if we have two users with similar activity history and one of them read an article the system will recommend the same article to the other user with the same activity history. On the other hand, the content-based recommender system focuses on the content the user reacts with the most and will keep recommending similar content to the user. Table 1 gives a brief about each system and the advantages and disadvantages of using each one.

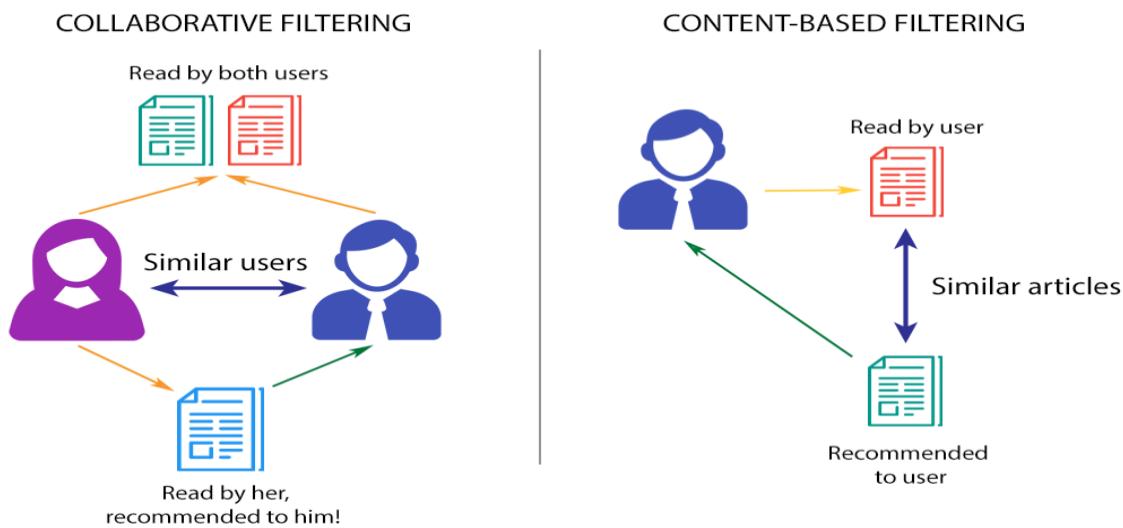


Figure 1 - The difference between collaborative and content-based recommender system



Table 1 - Recommender System types Comparison

Recommender System types Comparison			
	Content-based	Collaborative	Hybrid
<b>Brief</b>	This filtering is based on the description, or some data provided for the item or users. The system finds the similarity between items based on their context or description.	The recommendations are done based on the user's behavior. The history of the user plays an important role.	Combine between both collaborative and content-based recommender systems.
<b>Advantages</b>	- The user gets recommended the types of items they are interested in.  - The user is satisfied with the type of recommendation.	New products can be introduced to the user.	The accuracy of hybrid is usually higher than the other types since the combination of both kinds leads to increase common knowledge.
<b>Disadvantages</b>	- The user will never be recommended for different items.  - depends on the user activity.	- User's previous history is required or data for products is required based on the type of collaborative method used.  - The cold start problem where the system is unable to make accurate predictions for new or previously unseen data.	Analyzing data can be challenging and difficult compared to other recommending system techniques.



### 3 Literature Review

In this section, we searched thoroughly for similar systems, either software applications or websites that provide the same features as our application “Count Me In”. The purpose of this search is to compare our application and already existing systems to make sure that our application provides a uniqueness that sets “Count Me In” apart from other recommendation systems. This section helps us draw out, maintain, upgrade, or even delete features to help make our application the best version it can be. Three of these systems are for educational platforms and two are for events and activities platforms.

#### 3.1 Competitive Product Analysis

##### 3.1.1 Findcourses.co.uk

Findcourses.co.uk is a website based on the United Kingdom that connects users to course providers in multiple fields. It has over (30000) courses and over 700 providers [13].

- It provides an educational search engine to help find the providers of the courses the user wants to learn.
- It provides some brief quizzes<sup>1</sup> in different fields that recommend which course is most suitable for you (Figure 2) and then helps forward you to the recommended course provider.
- It provides filters to help you filter out the courses that you do not want such as “in company” courses.
- It provides the opportunity to rate and write a review on the course you took.

Upon searching for the courses that the user wants to learn, he/she can filter the courses according to category (it recommends the popular categories), type of training, course location, and whether the user wants it to be online/classroom/in the company, price, study pace, and some other filters that the user can specify. Once the website displays the courses the user can then filter the result by the average rating, price: lowest to highest, closest start date, length, number of reviews, and highest review score. The website, however, does not recommend the courses after getting to know the user’s interests at the beginning, the user must take the quiz for that, and the quizzes supplied are for a very little number of courses (less than 10).

<sup>1</sup> <https://www.findcourses.co.uk/EducationTest/Start/80>

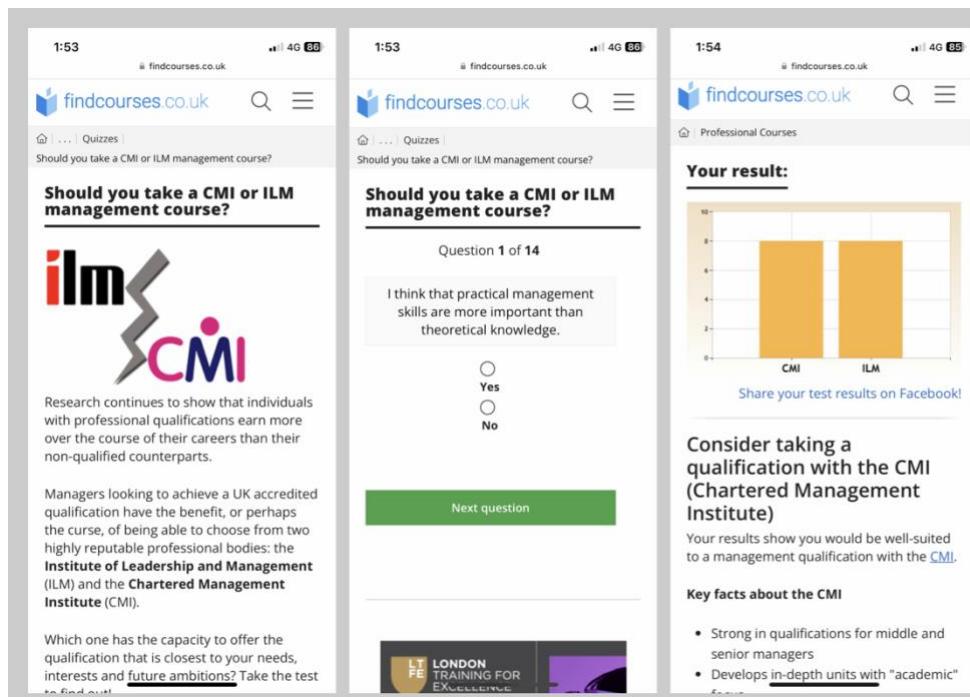


Figure 2 - findcourses.co.uk quiz interface and results.

### 3.1.2 Marquette.edu

Marquette.edu is a university website you can use to apply to different colleges and programs. It has 75+ majors, 80+ minors, as well as 90+ programs [14].

- It allows users interested to explore the majors and minors.
- It allows users to discover graduate programs.
- It helps users connect with online learning programs.
- It provides a “choose your major quiz”<sup>2</sup> to help the student choose the most suitable major for his/her personality. (Figure 3)

The university website is not a recommender system however it has a recommender feature that we are greatly interested in. The “choose your major quiz” gets to know the student beyond just their educational interests, and accordingly recommends majors that the user might want to consider. However, all the feature does is display the recommended majors, but it will not forward the user to the recommended major’s college application page and there are no reviews or ratings of any sort.

<sup>2</sup> <https://www.marquette.edu/explore/choose-your-major/quiz.php>

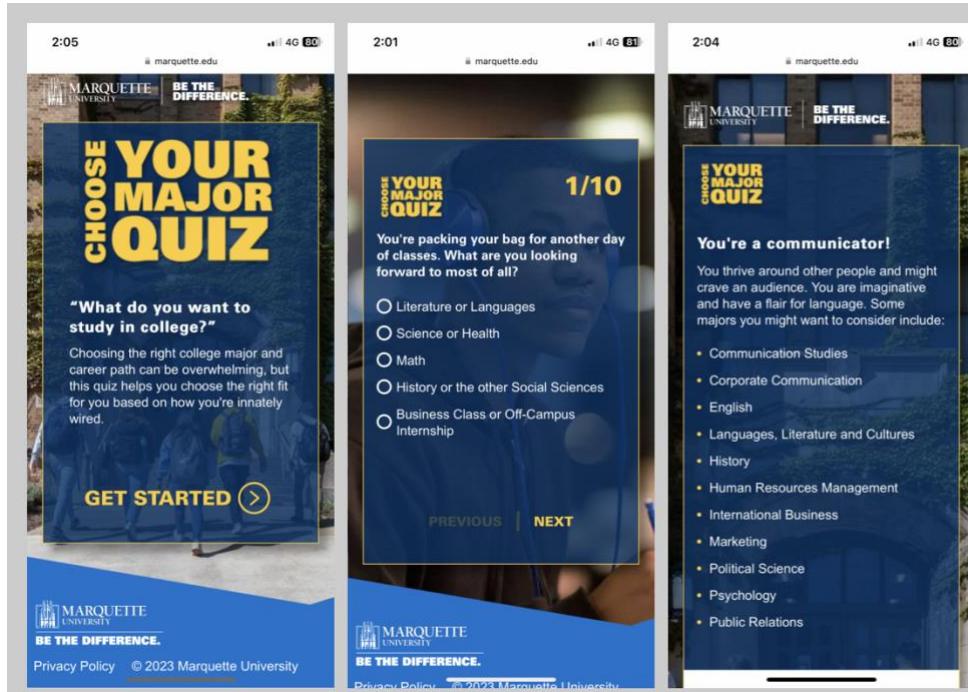


Figure 3 - Marquette.edu "choose your major quiz" interface and results.

### 3.1.3 Career explorer

A website that provides career suggestions to the user based on a set of questions to help people to choose their career, it contains a feature of recommendations for jobs and provides career matches based on your interests, goals, history, and workplace preferences. Figure 4 shows the interface of the application and some functions such as evaluation, questions, and the way the result is displayed [15].

- The user is allowed to register and start answering questions.
- The user is asked about personal information such as the degree of education.
- The user rates a set of jobs and excludes unwanted jobs.
- The website provides a list of suggested jobs based on user answers.

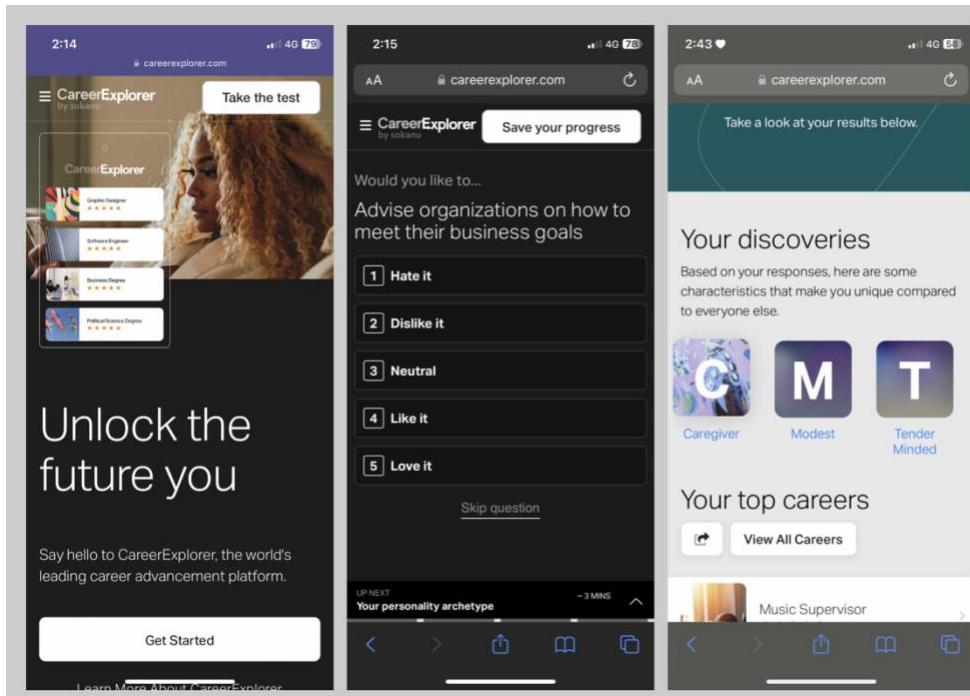


Figure 4 - Career Explorer quiz interface and results

### 3.1.4 Enjoy Saudi

Enjoy Saudi is a platform that offers a calendar for all recreational activities around all parts of the kingdom [16]. as shown in Figure 5.

- The users can browse the calendar easily or search for specific activities in the search box.
- It allows the users to register and start managing their favorite activities on the application.
- It allows the users to choose their interests.
- It provides recreational activities throughout the year.
- It displays details about the event, its dates, rules, and location.
- It allows the users to share the activities with their family and friends.
- It allows the users to rate and review the activity.
- It displays the activities on the map.
- It allows the users to add the activities to their devices' calendar.

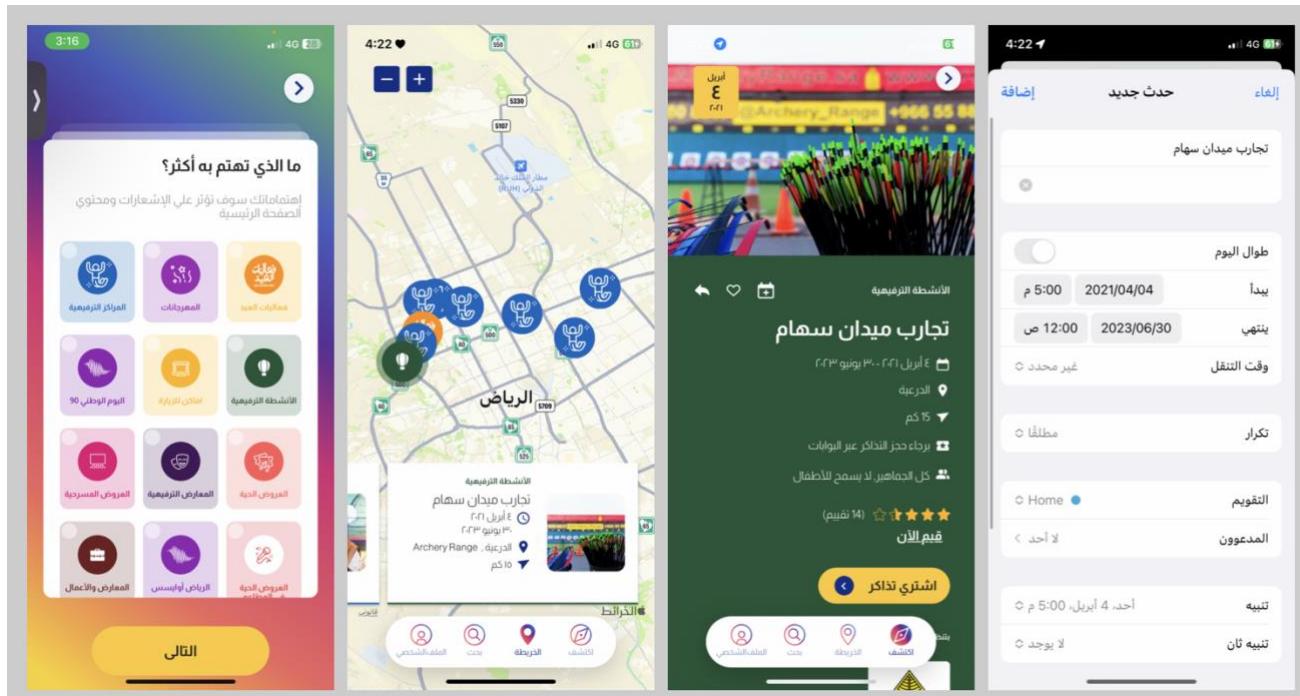


Figure 5 - Enjoy Saudi Interface

### 1.1.1 Faaliat

It is a platform for quick and easy access to all international events and days related to government and private agencies in the Kingdom of Saudi Arabia [17], as shown in Figure 6.

It shows all events, their dates, duration, classification, and location in all cities of the Kingdom of Saudi Arabia.

- It allows the users to search for events.
- It allows the users to rate and review the activity.
- It allows the users to register for events.
- It allows the users to share events.
- It allows the users to add the event to their calendar.

Upon registration, the users will be able to discover and search for the activities they want. They can also join any event they want and schedule it at the right time in their calendar.

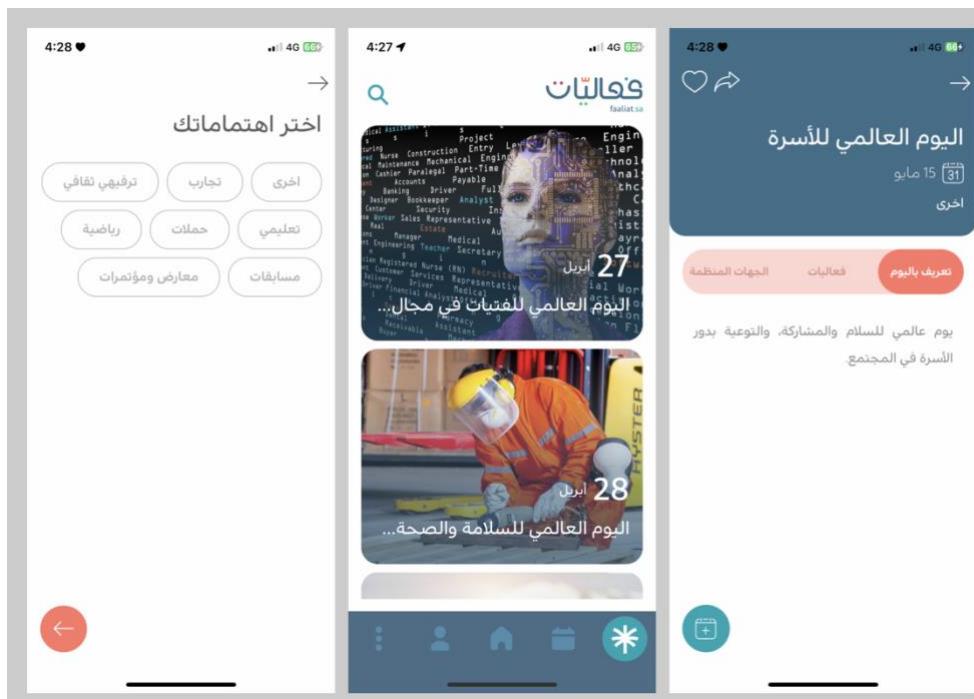


Figure 6 - Faaliat Interface



### 3.2 Comparison Table

Table 2 - Competitors Comparison Table

Similar web/mobile applications	Comparing criteria								
	Setting up a profile	Browsing content	Rating	Reviewing	Syncing activities to calendar	Website/Mobile application	Search	Languages	Domain
findcourses.co.uk	√	√	√ (Via filters)	√	√	Website	√	English	Educational
MARQUETTE UNIVERSITY BE THE DIFFERENCE.		√	√ (Via personality quiz)			Website	√	English - Spanish	Educational
CareerExplorer by sokanu	√		√ (Via test)		√	Website	√	English	Professional
faaliat.sa	√	√	√ (Via filters)	√	√	Both	√	English - Arabic	Entertainment
Count me in (our app)	√	√	√ (Via filters)	√	√	Both	√	Arabic	Entertainment
	√	√	√	√		Mobile Application	√	Arabic	Educational



### 3.3 Summary

“Count Me In”, is a hybrid recommender system that suggests extracurricular activities happening in the university to its students. We compared our application to other recommender system applications/websites as presented in Table 2. We compared different aspects, for example, some of the applications/websites we have compared because of their domain (educational) and others to inspect their recommender system, and to overall look at the features that could be useful to us despite their domain.

After thoroughly inspecting our competitors, we have concluded the following: almost every app/website has a user-friendly interface, allows users to set up a profile as well as set up their interests, allows users to rate, and allows the user to search so we have decided to follow in their footsteps and maintain those features to increase usability, we have noticed some of the applications allow the users to add activities to their devices’ calendar and considering how useful the feature can be to the students we have decided to adopt the feature to maximize time saving.

What sets our application apart from other apps/websites is that our application tailored for KSU students provides a timeline where the user can keep up with the latest extracurricular activities added. By default, the timeline shows the recommended extracurricular activities to meet the users’ interest, unlike our competitor that mostly uses only filters in a drop-down list.



## 4 System Design and Development

### 4.1 Methodology

The agile methodology is used in this project. The agile development process is a highly effective approach to software development. It emphasizes flexibility, collaboration, and iterative development, and considers the constantly changing nature of the project. Following the agile approach resulted in a high-quality product due to the testing at every stage.

The use of the Scrum Framework greatly helped in developing this project where it is an approach that involves employing a group of people's skills where necessary and needed. Three main roles make up the Scrum Framework team a scrum master, a product owner who is our supervisor, and lastly us the five developers. As for the events it consists of six events: **a sprint** is a time-boxed event that consists of the accomplishments promised to be delivered and objectives to be reached, this project has been done in five sprints. **Sprint planning** where the work that needs to be done to meet the objectives was set and then modified with our supervisor. **Daily scrums** where we -the developers- evaluated the progress of the sprint in 15-20 minutes. **Sprint review** where the output of the sprint is evaluated by the stakeholders. And lastly, the **Sprint retrospective** where we spent 1 hour after each sprint with the supervisor to reflect on what went well, what did not go well, and how we can enhance the software and identify the areas for improvements. Scrum Framework includes three key artifacts: the product backlog which is a prioritized list of features written as a user story, the sprint backlog which is a list created with the determined deliverables of each sprint, and the product increment that is the final product and the sum of all the completed product backlogs.

Jira<sup>3</sup> was employed for the product backlog, sprint planning, meeting notes, and sprint reviews. Additionally, GitHub<sup>4</sup> was used as well for code sharing between the developers, and continuous integration.

<sup>3</sup> <https://2022-gp1-group18.atlassian.net>

<sup>4</sup> <https://github.com/raghads123/2022-GP1-18>



## 4.2 System Requirements

### 4.2.1 System Users

“Count Me In” is developed with King Saud University students in mind. Users of our application fall into one of three categories students, activity admins, and a super admin. All of which should have basic knowledge of technology and be able to understand the Arabic language.

- **Students:** The general characteristics of the user are KSU students at different colleges, majors, levels, and interests.
- **Activity admin:** These could either be club leaders or any authorized personnel that provide activities or opportunities to students.
- **Super admin:** The university administration that has the authority to accept/decline activity admins’ requests to provide activities and opportunities.

### 4.2.2 Requirements Elicitation and Analysis

Our methods for requirements elicitations were both interviews and questionnaires. Through them, it came to our knowledge that our application is in fact, needed. The interview was the best technique that allows the interviewee to verify their understanding of the question and provide a detailed answer. Also, allows the interviewer to get a deeper answer. The questionnaires targeted KSU students while the interview targeted club leaders.

Through 151 responses to the questionnaires (Appendix A), we found out the following: more than half of the students of different levels have not enrolled in extracurricular activities, almost half of them are unaware of the activities taking place in the university, and more than 80% of the participants think that a platform that collects, recommend, and display the extracurricular activities would help them decide and enroll. After carefully analyzing the survey responses we noticed that most of the students have not enrolled in extracurricular activities despite wanting to because they do not know where to look for the activities they are interested in, and the various platforms make it harder for them to keep up with the extracurricular activities.

After the club leaders were interviewed (Appendix B), we noticed that many of them announce the events through social media sites, WhatsApp groups, and posters hanging around the college. Some of them do not face difficulty in reaching the target group for the events, but few



would rather have one platform for announcements and advertisements, but others face difficulties if the event is held in a different college other than the one in which the announcement was made in, and on the other hand, some find it impossible for the advertisement to reach everyone.

Also, all of them think that feedback is very important to see whether the event was successful or not. It also motivates those in charge of effectiveness. Most of them get it directly after the event, face to face, through social media, or an evaluation form. And others do not see that there is a certain way to get feedback.

There were inconsistencies in the survey responses and the interview answers, while the leaders think that they have reached the targeted groups, many of these groups showed that they were unaware of the events which interests them.



#### 4.2.3 User Interactions

- Student Use Case Diagram

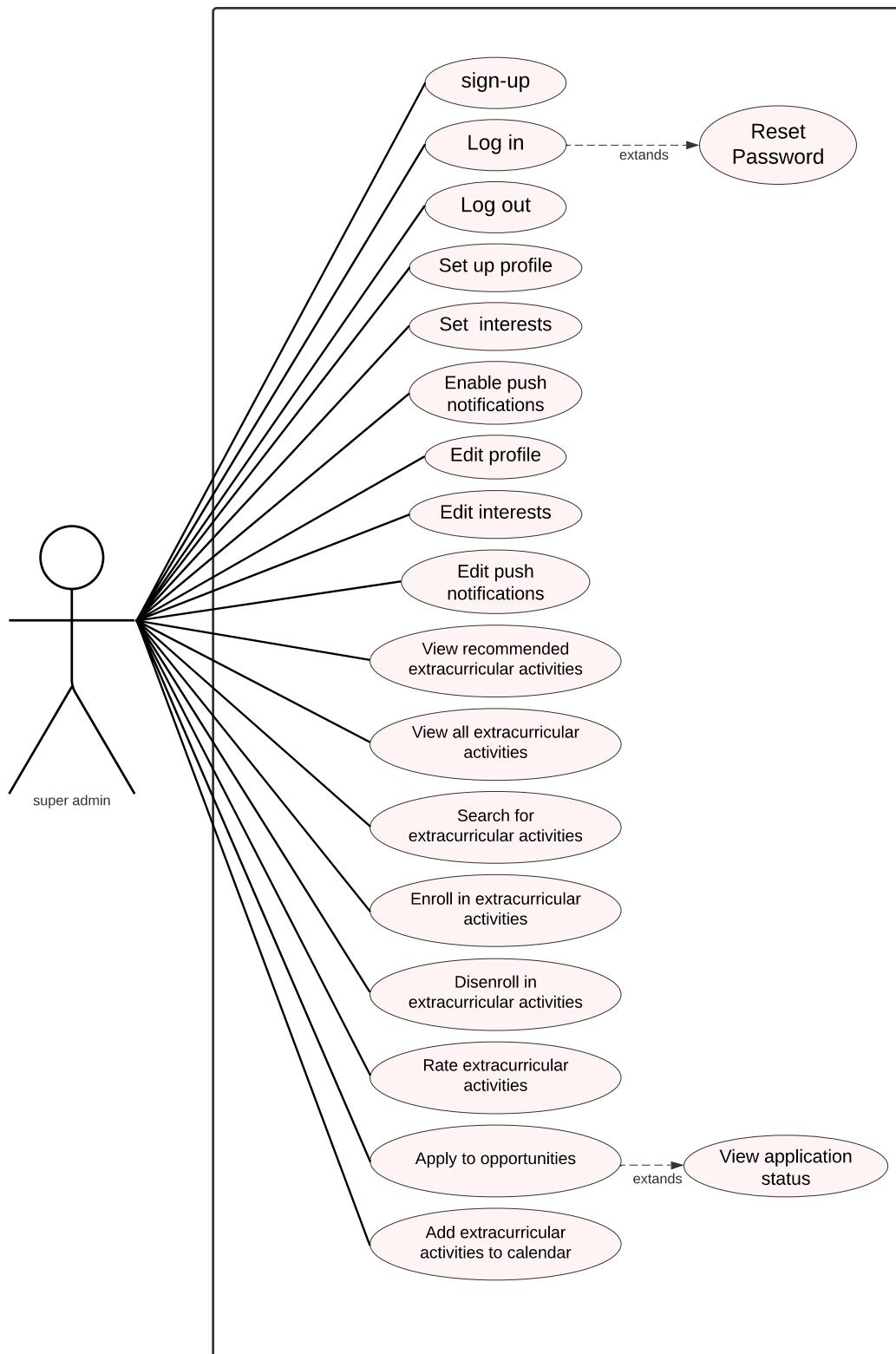


Figure 7 - Student Use Case Diagram



- Admins Use Case Diagram

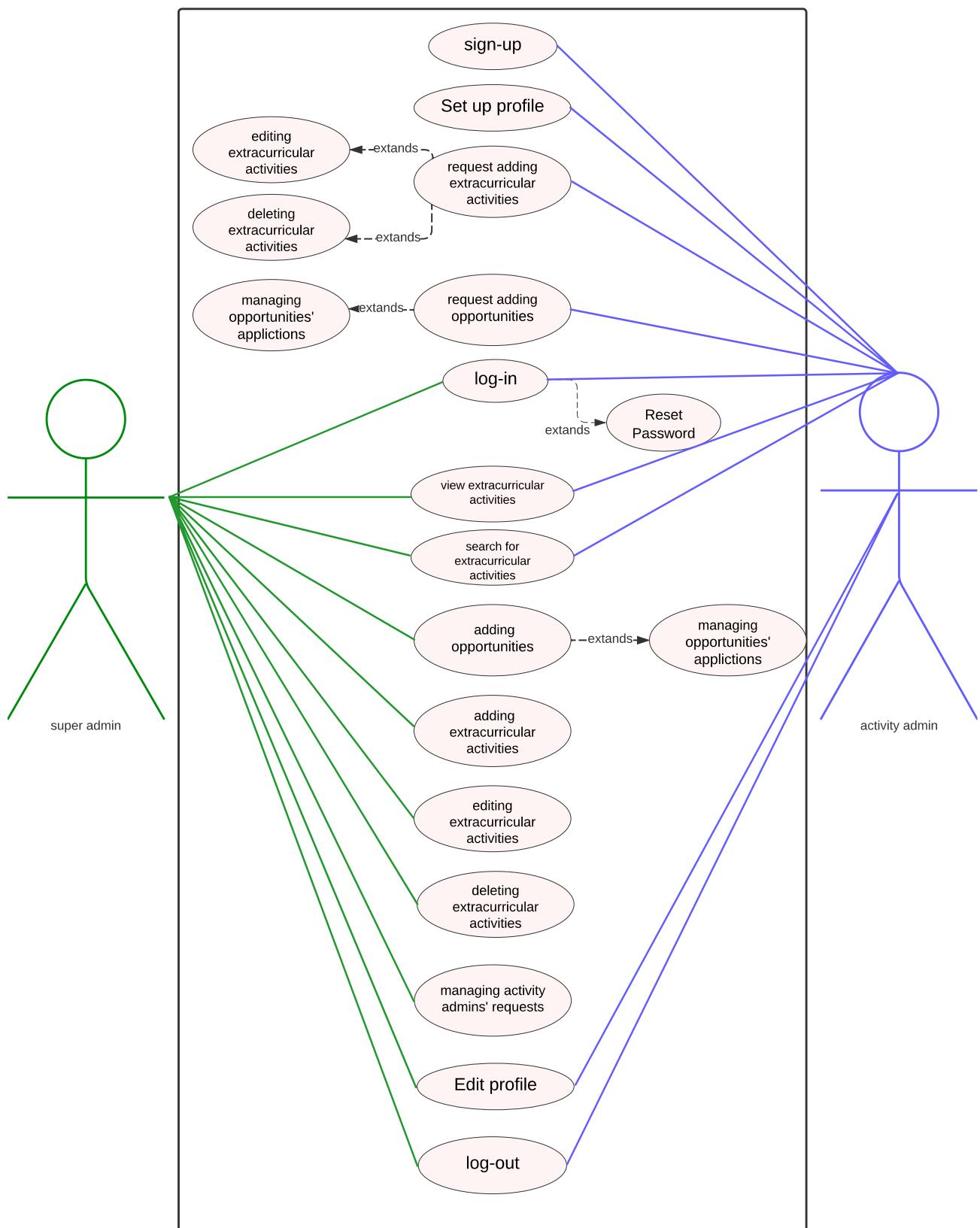


Figure 8 - Admins Use Case Diagram



#### 4.2.4 Roadmap and Product Backlog

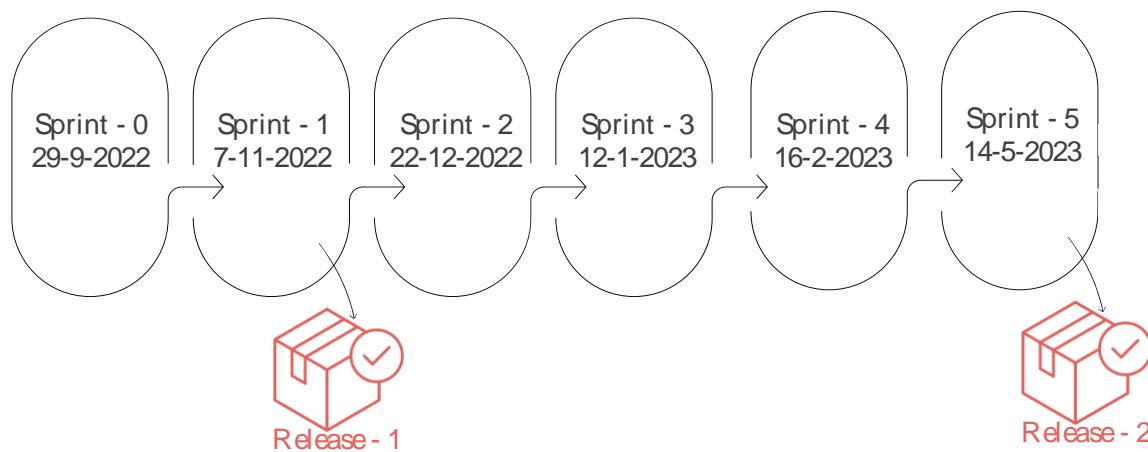


Figure 9 - Product Roadmap

Table 3 - Product Backlog Details

<b>Release - 1</b>	<b>Sprint - 0</b>	Domain analysis Requirements specification Requirement elicitation
	<b>Sprint - 1</b>	Data collection UI design Features for student: Sign up, log in, setting up profile, setting interests, editing interests, viewing activities, search, enroll to activity, disenroll to activity, apply to opportunities, log-out.
<b>Release - 2</b>	<b>Sprint - 2</b>	For activity admin and super admin: log-in, view extracurricular activities, search for extracurricular activities, log-out. For activity admin: sign-up, request adding opportunities, request adding/deleting/editing extracurricular activities.
	<b>Sprint - 3</b>	For student:



		Build a recommender system, notifications system.
	<b>Sprint - 4</b>	For super admin: adding opportunities, adding/deleting/editing extracurricular activities, managing activity admins' requests.
	<b>Sprint -5</b>	For student: sync activities in calendar, rating activities.

Table 4 - Product Backlog Table

ID	PBIs (User Stories)	Size	Type	Status	Acceptance Criteria
1	As a student, I want to be able to sign up so that I can make my own account to show my information and be able to benefit from all app features.	2	Feature	Done	<ul style="list-style-type: none"><li>- If I go to the signup page and fill in my information and click on the “sign-up button”. I will be transferred to the setting-up profile page.</li><li>- If I fill in my information and the password is less than 8 characters, I will get an error message indicating so.</li><li>- If I fill in my information and the password is missing a special character or an uppercase or a lowercase or a number, I will get an error message indicating so.</li><li>- If I fill in my information and the email is in the wrong format, I will get an error message indicating so.</li><li>- If I try signing up and the email is already in the database, I will</li></ul>



					get an error message indicating so.  - If I try to sign up and leave a field empty and click on the “create an account” button, I will get a message indicating that the field is required.
2	As a student, I want to be able to log in so that I can access my account.	2	Feature	Done	- If I go to the login page and leave a field empty and click on the “login” button, I will get a message indicating that the field is required.  - If I go to the login page and fill in my information successfully, then click on “log-in” button, I will be redirected to the homepage.  - If I go to the login page and try logging in with an email that hasn't signed up first, I will get an error message encouraging me to sign up first  - If I go to the login page and try logging in with the wrong email or password I will get an error message indicating so.
3	As a student, I want to be able to reset my password, so that I can be able to retrieve my account in case I forget my password.	3	Feature	Done	- If I forget my password and click on the “forget password” link on the log in page I will be sent an email to reset my password.  - If I reset my password, I will be able to use the new password to access my account immediately.



4	As a student, I want to be able to log out so that I can exit my account.	2	Feature	Done	<ul style="list-style-type: none"><li>- If I click on the log out button, I will get a confirmation message to confirm my action</li><li>- If I click on the log out button and confirm my action, then the system will redirect me to the log in page.</li><li>- If I click on the log out button and cancel my action, I will not lose access to the application</li></ul>
5	As a student, I want to be able to set up my profile, so that I can personalize my page.	3	Feature	Done	<ul style="list-style-type: none"><li>- After signing up successfully I should be navigated to “setting up profile page” where I can fill out the personal information necessary for the application.</li></ul>
6	As a student, I want to be able to edit my profile information, so that I can reflect the changes in them.	3	Feature	Done	<ul style="list-style-type: none"><li>- After setting up my profile successfully I should be able to edit my information through my profile page</li><li>- After successfully making changes and clicking on “save changes” button I should get a confirmation message that my changes have been saved and the changes should be displayed.</li></ul>
7	As a student, I want to be able to set my interests, so that I can personalize my profile more	3	Feature	Done	<ul style="list-style-type: none"><li>- After setting up my profile successfully I should be navigated to “setting up my interests” page.</li><li>- I should be able to choose my interest from a checklist.</li></ul>
8	As a student, I want to be able to edit my interests so that I can update them to match my new interests	3	Feature	Done	<ul style="list-style-type: none"><li>- After setting up my profile successfully I should be able to edit my interest through my profile page.</li></ul>



					<ul style="list-style-type: none"><li>- After successfully making changes and clicking on “save changes” button I should get a confirmation message that my changes have been saved.</li></ul>
9	As a student, I want to be able to allow the application to send me notifications about the extracurricular activities	5	Feature	Done	<ul style="list-style-type: none"><li>- After setting up my interests I should be navigated to “setting up notifications” page.</li><li>- If I choose to get notified about all the activities that are getting uploaded, I should get a notification every time an activity is uploaded.</li><li>- If I choose to get notified about opportunities that are getting uploaded, I should get notifications about them.</li><li>- If I tried to enroll in a limited seated extracurricular activity that has been fully booked, I want to be able to get notified if a seat is available</li></ul>
10	As a student, I want to be able to view all the extracurricular activities, so that I can see all the available activities.	5	Feature	Done	<ul style="list-style-type: none"><li>- I want all activities’ information is displayed nicely, and easy to grasp so that I can explore my options easily.</li></ul>
11	As a student, I want to be able to rate extracurricular activities that I enrolled in, so that I can get recommended more activities like the ones I rated highly	5	Feature	Done	<ul style="list-style-type: none"><li>- When an activity I have enrolled in ends, the rate button will appear and when I click it, I can rate each criterion and send it to the activity admin.</li></ul>
12	As a student, I want to be able to search for an extracurricular activity/	7	Feature	Done	<ul style="list-style-type: none"><li>- If I search for a specific keyword, all extracurricular</li></ul>



	opportunity, so that I can find a specific activity/ opportunity faster.				activities with that keyword will be displayed
13	As a student, I want to be able to enroll in any extracurricular activities, so that I may fully engage.	8	Feature	Done	<ul style="list-style-type: none"><li>- If I click on “enroll” to an activity’s button it will be in my activities page</li><li>- If I click on “enroll” to an activity’s button and I have been enrolled successfully a confirmation massage will appear</li><li>- If I have been already enrolled in the activity the “enroll” button to that activity should be disabled</li><li>- If the activity is limited seated the shown number of seats should decrease once I enroll</li></ul>
14	As a student, I want to be able to disenroll, so that I can leave the chance to others.	8	Feature	Done	<ul style="list-style-type: none"><li>- If I click on the “disenroll” button to an activity’s button a confirmation message should pop up to confirm my actions.</li><li>- If I click on the “disenroll” button to an activity’s button and confirm my actions. it will be removed from “my activities” page.</li><li>- if the activity that I disenrolled from is limited seated the number or seats should increase once I disenroll.</li></ul>
15	As a student, I want to apply to an opportunity so that I can benefit from them and develop my skills.	8	Feature	Done	<ul style="list-style-type: none"><li>- If I click on “apply to an opportunity” button, an application form should appear where I should specify the role I’m applying for and be able to briefly write about myself to</li></ul>



					<p>give me the edge against fellow applicants.</p> <ul style="list-style-type: none"><li>- If I click on “apply to an opportunity” button and I have applied successfully to a message will appear.</li><li>- If I have already applied to the opportunity the “apply to an opportunity” button should be disabled.</li></ul>
16	As a student, I want to be able to view my application to opportunity’s status so that I can keep up with it.	4	Feature	Done	<ul style="list-style-type: none"><li>- If I navigate to my opportunities page my applications status will be displayed nicely and up to date</li></ul>
17	As a student I want to be able to view the recommended extracurricular activities, so that I can see the activities best fit to me.	13	Feature	Done	<ul style="list-style-type: none"><li>- If I show interest in an activity, I want to be shown similar activities and they should be displayed nicely, and easy to grasp so that I can explore my options easily.</li></ul>
18	As a student, I want to synchronize my enrolled events with my calendar so that I can keep track with my events.	13	Feature	Done	<ul style="list-style-type: none"><li>- If I enroll in an activity, I will be asked if I want to add the activity to my device’s calendar.</li><li>- If I click “Yes” I get to choose which calendar I want the activity to be added to, after choosing the calendar window will pop up with all the information filled in, and after clicking “add” I will be transferred back to the application to continue browsing</li><li>- If I click “No” nothing will happen, and I can continue browsing.</li></ul>



19	As an activity admin, I want to be able to sign up so that I can make my own account to manage the extracurricular activities and be able to use app features.	2	Feature	Done	<ul style="list-style-type: none"><li>- If I go to the signup page and fill in my information and click on the “sign-up button”. I will be transferred to the setting-up profile page.</li><li>- If I fill in my information and the password is less than 8 characters, I will get an error message indicating so.</li><li>- If I fill in my information and the password is missing a special character or an uppercase or a lowercase or a number, I will get an error message indicating so.</li><li>- If I fill in my information and the email is in the wrong format, I will get an error message indicating so.</li><li>- If I try signing up and the email is already in the database, I will get an error message indicating so.</li><li>- If I try to sign up and leave a field empty and click on the “create an account” button, I will get a message indicating that the field is required.</li></ul>
20	As an activity admin, I want to be able to log in, so that I can access my account.	2	Feature	Done	<ul style="list-style-type: none"><li>- If I go to the login page and leave a field empty and click on the “login” button, I will get a message indicating that the field is required.</li><li>- If I go to the login page and fill in my information successfully, then click on “log-in” button, I</li></ul>



					<p>will be redirecting to the homepage.</p> <p>- If I go to the login page and try logging in with an email that hasn't signed up first, I will get an error message encouraging me to sign up first</p> <p>- If I go to the login page and try logging in with a wrong email or password I will get an error message indicating so.</p>
21	As an activity admin, I want to be able to log out, so that I can exit my account.	2	Feature	Done	<p>- If I click on the log out button, I will get a confirmation message to confirm my action</p> <p>- If I click on the log out button and confirm my action, then the system will redirect me to the log in page.</p> <p>- If I click on the log out button and cancel my action, I will not lose access to the application.</p>
22	As an activity admin, I want to be able to view the extracurricular activities, so that I can see all the available activities.	5	Feature	Done	<p>- I want all activities' information is displayed nicely, and easy to grasp so that I can explore my options easily.</p>
23	As an activity admin, I want to be able to search for an extracurricular activity/opportunity, so that I can find a specific activity/opportunity faster.	7	Feature	Done	<p>- If I search for a specific keyword, all extracurricular activities with that keyword will be displayed.</p>
24	As an activity admin, I want to be able to delete extracurricular activities so that canceled or out of date activities are no longer accessible.	7	Feature	Done	<p>- If I click on the "delete" button on an activity I uploaded, a confirmation box asking whether I want to delete the selected activity displays to confirm my action.</p>



					- If I confirm my action the activity should be deleted and no longer accessible
25	As an activity admin, I want to be able to edit extracurricular activities, so that if the information of the activity changes, I may reflect those changes.	8	Feature	Done	<ul style="list-style-type: none"><li>- If I click on the “edit” button on an activity that I uploaded I should be able to edit the fields that I’m allowed to.</li><li>- If I edit the activity successfully, I will get a confirmation message indicating so.</li></ul>
26	As an activity admin, I want to be able put in a request to add extracurricular activities, so that I can upload the activity for the students to view.	9	Feature	Done	<ul style="list-style-type: none"><li>- If I navigate to the “add an activity” page and put in a request to add an activity successfully, I should get a confirmation message.</li><li>- If I navigate to the “add an activity” page and put in a request to add an activity but leave a required field empty, I should get an error message indicating so.</li><li>- If I have already put in a request to add an activity, I will be able to keep up with the activity’s status in my activities page.</li></ul>
27	As an activity admin, I want to be able to put in a request to add an opportunity, so that I can upload the opportunity for the students to view.	9	Feature	Done	<ul style="list-style-type: none"><li>- If I navigate to the “add an opportunity” page and put in a request to add an opportunity successfully, I will get a confirmation message.</li><li>- If I navigate to the “add an opportunity” page and put in a request to add an opportunity but</li></ul>



					leave a required field empty, I will get an error message.  - If I have already put in a request to add an opportunity, I will be able to keep up with the activity's status in my opportunity page.
28	As an activity admin, I want to manage the student's application to opportunities to that I can approve/decline it.	10	Feature	Done	- If I click approve, a confirmation box asking whether I want to approve the selected item displays to confirm my action.  - If I click decline, a confirmation box asking whether I want to decline the selected item displays to confirm my action.  - If I approve/ decline an application, the applicant should be aware of the status of their application.
29	As a super admin, I want to be able to log in with the given credentials, so that I can access my account.	2	Feature	Done	- If I go to the login page and leave a field empty and click on the “login” button, I will get a message indicating that the field is required.  - If I go to the login page and fill in my information successfully, then click on “log-in” button, I will be redirecting to the homepage.  - If I go to the login page and try logging in with a wrong email or password I will get an error message indicating so.



30	As a super admin, I want to be able to log out, so that I can exit my account.	2	Feature	Done	<ul style="list-style-type: none"><li>- If I click on the log out button, I will get a confirmation message to confirm my action</li><li>- If I click on the log out button and confirm my action, then the system will redirect me to the log in page.</li><li>- If I click on the log out button and cancel my action, I will not lose access to the application.</li></ul>
40	As a super admin, I want to be able to view the extracurricular activities, so that I can see all the available activities.	5	Feature	Done	<ul style="list-style-type: none"><li>- I want all activities' information is displayed nicely, and easy to grasp so that I can explore my options easily.</li></ul>
	As a super admin, I want to be able to search for an extracurricular activity/opportunity, so that I can find a specific activity/opportunity faster.	7	Feature	Done	<ul style="list-style-type: none"><li>- If I search for a specific keyword, all extracurricular activities with that keyword will be displayed.</li></ul>
41	As a super admin, I want to be able to delete extracurricular activities so that canceled or out of date activities are no longer accessible.	7	Feature	Done	<ul style="list-style-type: none"><li>- If I click on the “delete” button on an activity I uploaded, a confirmation box asking whether I want to delete the selected activity displays to confirm my action.</li></ul>
42	As a super admin, I want to be able to edit extracurricular activities, so that if the information of the activity changes, I may reflect those changes.	8	Feature	Done	<ul style="list-style-type: none"><li>- If I click on the “edit” button on an activity that I uploaded I should be able to edit the fields that I'm allowed to.</li><li>- If I edit the activity successfully, I will get a confirmation message indicating so.</li></ul>
43	As a super admin, I want to be able to add extracurricular activities, so that I	9	Feature	Done	<ul style="list-style-type: none"><li>- If I navigate to the “add an activity” page to add an activity</li></ul>



	can upload the activity for the students to view.				successfully, I should get a confirmation message.  - If I navigate to the “add an activity” page to add an activity but leave a required field empty, I should get an error message indicating so.
44	As a super admin, I want to be able to add an opportunity, so that I can upload the opportunity for the students to view.	9	Feature	Done	- If I navigate to the “add an opportunity” page to add an opportunity successfully, I will get a confirmation message.  - If I navigate to the “add an opportunity” page to add an opportunity but leave a required field empty, I will get an error message indicating so.
45	As a super admin I want to be able to approve/ decline activity admin’s requests so that I can manage what appears in the students’ system.	10	Feature	Done	- If I click approve, a confirmation box asking whether I want to approve the selected item displays to confirm my action. If I approve the activity should be accessible to all.  - If I click decline, a confirmation box asking whether I want to disapprove the selected item displays to confirm my action. If I decline the activity should not be accessible to anyone.
46	As an activity admin, I want to manage the student’s application to opportunities to that I can approve/decline it.	10	Feature	Done	- If I click approve, a confirmation box asking whether I want to approve the selected item displays to confirm my action.



					<ul style="list-style-type: none"><li>- If I click decline, a confirmation box asking whether I want to decline the selected item displays to confirm my action.</li><li>- If I approve/ decline an application, the applicant should be aware of the status of their application.</li></ul>
--	--	--	--	--	--



## 4.3 System Design

### 4.3.1 Architectural Diagram

The purpose of the system architecture activity is to define a comprehensive solution based on logically related and consistent principles, concepts, and properties [18]. There are many systems architecture models that meet the objectives of different technical systems [19], based on our project objectives and need we decided to use MVC architecture design that contains three main logical components which are model, view and controller, as presented in Figure 10.

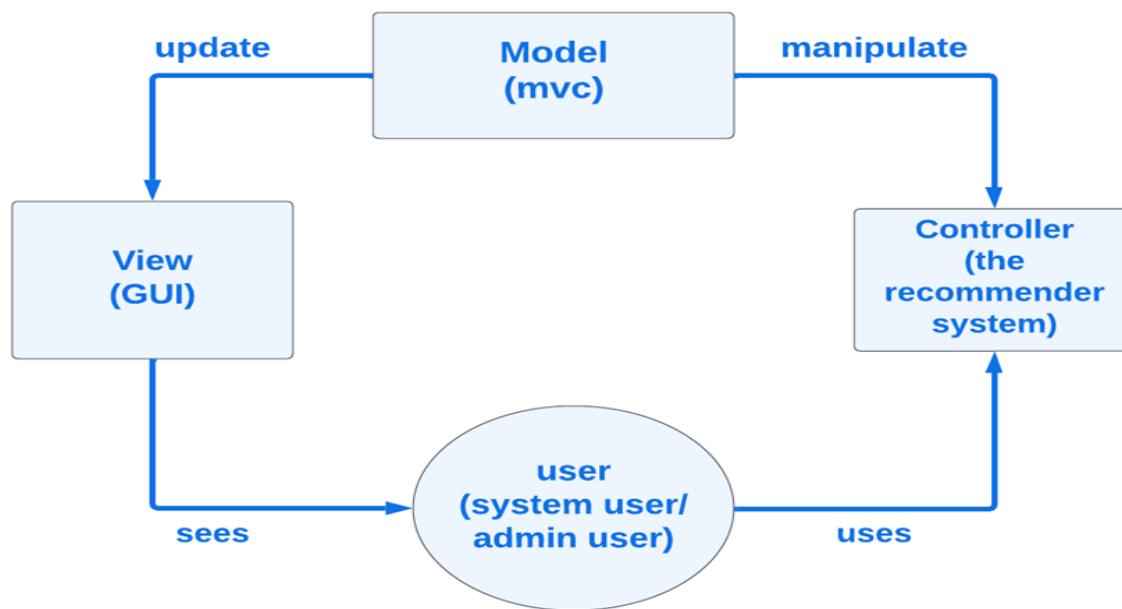


Figure 10 - MVC architecture

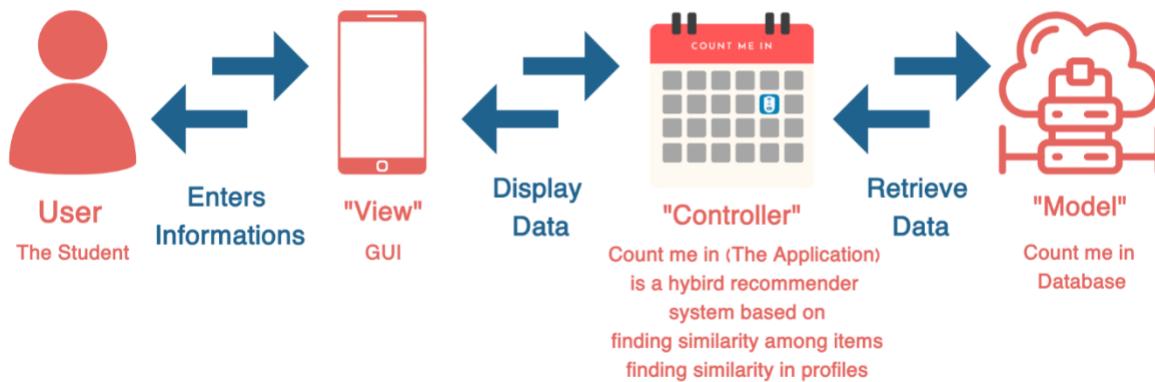


Figure 11 - "Count Me In" MVC architecture.

Figure 11 shows the "Count me in" MVC architecture, the view represented by GUI where the students(system user) can create profiles, set and edit their interests then the controller (the recommender system) can find similarity among items to recommend relatable activities, it is also use the similarity between students' profiles to recommend similar activities and opportunities to the students that is have a lot in common this is the collaborative-based filter. The model contains the "Count me in" database.



#### 4.3.2 Class Diagram /DFD

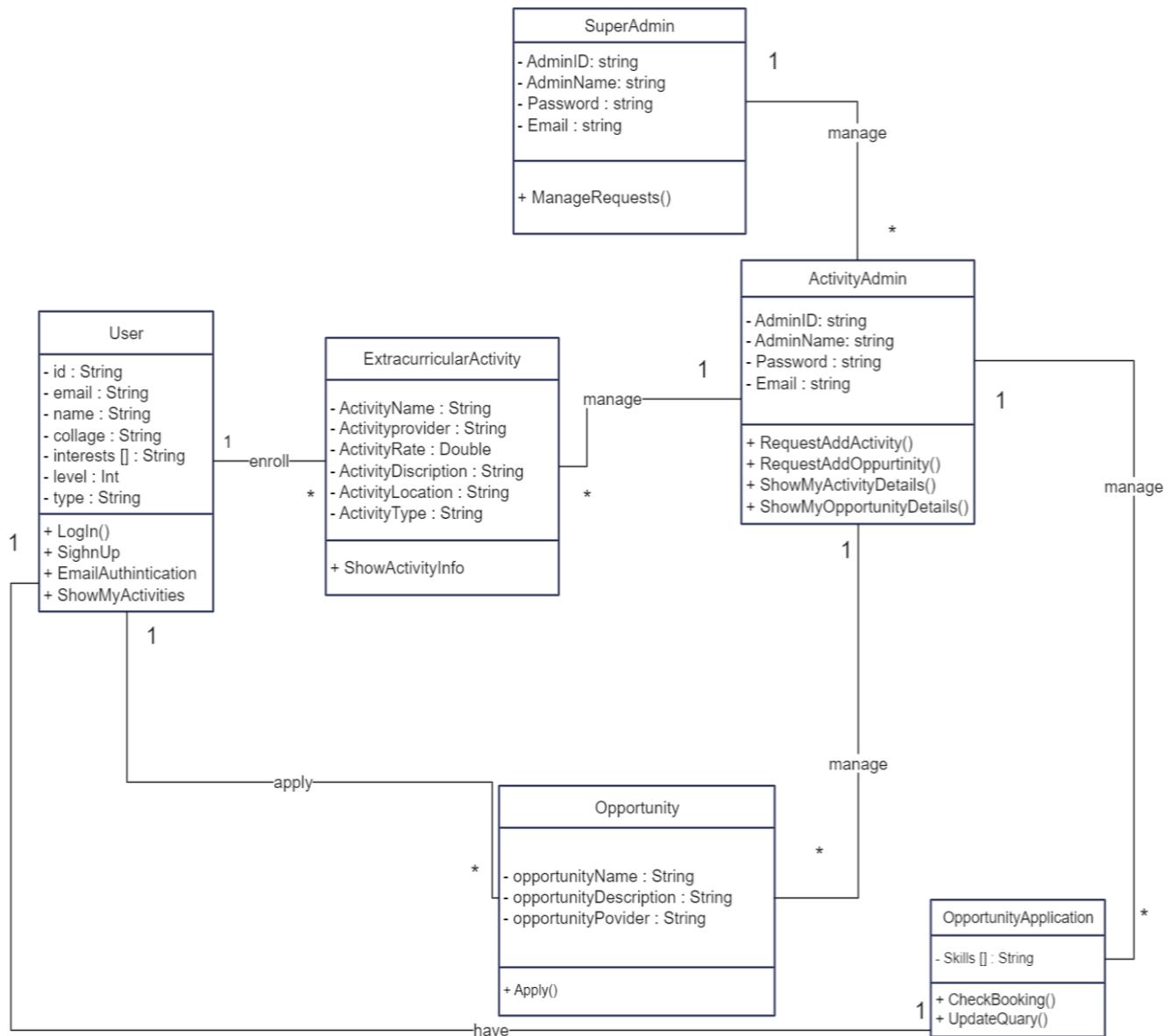


Figure 12 - Class Diagram



### 4.3.3 Component Level Design

Figure 13 represents the process of the content-based recommendation system.

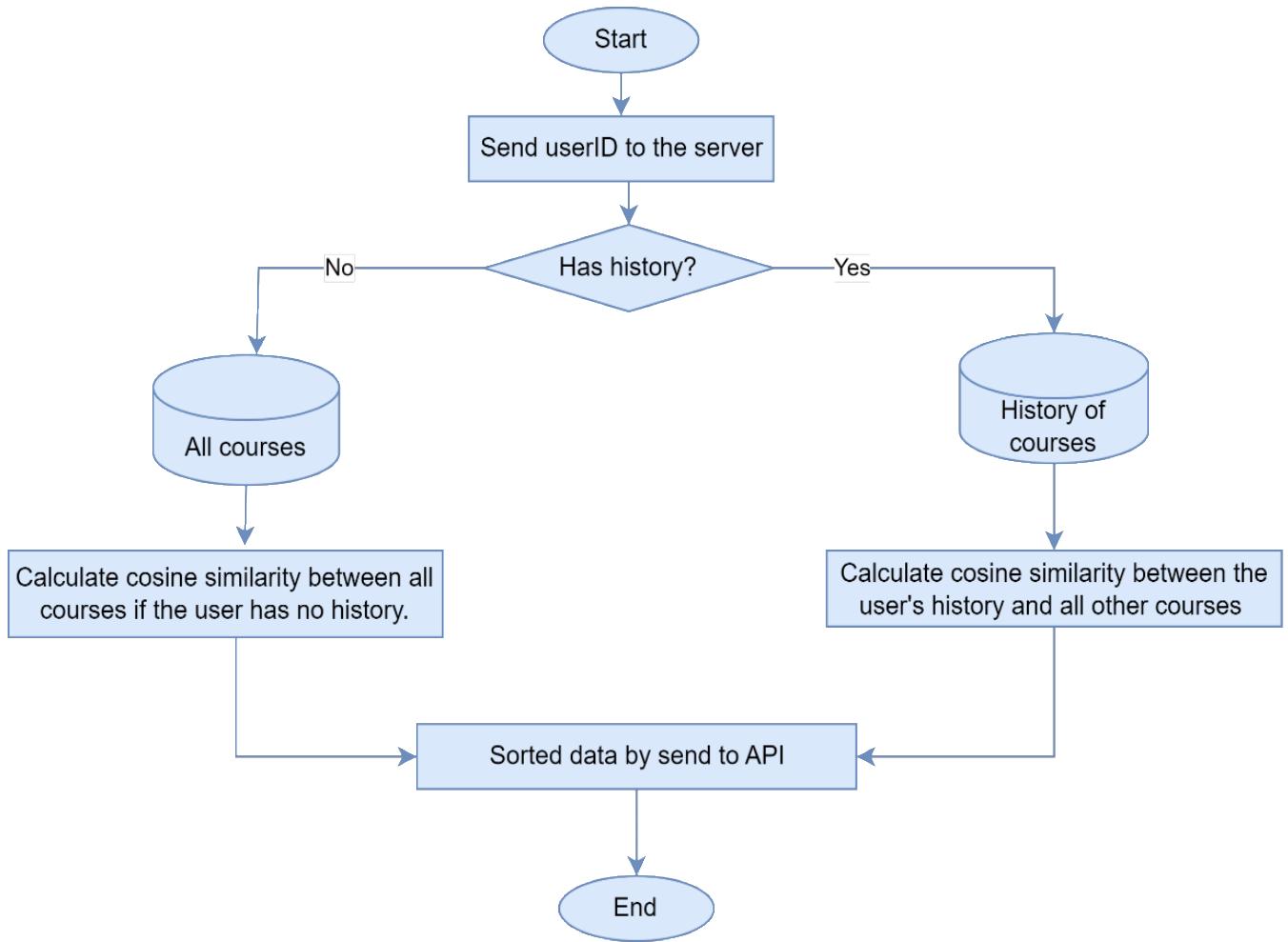


Figure 13 - Content-based Flowchart

Figure 14 represents the process of the model-based recommendation system.

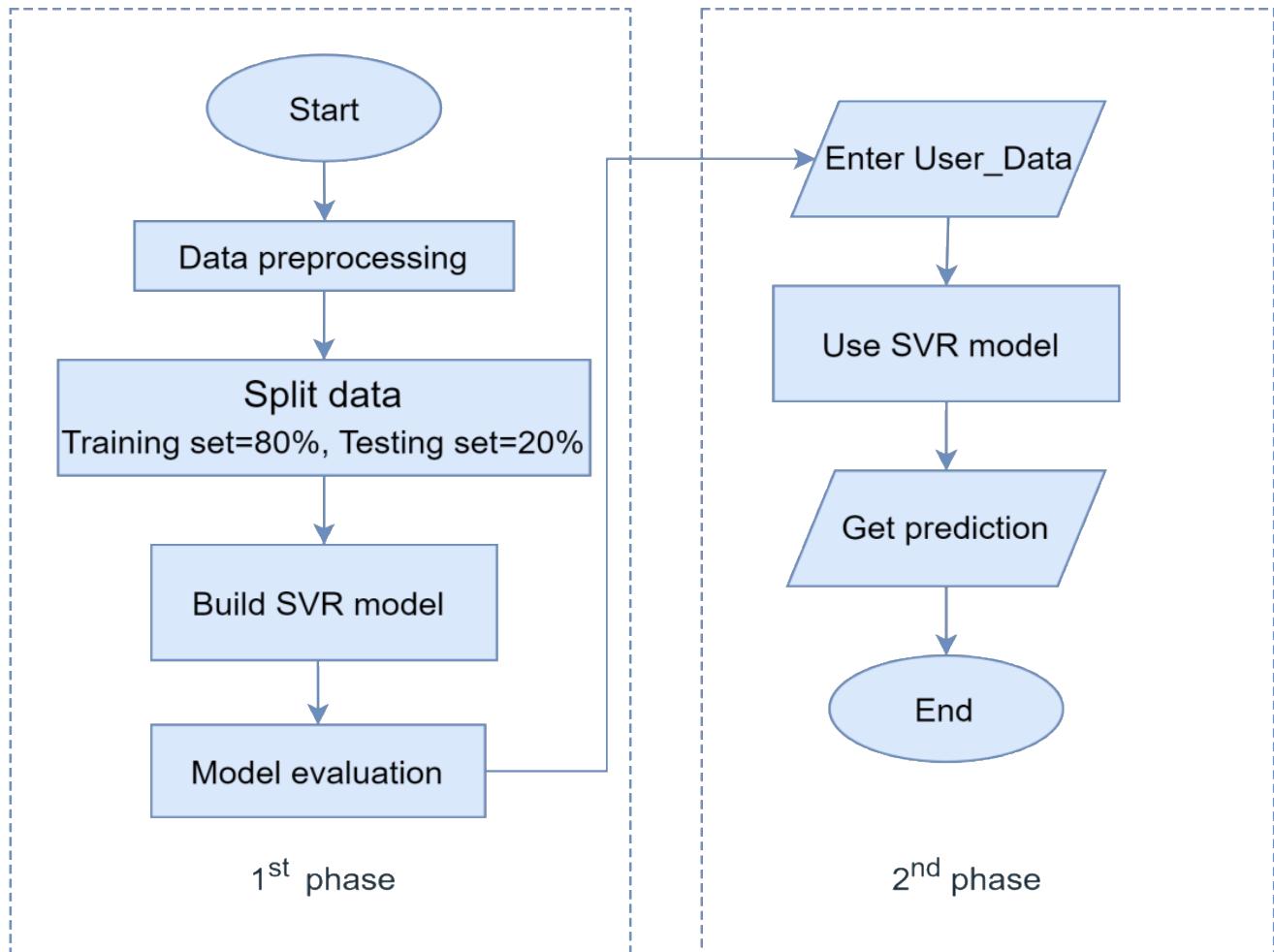


Figure 14 - Model-based Flowchart



Figure 15 represent the process of enrollment in an activity.

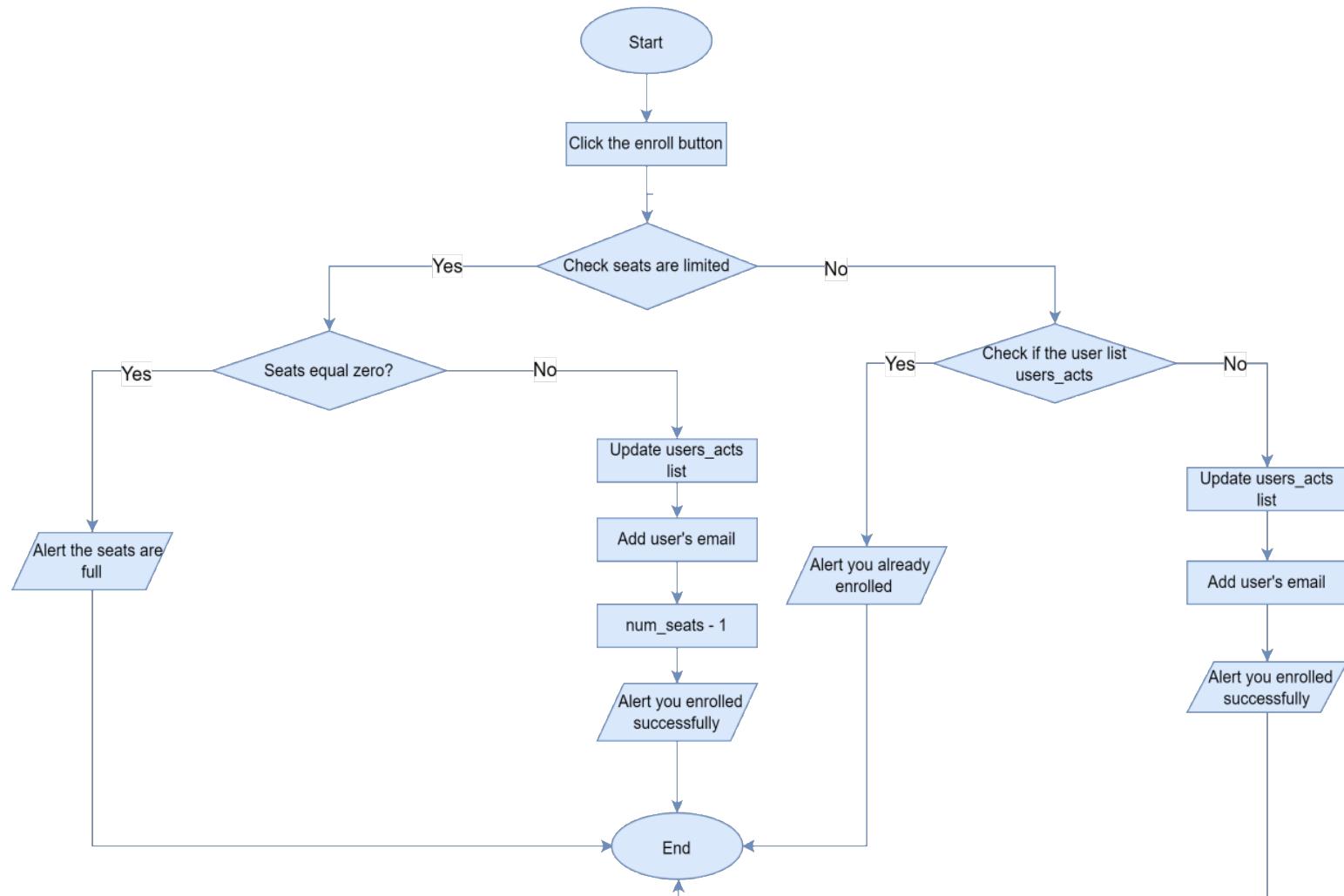


Figure 15 - Enrollment Flowchart



## 4.4 Data Design

### 4.4.1 Data Models

- ER Diagram

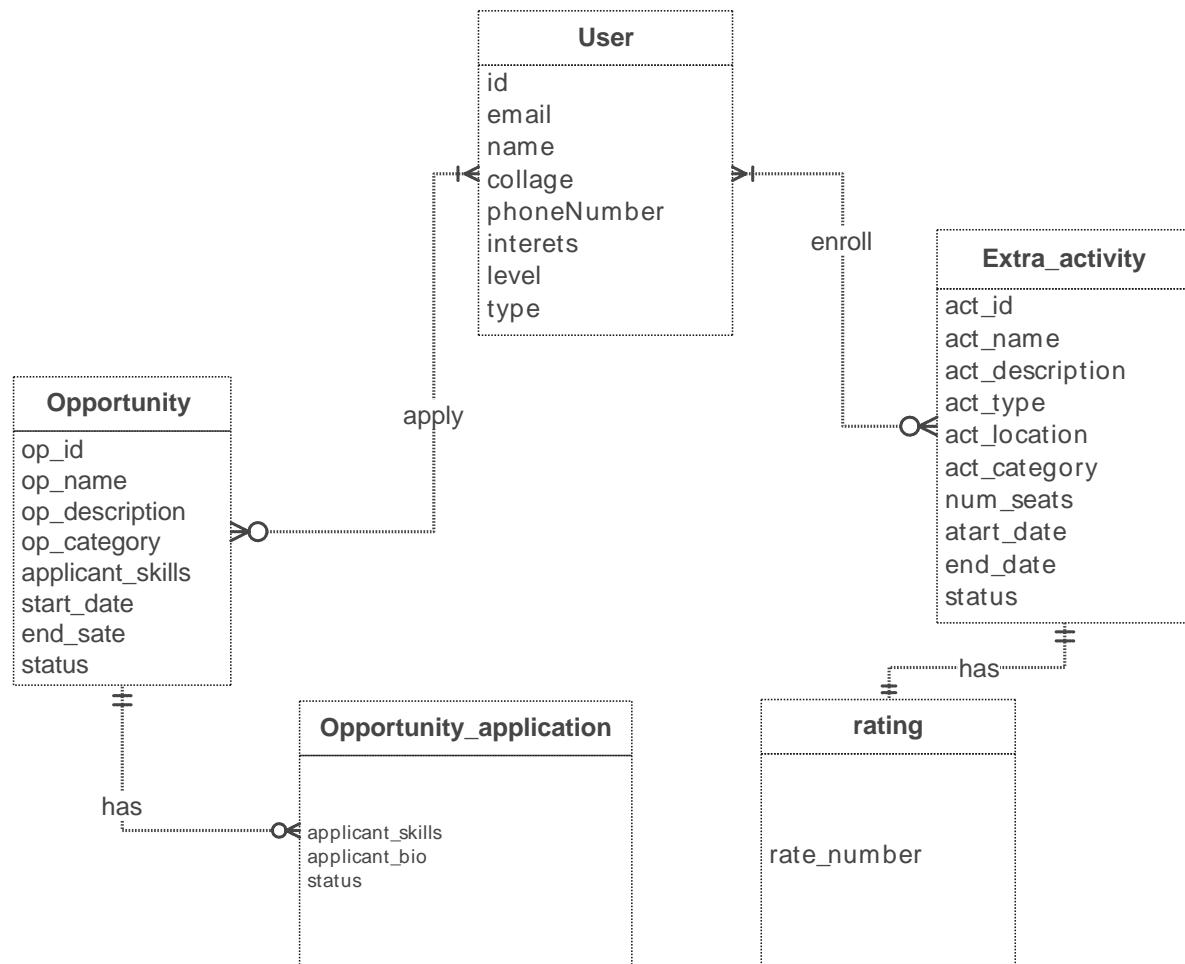


Figure 16 - ER Diagram



- Non-relational data model



Figure 17 - Non-relational Data Model



#### 4.4.2 Data Collection and Preparation

We gathered information and data for the extracurricular activities from many relative sources that produced them. We contacted the leaders of clubs, and we were provided with Excel sheets and reports on several extracurricular activities. Additionally, we collected extracurricular activities from the different social media accounts that announce them. Then, we performed data cleaning.



## 4.5 Interface Design

Figure 18, Figure 19, and Figure 20 show the navigation diagram for the students, activity admins, and the super admin's application respectively.

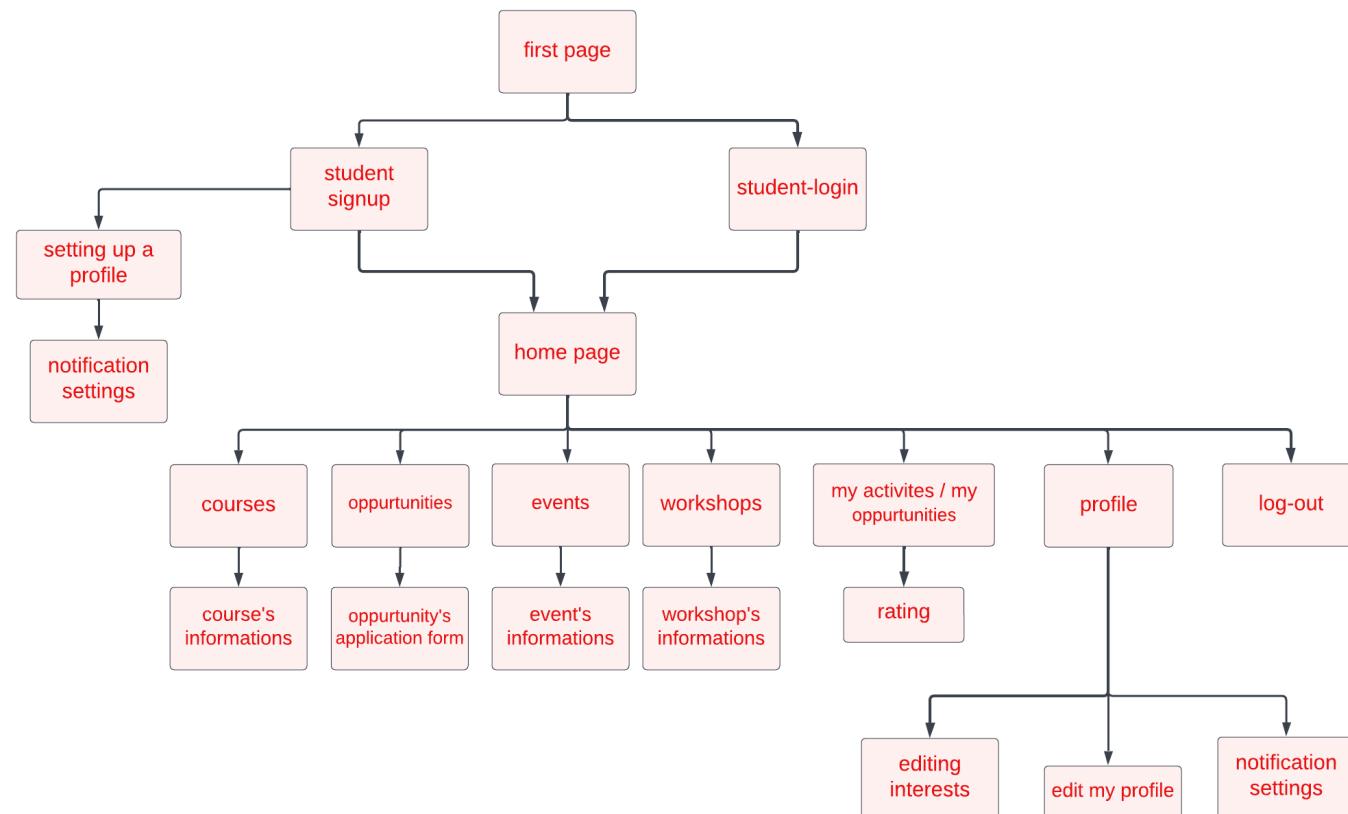


Figure 18 – Student Application Navigation Diagram

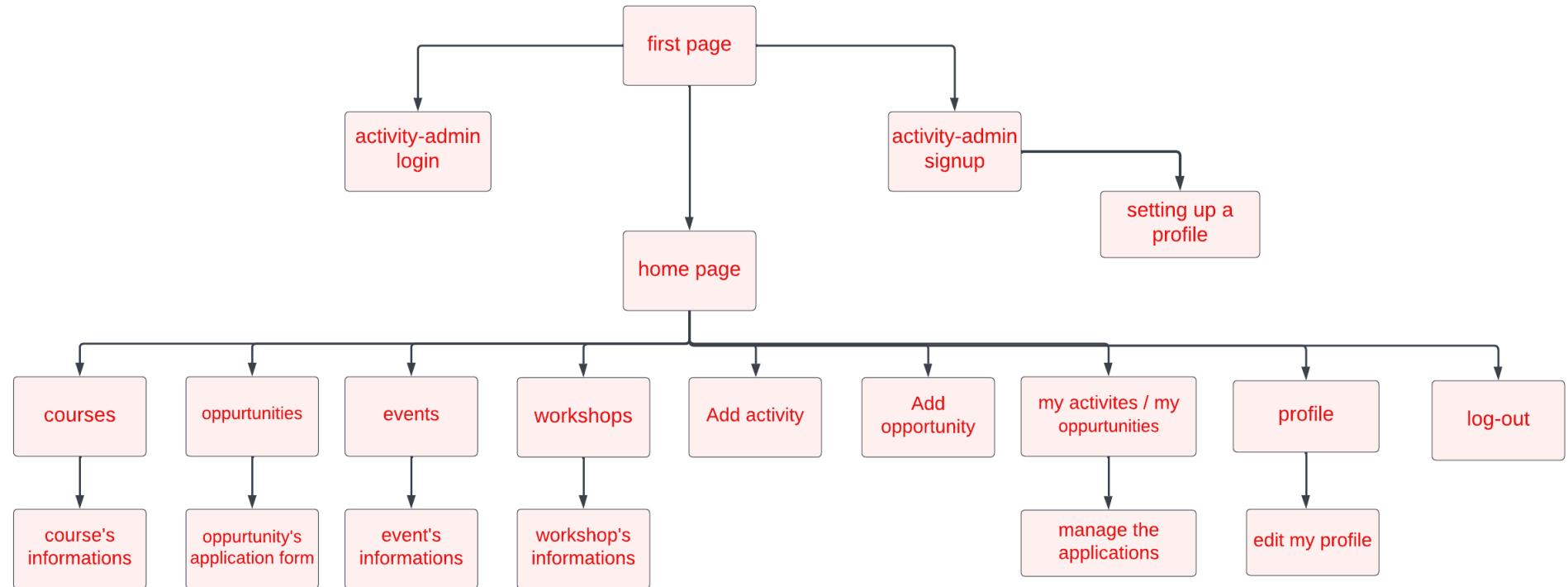


Figure 19 - Activity Admin Application Navigation Diagram

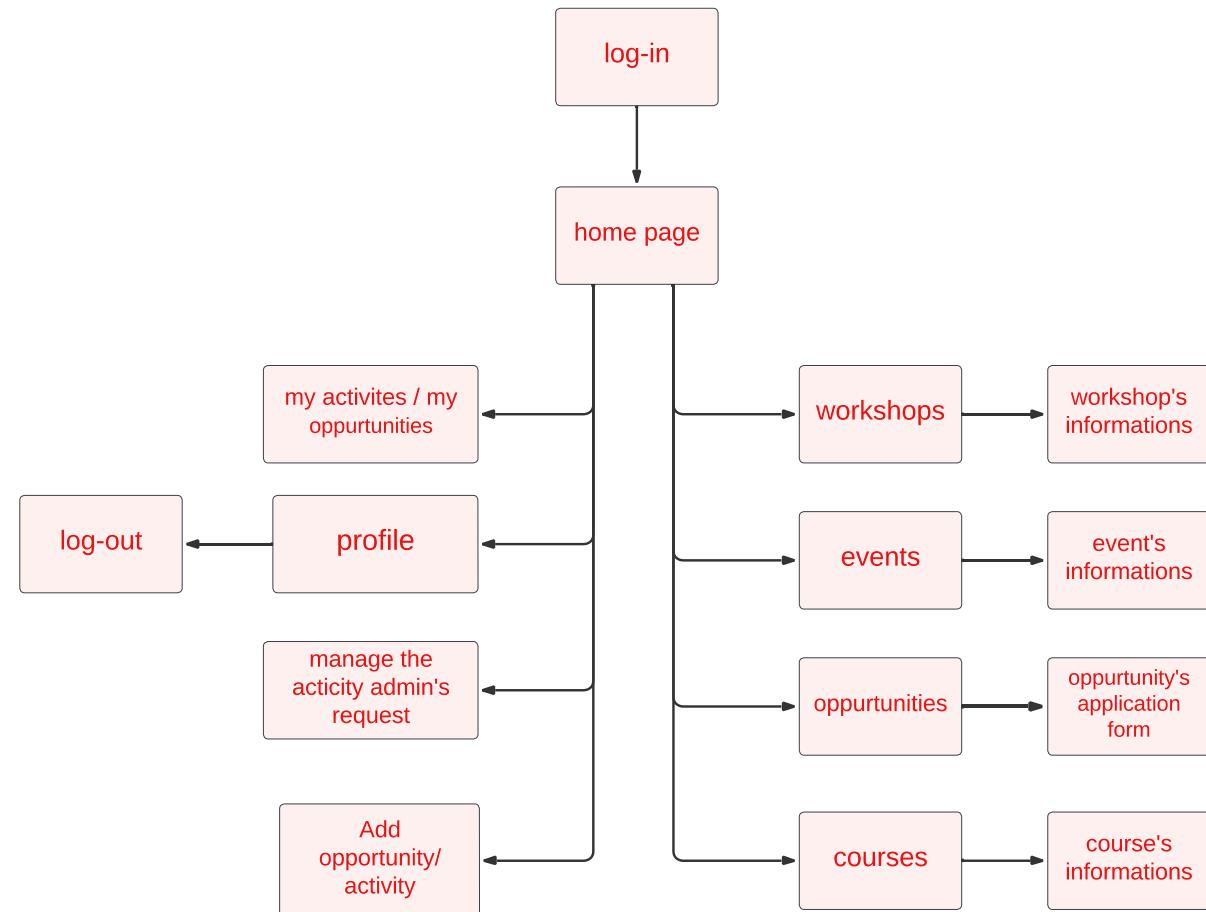


Figure 20 - Super Admin Application Navigation Diagram



We followed UX guidelines while developing the application:

- **Consistency and standards:** consistency in design throughout the application in font, buttons, and pages.
- **Aesthetic and minimalist design:** the interface is simple and only presents the needed information to avoid overwhelming the user.
- **Recognition rather than recall:** all functions are self-explanatory. The user can easily navigate throughout the application on her own at first use.
- **Error prevention:** validations rules are implied on all text input fields, conformation messages.
- **Visibility of system status:** alert messages used to ensure the system status for opportunities applications being sent, activity dashboard, editing interest's dashboard.



## 4.6 Implementation

Following the difficulties we met during the first release, which involved identifying an appropriate programming language to construct the application and familiarizing ourselves with its features. During this release, we encountered a few challenges as we opted to create a hybrid recommender system that combined both content-based and collaborative filtering techniques. To achieve this, we began by researching and learning about the programming languages that would be suitable for our system and easy to understand. After careful consideration, we concluded that Python was the ideal and widely used language for implementing our system.

Once we made our decision, we proceeded to test the recommender system on raw data to ensure that it functioned correctly and understood how it worked. We collected all the relevant code and resources available to us to see how we could improve the system and try out different approaches. Through this process, we developed a solid understanding of both Python and recommender algorithms, which allowed us to create a well-functioning hybrid recommender system.

We encountered an unexpected challenge with the API during the implementation phase. While searching and implementing, we discovered that Python could not directly connect with our code in Flutter and Dart. Instead, we needed to connect it to Firebase and then display the data in the front-end interface. This was critical to our project, and we had to adjust our approach to ensure that we could integrate the API effectively.

After searching we found a framework called Django [20] that allows developers to build web applications quickly and easily. It follows the Model-View-Controller (MVC) architectural pattern. It provides robust tools and libraries to handle common web development tasks such as routing, database management, authentication, and templating. To connect and manage a Firebase Flutter application in Django, you can use Firebase Admin SDK for Python. The Firebase Admin SDK provides a set of APIs for managing your Firebase project from server-side environments. Once you have initialized the Firebase Admin SDK, you can use it to manage your Firebase project from your Django application. For example, you can use the SDK to authenticate users, read and write data to the Firebase Realtime Database or Firestore, and send notifications to users.



We want to highlight the implementation of some functions that we mentioned above:

Table 5 - Content-based recommendation system code

The content-based recommender system code
<pre>The content-based recommender system code is written in Python using a Django API view called "CountMeInActivityContentBased". The purpose of this view is to recommend activities to users based on their history and ratings of activities. The Firestore Firebase collections "rating", "extra_acts" and "user_history". These collections contain information about activity ratings, all activity, and users' activity history, respectively.  The code retrieves the user's activity history from the "user_history" collection and calculates the cosine similarity between the user's history and all other activities. If the user has no history, the code calculates the cosine similarity between all courses. The resulting similarity values are sorted in descending order and returned as a JSON object that includes the recommended activities' information in the "data" key.  class CountMeInActivityContentBased (APIView):     def post (self, request, *args, **kwargs):         user_ID = request.data         print(user_ID["user_ID"])         #data courses rating         doc = db.collection('rating')         data = doc.stream()          #all courses         doc_courses = db.collection('extra_acts')         data_courses = doc_courses.stream()          #users history         hist = db.collection('user_history')         data_hist = hist.stream()          rating_data = {}         all_data = {}         prepared_data = {}         users_hist = {}          #preprocessing          for d in data_courses:             if d.to_dict()["Act_type"] == 'فعالية':                 all_data[d.id] = d.to_dict()                 prepared_data[d.id] = []          for d in data:             if d.to_dict()["Act_type"] == 'فعالية':                 rating_data[d.id] = d.to_dict()                 #print(d.to_dict()["Act_ID"])          for i in all_data:             for j in rating_data:                 if str(i) == str(rating_data[j]["Act_ID"]):</pre>



```
prepared_data[i].append(rating_data[j]["rating"])
else :
    prepared_data[i].append(0)
#break
#break

for u in data_hist:
    if u.to_dict()["ACT_type"] == 'فعالية':
        users_hist[u.to_dict()["user_email"]] = u.to_dict()["extra_activityID"]

#for k in prepared_data:
#    print(len(prepared_data[k]))
#collection historic --> {"useremail":raghad@gmail.com, "ID_course":"4GHKJH", "ACT_Type":""} --
> raghad@gmail.com

cs = {}

# get the historic and user --> calcul the CS between course ID (historic) and all other courses

#calcul the Cosine Similarity between history course and other courses
if user_ID["user_ID"] in users_hist:
    for course in prepared_data:
        cs[course] =
cosine_similarity([prepared_data[users_hist[user_ID["user_ID"]]]],[prepared_data[course]])[0][0]

#calcul the Cosine Similarity between all courses
else:
    for course in prepared_data:
        list_cs = []
        for course1 in prepared_data:
            #print(cosine_similarity([prepared_data[course]],[prepared_data[course1]])[0][0])
            list_cs.append(cosine_similarity([prepared_data[course]],[prepared_data[course1]])[0][0])
        cs[course] = sum(list_cs)

#sorting by the CS
cs = sorted(cs.items(), key=lambda x: x[1], reverse=True)

#change format OUTPUT
cs_final = {}
cs_final1 = []
for c in cs:
    cs_final[c[0]] = c[1]
    cs_final1.append(c[0])

data_output = {"data":[]} # --> {course1:{}}
for ID in cs_final1:
    try:
        data_output["data"].append(all_data[ID])
    except:
        for element in all_data:
            if all_data[element]["Act_ID"] == ID:
                data_output["data"].append(all_data[element])
            else:
                pass

return Response(data_output)
```



Table 6 - The Model based (collaborative) recommendation system code

**The Model-based (collaborative) recommendation system**

The model based (collaborative) recommendation system is using also the Django API view. The view begins by extracting the user ID from the POST request data and printing it to the console. It then retrieves data from three collections in a Firestore database: "rating", "extra\_acts", and "users". It stores the data in dictionaries and lists for further processing.

The view uses a Support Vector Regression (SVR) model to train on the training set and predict the user's preferences for each activity in the testing set. The predicted preferences are then sorted and returned as a response to the original POST request.

```
class CountMeInActivityModelBased(APIView):  
  
    def post(self, request, *args, **kwargs):  
  
        user_ID = request.data  
  
        print(user_ID["user_ID"])  
  
        doc = db.collection('rating')  
  
        data_ = doc.stream()  
  
  
        #all courses  
  
        doc_courses = db.collection('extra_acts')  
  
        data_courses = doc_courses.stream()  
  
  
        #all users  
  
        doc_users = db.collection('users')  
  
        data_users = doc_users.stream()  
  
  
        rating_data = {}  
        users_data = {}  
        all_data = {}  
  
        dataset = {"userID":[],"courseID":[],"rating":[]}
```



```
count1 = 0
count2 = 0
for d in data_:
    if d.to_dict()["Act_type"] == 'فعالية':
        rating_data[d.id] = d.to_dict()

for d in data_courses:
    if d.to_dict()["Act_type"] == 'فعالية':
        all_data[d.id] = [d.to_dict(),count1]
        count1 = count1 + 1

for d in data_users:
    users_data[d.id] = [d.to_dict()["email"],count2]
    count2 = count2 + 1

for i in users_data: #user1 --> all courses
    for j in all_data:
        for k in rating_data :
            if rating_data[k]["Act_ID"] == all_data[j][0]["Act_ID"]:
                if rating_data[k]["useremail"] == users_data[i][0]:
                    #           if users_data[i] == rating_data[k]["useremail"] and all_data[j]["Act_ID"] ==
rating_data[k]["Act_ID"]:
                        dataset["userID"].append(users_data[i][1])
                        dataset["courseID"].append(all_data[j][1])
                        dataset["rating"].append(rating_data[k]["rating"])
                    else :
                        dataset["userID"].append(users_data[i][1])
```



```
dataset["courseID"].append(all_data[j][1])

dataset["rating"].append(0)

else :

    dataset["userID"].append(users_data[i][1])

    dataset["courseID"].append(all_data[j][1])

    dataset["rating"].append(0)

# indexing userID & courseID --> {'ID1':1,'ID2':2,...} user ID1 : 1

#Model Based

dataset = pd.DataFrame(dataset)

#dataset.to_excel('data.xlsx')

#----> preprocessing for dataset ---> delete missing values (NAN) ----> delete duplications

# delete missing values (NAN)

dataset = dataset.dropna()

# delete duplications

dataset = dataset.drop_duplicates()

#dataset = dataset.dropna()

#dataset.to_excel('dataset.xlsx')

#reader = Reader(rating_scale=(1, 5))

#data = Dataset.load_from_df(dataset[["userID", "courseID","rating"]], reader)

# Split the dataset

x = dataset[['userID','courseID']].to_numpy()

y = dataset["rating"].to_numpy()
```



```
trainsetx,testsetx,trainsety,testsety = train_test_split(x,y, test_size=.20)

#training
model = SVR()
model.fit(trainsetx,trainsety)

#prediction
prediction_data = {}

for i in users_data:
    if str(users_data[i][0]) == str(user_ID["user_ID"]):
        for course in all_data:
            pred = model.predict([[users_data[i][1],all_data[course][1]]])
            print(pred)
            prediction_data[all_data[course][0]["Act_ID"]] = pred

    #{

    # "user_ID":"441201395@student.ksu.edu.sa"
    #

prediction_data = sorted(prediction_data.items(), key=lambda x: x[1], reverse=True)

#change format OUTPUT
prediction_data_final = {}
prediction_data_final1 = []
for c in prediction_data:
    prediction_data_final[c[0]] = c[1]
    prediction_data_final1.append(c[0])

data_output = {"data":[]} # --> {course1:{}}
```



```
for ID in prediction_data_final1:  
    try:  
        data_output["data"].append(all_data[ID][0])  
    except:  
        for element in all_data:  
            if all_data[element][0]["Act_ID"] == ID:  
                data_output["data"].append(all_data[element][0])  
            else:  
                pass  
  
    return Response(data_output)
```

These two codes presented in Table 5 and Table 6 are for the events section, we duplicate them for the other activities, and we only change the Act\_type.



Table 7 - API implementation code

API implementation
<p>API implementation as we mentioned that we used the Django API view.</p> <p>This is a code that is used to configure and run a Django web application using ASGI (Asynchronous Server Gateway Interface) protocol.</p> <p>The third line sets the value of an environment variable called DJANGO_SETTINGS_MODULE to the name of the Django settings module to be used by the application. In this case, it is set to CountMeIn_API.settings.</p> <pre>import os  from django.core.asgi import get_asgi_application  os.environ.setdefault('DJANGO_SETTINGS_MODULE', 'CountMeIn_API.settings')  application = get_asgi_application()</pre> <ul style="list-style-type: none"><li>- The “urlpatterns” variable is defined as a list that contains all the URL patterns for the web application.</li><li>- The first URL pattern maps the URL /admin/ to the Django admin interface.</li><li>- The second URL pattern maps the URL /api-auth/ to the Django REST framework authentication views.</li><li>- The third URL pattern maps the root URL / to a view named CountMeInApi using the as_view method.</li><li>- The next few URL patterns map specific URLs to views that handle requests related to courses, activities, and workshops. Each view is named according to the type of recommendation algorithm used (ContentBased or ModelBased).</li></ul>
<pre>from django.contrib import admin  from django.urls import path, include  from.viewsimport  CountMeInCoursesContentBased,CountMeInCoursesModelBased,CountMeInActivityContentBased,CountM eInActivityModelBased  from .views import CountMeInWorkshopContentBased, CountMeInWorkshopModelBased, CountMeInApi  urlpatterns = [</pre>



```
path('admin/', admin.site.urls),  
  
path('api-auth/', include('rest_framework.urls')),  
  
path("",CountMeInApi.as_view(),name='countmein'),  
  
path('coursesCB/',CountMeInCoursesContentBased.as_view(),name='countmein'),  
  
path('coursesMB/',CountMeInCoursesModelBased.as_view(),name='countmein'),  
  
path('activityCB/',CountMeInActivityContentBased.as_view(),name='countmein'),  
  
path('activityMB/',CountMeInActivityModelBased.as_view(),name='countmein'),  
  
path('workshopCB/',CountMeInWorkshopContentBased.as_view(),name='countmein'),  
  
path('workshopMB/',CountMeInWorkshopModelBased.as_view(),name='countmein')  
]
```

More can be viewed in our project's GitHub repository<sup>5</sup>

---

<sup>5</sup> <https://github.com/raghads123/2022-GP1-18>



## 5 System Evaluation

### 5.1 User Acceptance Testing

The final phase of the software testing process and development life cycle is User Acceptance Testing (UAT), also known as End User Testing. User Acceptance Testing determines whether a feature or program achieves its goals and is often carried out by the end users or clients. The program cannot be made available to the public until UAT is finished [21]. So, in this section, we will describe the testing procedures used to evaluate our system. We will begin by detailing the participant's demographics as well as the questions and findings from the survey.

Our UAT is divided into two sections; first, we will test the super admin and activity admin, who has an excellent technical background, and evaluate if the features of the super admin and activity admin function well in the “Count Me In” application. The second section will be conducted as well with 20 users (students) of various colleges and majors, levels, and interests to evaluate how well the “Count Me In” features work well in real-world situations.

Additionally, we created a questionnaire to ensure that we collected user responses in a way that was anonymous. The questionnaire covers a variety of questions about the application to get feedback from users on the user interface, interaction, and system as a whole.

#### 5.1.1 Demographics of Participants

We tested “Count Me In” application on 22 KSU students, from different colleges, majors, levels, and interests. In addition, we tested “Count Me In” application on 1 super admin and 5 activity admins, Table 8 shows the details of the participants’ demographic.



Table 8 - Demographics of Participants

Variable	Classification	Number of participants
Level	Level 7	1
	Level 8	2
	Level 9	1
	Level 10	3
	Level 11	15
	Level 12	5
College	College of Computer and Information Science	21
	College of Science	1
	College of literature	2
	College of law	3
Major	Information technology	19
	Information system	2
	Physics	1
	Literature	2
	Law	3
Native language	Arabic	28
	English	0
Type of user	Student	22
	Activity admin	5
	Super admin	1
Experience using mobile applications	Low	0
	Medium	1
	High	27



### 5.1.2 Questionnaire/Interview Results

Results of user feedback on “Count Me In” are displayed in this section. The questionnaire as presented in Appendix C involved 20 users, and the following criteria were used to determine the results:

their response to the system, their response to the system's user interface, learning to know how to use the system, and overall response to the system.

Some results were based on a scale between 1 and 5 where 1 means strongly agree and 5 means strongly disagree. The percentage of users who found that the application met their needs perfectly is 70%. The percentage of users who strongly agreed that the features found in the application are practical and time-saving is 85%. The percentage of users who strongly agreed they found the navigation through the application was easy is 59%, and 0% disagreed. The percentage of users who strongly agreed that they found the prompts for inputs clear is 92%, and 0% disagreed. The percentage of users who strongly agreed that the recommendations were relevant within the first use is 81%. The percentage of users who strongly agreed that the interface is clear and easy to use is 85%. The percentage of users who think that the ease of use and the provided features are what make the application unique is 70%, while 42% find the interface design enhances the user experience. The percentage of users who strongly agreed that the application is the best alternative to reach and publish extracurricular activities than social media platforms is 92%. The percentage of users who strongly agreed that they would use the application frequently is 77%, and that they would suggest the "Count Me In" application to others is 89%.

In conclusion, most users provided positive feedback on “Count Me In”, a practical and easy-to-use application for publishing extracurricular activities. They found the interface clear, the prompts for inputs were clear, and the features were practical and time-saving. Additionally, users found the recommendations relevant and the application to be a better alternative to social media platforms.



## 5.2 Quality Attributes (NFR testing)

Table 9 explains how we tested the non-functional requirements.

Table 9 - NFR Testing

User story	Quality Attribute	Measure	Results
As a user, I want to learn how to use the application and its main functions within the first use	Usability: measures how easy it is for users to learn and use a system to achieve their goals?  Learnability: the ability of an application to be easy to learn and use for inexperienced users.	- We tested the time to learn attributes and we found out that inexperienced users will take on average half a minute to use the application's main functions.  - We also tested the success rate attribute and we found that 99.5% of inexperienced users can complete tasks using the application without errors.	- 10 users tested the 4 main functions, log in, add activity / opportunity, view the recommended activities/ opportunity, apply to an opportunity and enroll in activity.  - It results in 10/10 users adding an activity/opportunity successfully. 10/10=1.  - 9/10 tested the recommender and it gave them a reasonable activity. 9/10=0.9.  - 9/10 applied to an opportunity successfully. 9/10 =0.9.  - 8/10 enrolled to an activity successfully. 8/10=0.8.



As a user I want the application to respond within seconds given good connection	Performance: measures how well the system responds to user requests under specific conditions, such as a good internet connection.	The time it takes for the application to respond to user requests or actions is 1 to 3 seconds maximum.	10/10 of users tested the application and the response time of each action was between 1 to 3 seconds maximum.
As a user, I want the application to authenticate me so that no one can access my account.	Security: the ability of the system to protect user data and prevent unauthorized access.	The application verifies user identities and grants appropriate access permissions.	The system provides an authentication email that is sent to new users to confirm their identity
As a user, I want the application to be available whenever I need It.	Availability: the ability of a system to be operational and accessible to users when required. In other words, it measures the amount of time a system is up and running and able to perform its intended functions.	Compute the amount of time a day the system is available.	We have an essential service provider which is the firebase Firestore database. Firebase's availability is 99.95% of all time [21].



As a user, I want the application to be secure and reliable so I can share my personal information.	Security: the ability of an application to protect user data and prevent unauthorized access, modification, or destruction of that data.	The application verifies user identities and grants appropriate access permissions.	The system also prevents weak passwords. It must include upper case letter, lower-case letter, numbers and special character. Also, the password should be 8 characters in length at least.
---	---	---	---

### 5.3 Discussion

We tested the user acceptance of the application with 20 users, 3 activity admins, and 1 super admin. We asked them a few questions (Appendix C) to ensure they understood and went through the application smoothly, the results were excellent. Moreover, the non-functional requirements were implemented and tested successfully as shown in Table 9. We represented how we tested the non-functional requirements we let users download and go through the application to test usability and learnability. As they go into functions, we tested the performance, availability, and security.

In general, the feedback was incredible. Almost all the users, admins, and super admin strongly agreed that the application navigation was easy and had a clear interface. The proposed solution got the best feedback from people since it is a mobile application that students need.



## 6 Conclusions and Future Work

To conclude, “Count Me In” focuses on providing an application that makes organizing extracurricular activities at the university easier. It supports students as well as activity admins. Developing the “Count Me In” application went through many stages, first, we started by defining the problem and the solution. Our main problem was that the lack of a platform helps students easily identify the activities and opportunities offered to them. In addition, our application provides a hybrid recommendation system that improves the process of finding and participating in extracurricular activities and saves students effort and time. Our application is suitable for students at King Saud University at different levels. We dove into background analysis and conducted studies on different recommendation systems and different similarity measures. This part of the report was particularly necessary to help us decide on the type of recommender system and similarity measure to be used. Following the background chapter comes the competitive analysis chapter where we explored the different types of applications/systems that are of help to our study, this step gave us insight into how to use recommender systems, and it also helped define the requirements for the application. Next comes the System Analysis chapter covering user characteristics, user survey, and results analysis, user stories, and software requirements. It explained the requirements-gathering process, which helped us write user stories that reflect user needs. User stories were the step toward writing functional and non-functional requirements. In the System Design chapter, we determined the system design in this project and described the main functions providing illustrations and diagrams such as use cases, and a sequence diagram.

We mentioned the software needed to implement this project and the code fragments for the major functions in the Implementation chapter. This is followed by a System Testing chapter where we discussed the testing process and how we used various types of software testing techniques to check that the system matched the requirements. Finally, we hope that the project met the expectations and goals set.



## 6.1 Local and global impact

By simplifying the process of finding and enrolling in extracurricular activities, “Count Me In” can help reduce stress and anxiety for students, allowing them to be more organized and immersed, which can lead to a more vibrant and engaged university community.

Our solution can be applied to different universities, the hybrid recommender system used in the application could potentially be used in other contexts beyond university extracurricular activities, such as recommending job opportunities or volunteer opportunities.

## 6.2 Problems and Challenges Encountered During the Software Development

When creating a project, it is customary to encounter some difficulties in the implementation stages, as the planned process sometimes does not give the expected result. At the implementation, we were unfamiliar with the Flutter framework, and there were some exceptions we encountered that were unclear to solve. Time was another issue we dealt with while learning a new framework and studying/programming, as the most considerable difficulty that we faced, was in the recommender system part, how to integrate everything together, and finding a suitable and affordable platform to deploy our API. Despite these challenges, we have become more organized by managing our time wisely and learning to solve unclear exceptions by ourselves.

## 6.3 Limitations of the system

“Count Me In”, like most applications, has a few limitations that will hopefully be worked out in the near future. One of these limitations is that the application only supports the Arabic language, we intend to include more languages starting with English. Moreover, it only supports Android and is intended for students at King Saud University.

## 6.4 The main contribution of the project

Our project contributed to enriching the academic experience for college students, encouraging them to explore their interests and talents, refine their skills and make benefit from the university resources to better help them and their future. All the students will be up to date on the activities and opportunities.



## 6.5 Future work

“Count Me In” aspires to expand to cover more universities all over the kingdom, support more languages and operating systems, improve the recommendation system to be more accurate by employing the user’s interests, and add more features like GPS to ease the process of finding where the activity is being held and enabling the “dark mode” feature and many more.



## 7 Acknowledgments

First and foremost, we thank Allah for the inspiration, motivation, and completion of this project. This accomplishment could not have been possible without the dedicated team members who were open to suggestions and improvements, our supervisor who guided us every step of the way, and our examination committee members whose valuable comments helped us improve our project.

We extend our sincere appreciation and thanks to our great supervisor, Dr. Amani Al-Ajlan, for sharing her vision, imparting her knowledge, and allowing us to undertake such an innovative project. We are extremely lucky to have a supervisor who cared so much, providing us with valuable advice and ultimate motivation.

We would like to express our gratitude and respect for the leaders of the clubs who showed us kindness and were willing to offer their help and guidance in every way they can.

And lastly, we are immensely grateful to our families and friends for their patience, support, and encouragement.

We are grateful for the knowledge and experiences we gained from everyone involved in this project, and we will carry their knowledge and advice with us in the future. This project's success demonstrated the significance of collaboration and determination, and we are incredibly proud of our team's accomplishment.



## 8 References

- [1] "Are Extracurricular Activities in College Important?," Great Value Colleges, February 2014. [Online]. Available: <https://www.greatvaluecolleges.net/faq/are-extracurricular-activities-in-college-important/>. [Accessed 5 November 2022].
- [2] Vicbob, "Why Students Should Engage In Extracurricular Activities," Opera news, July 2020. [Online]. Available: <https://ng.opera.news/ng/en/lifestyle/7d796c8ef33829c41f27a34f196f751a>. [Accessed 1 November 2022].
- [3] V. Vassilev, "Extracurricular Activities Can Help You Land Your Dream Job," Access Masters, 13 December 2019. [Online]. Available: <https://www.accessmasterstour.com/articles/view/extracurricular-activities-can-help-you-land-your-dream-job>. [Accessed 1 November 2022].
- [4] A. T. G. Adomavicius, "Toward the next generation of recommender systems," 25 April 2005. [Online]. Available: <https://ieeexplore.ieee.org/document/1423975/authors#authors>. [Accessed 20 October 2022].
- [5] F. C. Lunenburg, "Extracurricular Activities," 2010. [Online]. Available: <http://www.nationalforum.com/Electronic%20Journal%20Volumes/Lunenburg,%20Fr%20ed%20C.%20Extracurricular%20Activities%20Schooling%20V1%20N1%202010.pdf>. [Accessed 11 March 2023].
- [6] N. Wilson, "Impact of Extracurricular Activities on Students," May 2009. [Online]. Available: <https://minds.wisconsin.edu/bitstream/handle/1793/43405/2009wilsonn.pdf?se>. [Accessed 11 March 2023].
- [7] L. R. B. S. P. B. K. Francesco Ricci, "Recommender Systems Handbook," May 2010. [Online]. Available: [https://www.cse.iitk.ac.in/users/nsrivast/HCC/Recommender\\_systems\\_handbook.pdf](https://www.cse.iitk.ac.in/users/nsrivast/HCC/Recommender_systems_handbook.pdf). [Accessed 15 October 2022].
- [8] P. L. Mingang Chen, "Performance Evaluation of Recommender Systems," 8 December 2017. [Online]. Available: <http://www.ijpe-online.com/EN/abstract/abstract3798.shtml>. [Accessed 5 November 2022].
- [9] D. B. Michael J. Pazzani, "Content-Based Recommendation Systems," 2007. [Online]. Available: [https://link.springer.com/chapter/10.1007/978-3-540-72079-9\\_10#author-information](https://link.springer.com/chapter/10.1007/978-3-540-72079-9_10#author-information). [Accessed 5 November 2022].
- [10] U. C. Tarun Bhatia, "User based Collaborative filtering Recommendation System using Apache Mahout," May 2016. [Online]. Available: [https://www.researchgate.net/publication/303406533\\_User\\_based\\_Collaborative\\_Filtering\\_Recommendation\\_System\\_using\\_Apache\\_Mahout](https://www.researchgate.net/publication/303406533_User_based_Collaborative_Filtering_Recommendation_System_using_Apache_Mahout). [Accessed 5 November 2022].
- [11] "Home," 3 June 2022. [Online]. Available: <https://www.collegeparentcentral.com/2022/06/>. [Accessed 19 September 2022].
- [12] Y. Verma, "A Guide to Building Hybrid Recommendation Systems for Beginners," 23 October 2021. [Online]. Available: <https://analyticsindiamag.com/a-guide-to-building-hybrid-recommendation-systems-for-beginners/>. [Accessed 5 November 2022].



- [13] "Find Professional Training Courses," Fidcourses.co.uk, [Online]. Available: <https://www.findcourses.co.uk>. [Accessed 28 September 2022].
- [14] "A Marquette education prepares students to Be The Difference," Marquette.edu, [Online]. Available: <https://www.marquette.edu>. [Accessed 28 September 2022].
- [15] CareerExplorer, [Online]. Available: <https://www.careerexplorer.com>. [Accessed 28 September 2022].
- [16] "About Us," [Online]. Available: <https://enjoy.sa/en/about-us>. [Accessed 28 September 2022].
- [17] "About Faaliat," Faaliat, [Online]. Available: <https://faaliat.sa/ar/about>. [Accessed 28 September 2022].
- [18] D. R. R. B. P. F. Marc Erich Latoschik, "SEARIS: software engineering and architectures for realtime interactive systems," 25 October 2009. [Online]. Available: <https://dl.acm.org/doi/abs/10.1145/1639950.1639982>. [Accessed 1 November 2022].
- [19] A. Wickramarachchi, "Software Architecture Patterns," Towards Data Science, 29 August 2017. [Online]. Available: <https://towardsdatascience.com/software-architecture-patterns-98043af8028>. [Accessed 1 November 2022].
- [20] "Getting started with Django," Django, 2013. [Online]. Available: <https://www.djangoproject.com/start/>. [Accessed 1 May 2023].
- [21] "What is UAT in Agile?," Wrike, 2013. [Online]. Available: <https://www.wrike.com/agile-guide/faq/what-is-uat-in-agile/>. [Accessed 5 November 2022].
- [22] "Service Level Agreement for Hosting and Realtime Database," Google, 9 April 2020. [Online]. Available: <https://firebase.google.com/terms/service-level-agreement>. [Accessed 13 April 2023].
- [23] "MVC Framework - Introduction," Tutorials Point, 2013. [Online]. Available: [https://www.tutorialspoint.com/mvc\\_framework/mvc\\_framework\\_introduction.htm](https://www.tutorialspoint.com/mvc_framework/mvc_framework_introduction.htm). [Accessed 1 November 2022].



## 9 Appendix A: Survey Questions and Answers

Below are the responses of the students (system users) to the survey conducted for requirement elicitation.

### 1. What level are you? ما مستواك التعليمي؟

151 responses

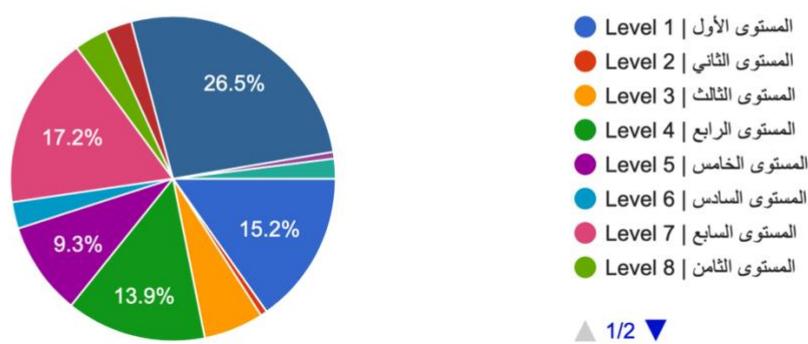


Figure 21 - System user Survey Question (1) Results 1 of 2

### 1. What level are you?

ما مستواك التعليمي؟

151 responses

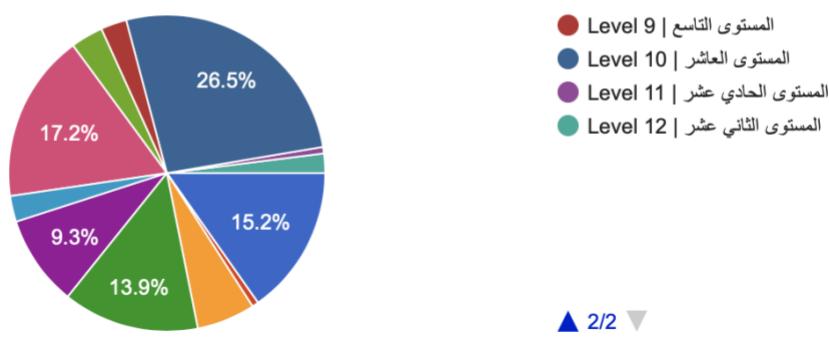


Figure 22 - System user Survey Question (1) Results 2 of 2



2. Have you ever enrolled in the university's extracurricular activities(i.e. courses - clubs)? هل سبق لك

الانخراط بأنشطة الجامعة اللامنهجية (كالدورات و النوادي)؟

151 responses

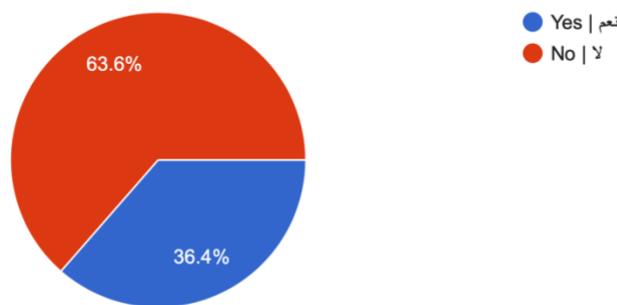


Figure 23 - System user Survey Question (2) Results

3. If your answer is yes, please list them below.

إذا كانت إجابتك نعم، الرجاء ذكرهم بالأسفل.

52 responses

- لا
- سبق و دخلت ناديين و حضرت فعاليات نوادي
- النادي الثقافي لكلية الحاسب
- سجلت بثلاث نوادي الاخير نادي عقول رقيبه
- نوادي كلية علوم الحاسوب والمعلومات
- نادي الانقلش
- نادي الصيدلة ونادي العقول الرقمية ونادي الانجليزي
- Vision 2030
- Social and cultural club CCIS
- Digital minds
- English Speaking center

Figure 24 - System user Survey Question (3) Results 1 of 7



3. If your answer is yes, please list them below.

إذا كانت إجابتك نعم، الرجاء ذكرهم بالأسفل.

52 responses

النادي الثقافيه الاجتماعى

النادي الاجتماعي بالحاسب / نادي الرياضيات / نادي فيزكا/ نادي علم النفس

نادي العلاج الوظيفي/ نادي الفنون/ النادي الثقافي الاجتماعي وبعض الدورات المختلفة

نادي العلاج الوظيفي

نادي طلابي

- The CSE

- cyber security club

النادي الثقافي الاجتماعي في كلية الحاسب

نادي رتاع/نادي القراءة / دورات متعددة عن بعد

الثقافي ونظم المعلومات الادارية لجنة الاعلام

Figure 25 - System user Survey Question (3) Results 2 of 7

3. If your answer is yes, please list them below.

إذا كانت إجابتك نعم، الرجاء ذكرهم بالأسفل.

52 responses

النادي الثقافي الاجتماعى

نادي المحاسبة، النادي الثقافي الاجتماعي بكلية الادارة، نادي الاستثمار، الورشة الفنية

الملنقي العلمي الثاني عشر

GDSC club

نادي الرياضيات

النادي الثقافي الخاص بكلية

نادي الثقافى

دورة الاسعافات الاولية

نوادي الجامعه

نادى، التغذية الاكلينيكية

Figure 26 - System user Survey Question (3) Results 3 of 7



3. If your answer is yes, please list them below.

إذا كانت إجابتك نعم، الرجاء ذكرهم بالأمثل.

52 responses

فريق أرشدني

نادي التغذية السريرية

نوادي الجامعة

اعمال تطوعية خارج الجامعة مثل لقاء تعريفي بتخصصات الكلية في مدارس ابن خلدون الخاصة

نادي علم النفس

نادي كلية التربية

النادي الثقافي لكلية اللغات والترجمة

نادي نبض التربية التحقت به اول مره كعضوه في اللجنة الوجستيه بعدها كعضوه في اللجنة الاعلاميه وهذه السنين التحق كقائد للجنة الجوده

ايضاً التحقت بنادي المترجم هذى السنوي كعضوه في لجنه الاعلام

و فيما سبق التحقت ايضاً باندية كلية علم النفس ونادي

المساء ، شات الـ سـ

Figure 27 - System user Survey Question (3) Results 4 of 7

3. If your answer is yes, please list them below.

إذا كانت إجابتك نعم، الرجاء ذكرهم بالأمثل.

52 responses

المرسم وورشات الرسم

النادي الثقافي الاجتماعي

نادي الاحياء الدقيقة والنبات

نادي الكيمياء الحيوية

نادي فخر التطوع ، نادي التسويق

نادي القراءة و نادي المعلومات

: النواحي

الادارة - المحاسبة - الاستثمار - الطلبة المتفوقين

النادي الثقافي لكلية الحاسوب - نادي ضياء - الشراكة

نادي ضياء - الثقافي للعلوم - العقول الرقمية

نادي ضياء - النادي الثقافي الاجتماعي

Figure 28 - System user Survey Question (3) Results 5 of 7



3. If your answer is yes, please list them below.

إذا كانت إجابتك نعم، الرجاء ذكرهم بالأسفل.

52 responses

نادي الاعلاميات

نادي ضياء

نادي الفن

فريق وحدة الابتكار الاجتماعي

نادي النبات والاحياء الدقيقة ، دورات معهد ريادة الاعمال في جامعة الملك سعود

نادي الفصحي

النادي الثقافي بكلية الحاسوب

نادي نبض العام - ونادي علم النفس

Cultural club (science college)

Phyzica

نادي الأحياء الدقيقة والنبات

الحمد لله رب العالمين

Figure 29 - System user Survey Question (3) Results 6 of 7

3. If your answer is yes, please list them below.

إذا كانت إجابتك نعم، الرجاء ذكرهم بالأسفل.

52 responses

Cultural club (science college)

Phyzica

نادي الأحياء الدقيقة والنبات

النادي الثقافي والإجتماعي لكلية الحاسوب

نادي الاستثمار

نادي المالية نادي التسويق نادي الثقافي الاجتماعي

نادي العقول الرقمية والنادي الثقافي

النادي الثقافي بكلية الحاسوب

ضياء - ثقافي الحاسوب

النادي الثقافي

Figure 30 - System user Survey Question (3) Results 7 of 7



4. If your answer is no, please choose the answer. إذا كانت إجابتك لا، الرجاء اختيار السبب.

94 responses

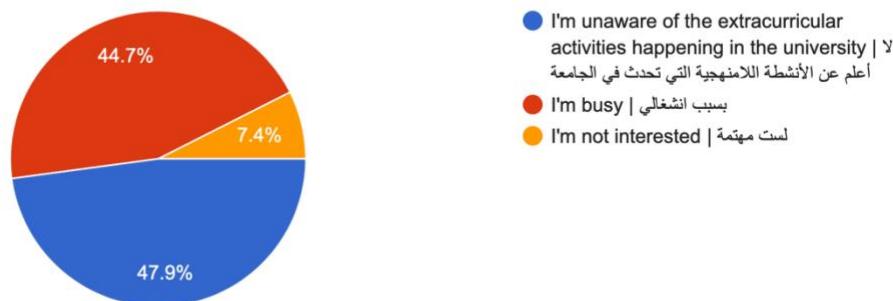


Figure 31 - System user Survey Question (4) Results

5. Do you know where to find out about all the extracurricular activities? هل تعلمين عن أين تتوفر جميع معلومات المتعلقة بالأنشطة اللامنهجية؟

151 responses

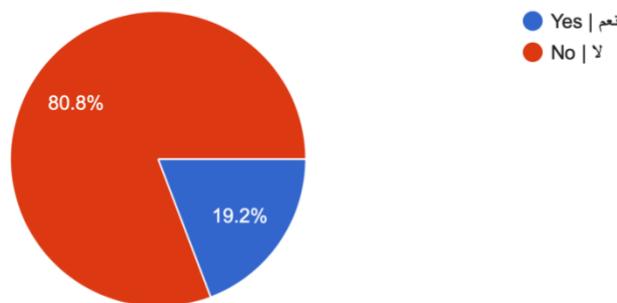


Figure 32 - System user Survey Question (5) Results

6. How do you usually know about the different activities taking place in the university? كيف تعرفين عن الأنشطة المختلفة التي تقام في الجامعة؟

151 responses

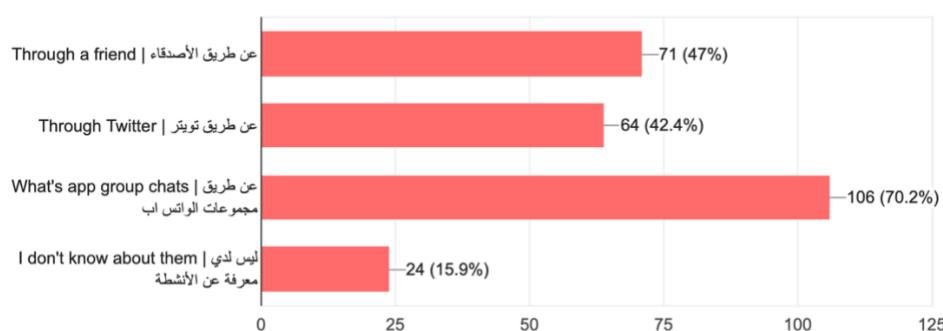


Figure 33 - System user Survey Question (6) Results



7. Do you find it hard to keep up with all the extracurricular activities because of the different

هل تواجهين صعوبة في مواكبة جميع الأنشطة اللامنهجية بسبب المنصات المختلفة التي تعرضها؟

151 responses

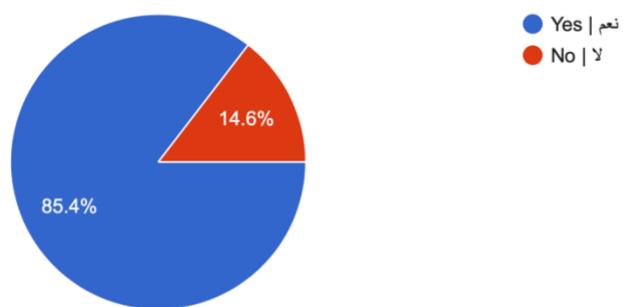


Figure 34 - System user Survey Question (7) Results

8. have you ever missed out on enrolling in a workshop/ extracurricular programs /courses/ events

because you didn't know of them until too late? هل سبق حضور معارض لأنك لم تكن على علم بها إلا بعد فوات الأوان؟

151 responses

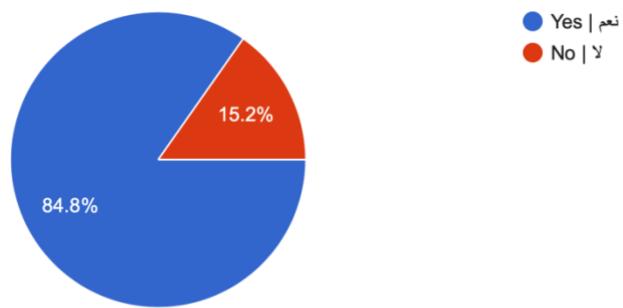


Figure 35 - System user Survey Question (8) Results



9. Do you think having a platform that collects and displays and recommend the extracurricular activities will help you decide and enroll?  
هل تعتقد أن وج...عرض الأنشطة الالامنهجية سيساعدك على اتخاذ القرار والتسجيل؟  
151 responses

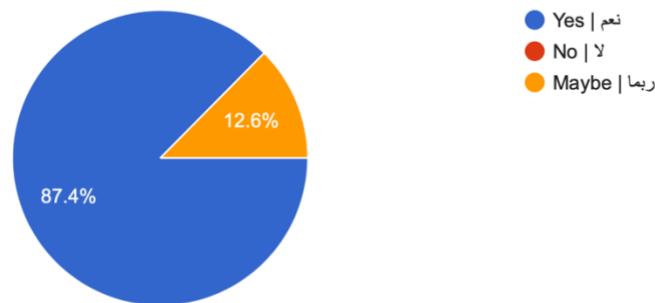


Figure 36 - System user Survey Question (9) Results

10. Do you think that an application that syncs to your calendar will help manage your busy schedule as a college student?  
هل تعتقدين أن تزامن التطبيق..تقديم الخاص بك سيساعد في إدارة جدولك المزدحم كطالب جامعي؟  
151 responses

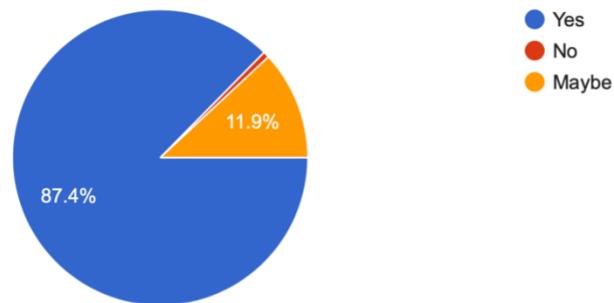


Figure 37 - System user Survey Question (10) Results



Do you have any suggestion or features you would like to add to our app "Count Me In"?

"هل لديك أي اقتراح أو خاصية تودين إضافتها إلى تطبيقنا "Count Me In"؟

29 responses

great idea 🌟

تكون الانشطة او البرامج مقسمة على التخصصات وممكن المستخدم يفلتر ايش التخصصات الي بيعا يشوفها

لا يوجد

متطلبات التسجيل بالتقديم على الفرص

مثال: للتقديم على المجموعة البحثية يتشرط توفر مهارة كذا وكذا

البحث جميل جداً ، أصبتم باختيار المشكلة واتمنى من كل قلبي توفر هالمنصة وتأخذون فل مارك بالبحث

تتبّيه عند اقتراب موعد النشاط

علامة الانشطة التي اهتم بها بحيث عن نزول اي اعلان لهم يصلني إشعار، شاكرين جهودكم

ادراج النوادي المتاحة للطالب من ضمن الانشطة

"بروفايل لك واذا كنت عضوه بشيء بيان لك معلومات او اشياء مهمه كـ "عضوه" مو كـ "مطلع"

Figure 38 - System user Survey Question (11) Results 1 of 3

Do you have any suggestion or features you would like to add to our app "Count Me In"?

"هل لديك أي اقتراح أو خاصية تودين إضافتها إلى تطبيقنا "Count Me In"؟

29 responses

يتميز بألوان جميلة وبمبهجة لكي تبعدنا من هم الجامعية

أتوقع هذا التطبيق بيخفف التشتت عشان نلقى الدورات او البرامج الي تقيينا قبل ما تخلص لاني عانيت شخصيا احب ادخل هالبرامح لكن للاسف ادور في اكثر من منصه في النهايه اغلبها خاصت وما عرفت عنها اتمنى التطبيق يطبق في اسرع وقت شكر لكم بالتوفيق

،ممكن يكون التطبيق شامل- من ناحية النوادي والدورات + اضافة كل فعاليات النوادي > عشان يكون فيه سهولة بالحضور والاستمتاع  
،يعني زي اذا بيسوون نادي فعالية يكون اعلان هذى الفعالية موجوده بالتطبيق

،ممكن يضاف للتطبيق فرصه انو نضيف جداولنا الدراسية حتى يكون شامل ومواعيد الاختبارات وما الى ذلك +

لا، لا يوجد

عرض الانشطة اللامنهجية بحيث يكون هناك خيارين، خيار يعرض جميع الانشطة بالترتيب الزمني، والخيار الآخر للتصنيف حيث تكون الانشطة مقسمة بناءً على نوعيتها او الجهة المقدمة وغيرها. ومن الممكن اضافة الاختلافات مع انشطة النوادي والدورات

يكون فيه خانة الاهتمامات ووش المجالات اللي اهتم فيها بحيث تطلع لي الانشطة اللي تلائم اهتماماتي

توضيح كافة التفاصيل الصغيرة للأنشطة او وضع مساحة استفسارات للطلاب

Figure 39 - System user Survey Question (11) Results 2 of 3



Do you have any suggestion or features you would like to add to our app "Count Me In"?

هل لديك أي اقتراح أو خاصية تودين إضافتها إلى تطبيقنا "Count Me In"؟

29 responses

فكرة التطبيق رائعة

اقتراحي اضافه خريطة لمباني الجامعه والمراکز التابعه لها توضح مقر المراكز تقريرا مثل قوائم ماب بشكل ابسط وتوضيح جميع المطاعم الموجوده بالجامعه وموقعها

ارتباط التطبيق بالامانات بحيث اي شي يوصلهم مفقود ينزلونه بالتطبيق ويتحدث بشكل دوري

خانه خاصه بالتطوعات داخل الحرم الجامعي لمن لديها وقت كافي

يعني التطبيق بيخدم جميع الطالبات ب اذن الله وبيختصر وقت الله يوفقكم ويسير امركم ويتجزونه ب اذن الله  
واحنا فخورين فيكم

ممكن خانة اقتراح أنشطة وتعرض للنادي

بحيث أن اللي جرب هذا النادي او البرنامج يذكر تجربته reviews يضاف خانة

بتوفيق

Figure 40 - System user Survey Question (11) Results 3 of 3



## 10 Appendix B: Interview Questions and Answers

Below are questions and answers conducted from interviewing club leaders (potential admin users) for requirement elicitation:

Table 10 - Interview 1 Outline

INTERVIEW 1 OUTLINE	
<b>Interviewee:</b> Lama is the leader of the Digital Minds Club	<b>Interviewer:</b> Noura Al-Qahtani
<b>Duration:</b> 5:50pm – 6:25pm (35 minutes)	
Questions	Answers
<b>Question1:</b> What is the method of advertising events?	<b>Answer1:</b> The club's activities are announced through the club's social media accounts such as Twitter, LinkedIn, and Instagram. in addition to advertisements via WhatsApp groups.
<b>Question2:</b> Do you face difficulty in nominating and selecting club members?	<b>Answer2:</b> As for the selection of members, we do not have problems, but the selection of captains and deputies for club committees is sometimes difficult because we try to choose the most qualified among many applicants.
<b>Question3:</b> Do you face difficulty in reaching the target group effectively?	<b>Answer3:</b> No, because our club specializes in events that target followers of the club's social media accounts and who are interested in technical content.
<b>Question4:</b> Is the feedback from the participants in the event important? And how do they get it?	<b>Answer4:</b> It is very important to me as a club leader, because the feedback tells us if the event is successful or not, and is it worth repeating, for example. As for how we get feedback, often the same participants share their opinions with us via Twitter or face-to-face when we interview them, but there is no specific way we get feedback.
<b>Question5:</b> What are the most important ways to join the club?	<b>Answer5:</b> We publish the link to register for membership in the club through our Twitter account and WhatsApp groups



Table 11 - Interview 2 Outline

<b>INTERVIEW 2 OUTLINE</b>	
<b>Interviewee:</b> Rand, former leader of the Social Cultural Club at the Faculty of Computer and Information Sciences	<b>Interviewer:</b> Noura Al-Qahtani
<b>Duration:</b> 6:50pm – 7:10pm (20 minutes)	
<b>Questions</b>	
<b>Question1:</b> What is the method of advertising events?	<b>Answer1:</b> social media in general, specifically Twitter and WhatsApp, as the students come from all classes and specializations.
<b>Question2:</b> Do you face difficulty in nominating and selecting club members?	<b>Answer2:</b> Very, but often the selection of members is done by the leaders of the committees, meaning the president of the club carefully chooses wonderful leaders because they are the ones who choose the students for their committees because they are informed of the tasks of the committee.
<b>Question3:</b> Do you face difficulty in reaching the target group effectively?	<b>Answer3:</b> Often the target group is one, I mean, either for all university students or for the students at the college itself. Access through groups is easy, but if there is another way, it is very nice.
<b>Question4:</b> Is the feedback from the participants in the event important? And how do they get it?	<b>Answer4:</b> Very, as it motivates the members of the event that they see the impact of their work and effort over the past period and also for improvement and development, we often get it through one of the sites where they write, such as Padlet or surveys.
<b>Question5:</b> What are the most important ways to join the club?	<b>Answer5:</b> Registration at the beginning of each semester through the link posted everywhere.



Table 12 - Interview 3 Outline

<b>INTERVIEW 3 OUTLINE</b>	
<b>Interviewee:</b> Esraa, former leader of the Digital Minds Club, the design committee, and the game development event	<b>Interviewer:</b> Noura Al-Qahtani
<b>Duration:</b> 8:50pm – 9:25pm (35 minutes)	
Questions	Answers
<b>Question1:</b> What is the method of advertising events?	<b>Answer1:</b> Most of the events we advertise in more than one way, depending on whether they are live or online, but now there is a mixture of both. We often advertise this through the club's WhatsApp groups or social media accounts, Twitter and Instagram, or by emailing the club's database or posting advertisements throughout the college.
<b>Question2:</b> Do you face difficulty in nominating and selecting club members?	<b>Answer2:</b> Yes, because I must know the personality and nature of the student even if she sends us her CV and it was so perfect and professional, that is not enough. Because I must make sure this student is really going to work or not, because we can't collect her hours and give her a certificate if she doesn't work.
<b>Question3:</b> Do you face difficulty in reaching the target group effectively?	<b>Answer3:</b> Mostly not, because most of the events are the target group of students at King Saud University, but the topic depends on the time because if the time of the event is the time of the exams, it is very difficult for the students to attend the event. Therefore, we try as much as possible to put the event at a suitable time for most students, also advertisements will reach them in some way. Sometimes the advertisement does not reach, especially if the event is in other colleges.
<b>Question4:</b> Is the feedback from the participants in the event important? And how do they get it?	<b>Answer4:</b> Very important, we often get it after the event ends directly from the participants in the event through questions or through a form or QR code, as for club members through the friendly session.
<b>Question5:</b> What are the most important ways to join the club?	<b>Answer5:</b> The nomination is through the president of the club or the committee, so that they know the nature of the student and that she is qualified for the nomination. -Send a club registration form through Twitter or Instagram At the beginning of the semester or year, there is a table in the college with registration forms on which the heads and members of the club are based.



Table 13 - Interview 4 Outline

<b>INTERVIEW 4 OUTLINE</b>	
<b>Interviewee:</b> Zainab is the leader of the marketing club	<b>Interviewer:</b> Noura Al-Qahtani
<b>Questions</b>	<b>Answers</b>
<b>Question1:</b> What is the method of advertising events?	<b>Answer1:</b> Through social media (WhatsApp, Twitter, Insta, Snapchat, ...). Also, advertisements in the university (posters, or any other striking creative method).
<b>Question2:</b> Do you face difficulty in nominating and selecting club members?	<b>Answer2:</b> The Marketing Club does not have any difficulties in this regard, but I know some clubs that suffer from this problem. The reason is that there is no strong media for the club's activities, therefore, the lack of registrants, the weakness of the team specialized in the guidance of interviews, acceptance and rejection (human resources teams, quality teams..), the lack of a clear vision of the club's plans, following old methods of attracting members.
<b>Question3:</b> Do you face difficulty in reaching the target group effectively?	<b>Answer3:</b> Yes, sometimes it is tough for us to contact our target group because they attend colleges far from us.
<b>Question4:</b> Is the feedback from the participants in the event important? And how do they get it?	<b>Answer4:</b> Certainly important, the views of event visitors are measured through comments on social media, or some specific events require the creation of an event evaluation form.
<b>Question5:</b> What are the most important ways to join the club?	<b>Answer5:</b> Through the personal nomination of the distinguished or a registration form at the beginning of each semester.



Table 14 - Interview 5 Outline

<b>INTERVIEW 5 OUTLINE</b>	
<b>Interviewee:</b> Hanin, leader of the Psychology Club	<b>Interviewer:</b> Noura Al-Qahtani
<b>Duration:</b> 10:00am – 10:20am (20 minutes)	
<b>Questions</b>	<b>Answers</b>
<b>Question1:</b> What is the method of advertising events?	<b>Answer1:</b> We publish a form to register for the event on the club's Twitter account
<b>Question2:</b> Do you face difficulty in nominating and selecting club members?	<b>Answer2:</b> A lot because the club already depends on them. Sometimes it's hard to select someone who's so enthusiastic throughout the semester, I mean in the beginning and in the interview that they're excited and willing to do things, and if the time comes, we need to, we won't meet them. It's hard for me on the one hand that they don't speak for themselves well in the registration form that we publish. Also, sometimes the student's CV is well written, but the number and email are not written correctly, so it is difficult to communicate with them. Sometimes there are so many female filters that it's hard for me to choose one
<b>Question3:</b> Do you face difficulty in reaching the target group effectively?	<b>Answer3:</b> No, because most of our topics are general and suitable for all groups
<b>Question4:</b> Is the feedback from the participants in the event important? And how do they get it?	<b>Answer4:</b> It will certainly help us develop the next events. Often, we get it from the surroundings of the members and the time of the event from the officials, supervisors and attendees. Sometimes there are comments on Twitter, or I receive messages on WhatsApp.
<b>Question5:</b> What are the most important ways to join the club?	<b>Answer5:</b> We publish a registration form on Twitter and WhatsApp groups before the beginning of each semester. Sometimes I get a recommendation from a former club member.



## 11 Appendix C: UAT Questions and Answers

Below are questions and answers conducted from user acceptance testing.

مستوى التعليم What is your level of education

28 responses

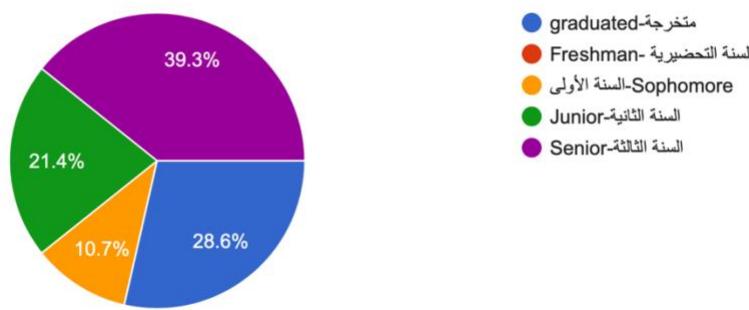


Figure 41 - UAT Question (1) Results

هل ما طلب منك إدخاله من معلومات أو بيانات واضحًا بالنسبة لك Prompts for inputs are clear

27 responses

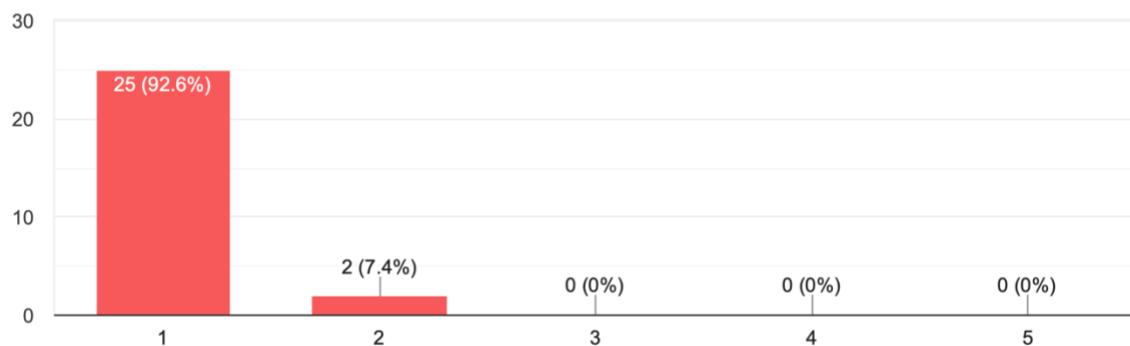


Figure 42 - UAT Question (2) Results



واجهة التطبيق تبدو واضحة وسهلة الاستخدام the interface is clear and easy to use

28 responses

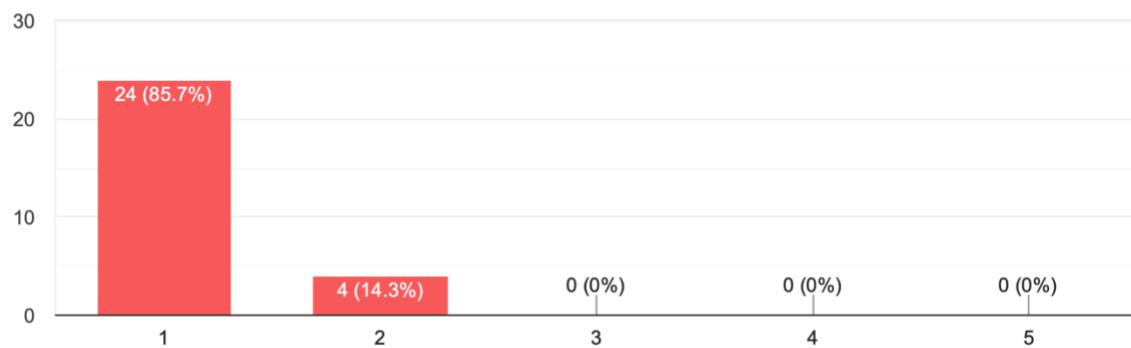


Figure 43 - UAT Question (3) Results

التنقل عبر صفحات التطبيق سلس The navigation through the application was easy

28 responses

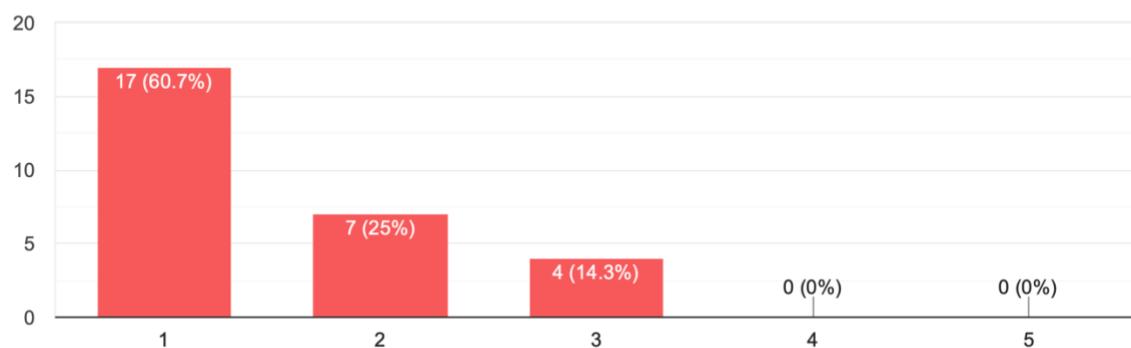


Figure 44 - UAT Question (4) Results



إقتراحات التطبيق عند أول استخدام بدت منطقية و المناسبة لإهتماماتي  
the recommendations were relevant within the first use  
28 responses

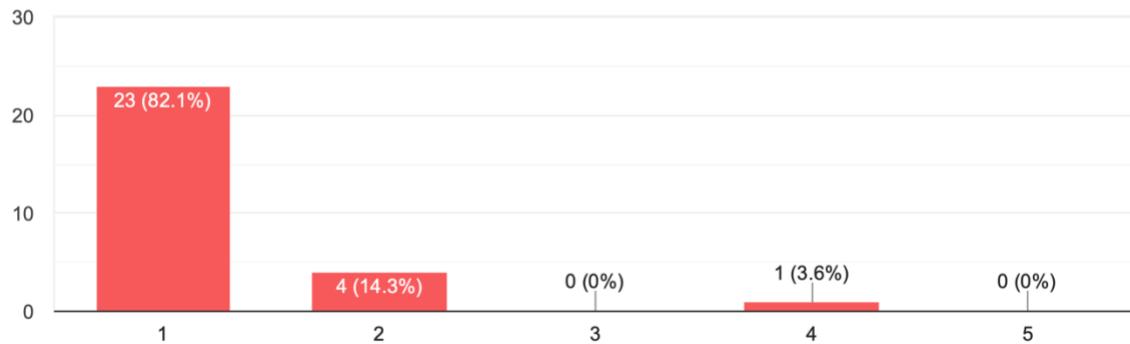


Figure 45 - UAT Question (5) Results

خصائص التطبيق ستسهل عملي وتحفظ وقتي  
the application features are practical and time-saving  
28 responses

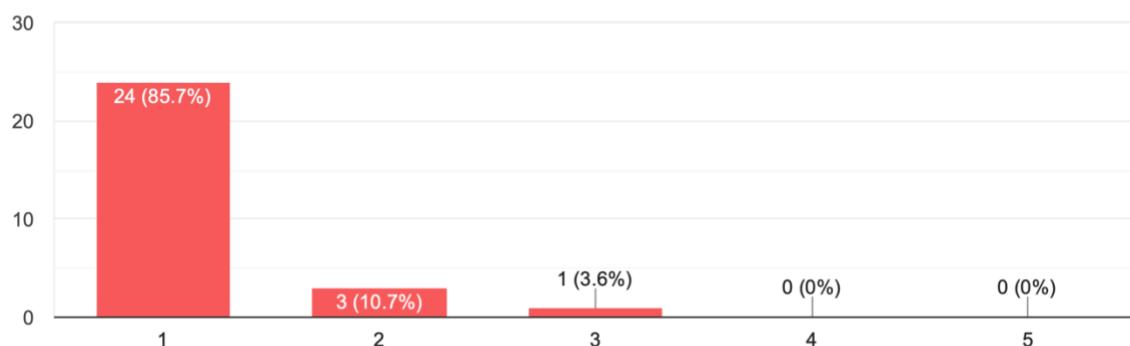


Figure 46 - UAT Question (6) Results



يلبي التطبيق احتياجاتي بشكل كافي  
the application met my needs perfectly  
28 responses

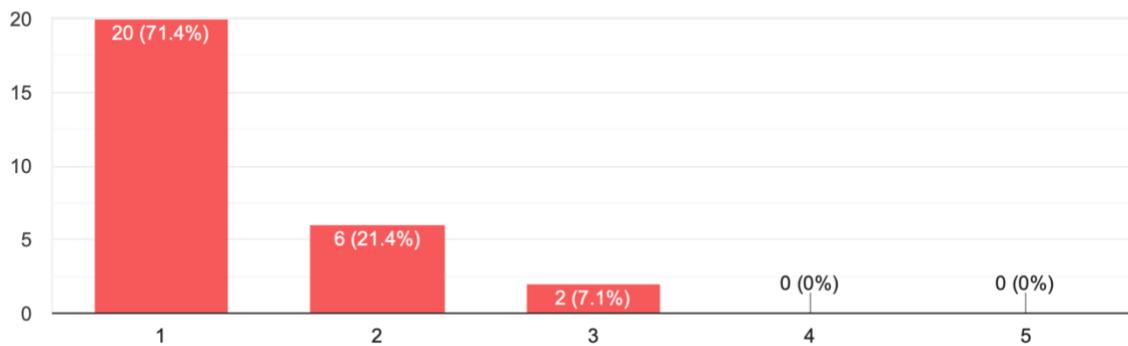


Figure 47 - UAT Question (7) Results

أرى بأن التطبيق بديل جيد ويقدم طريقة أكثر كفاءة لنشر والوصول للفعاليات اللاصفية بدل الطريقة الحالية باستخدام موقع التواصل الاجتماعي  
I think the application is the better alternative for extracurricular activities than social media platforms  
28 responses

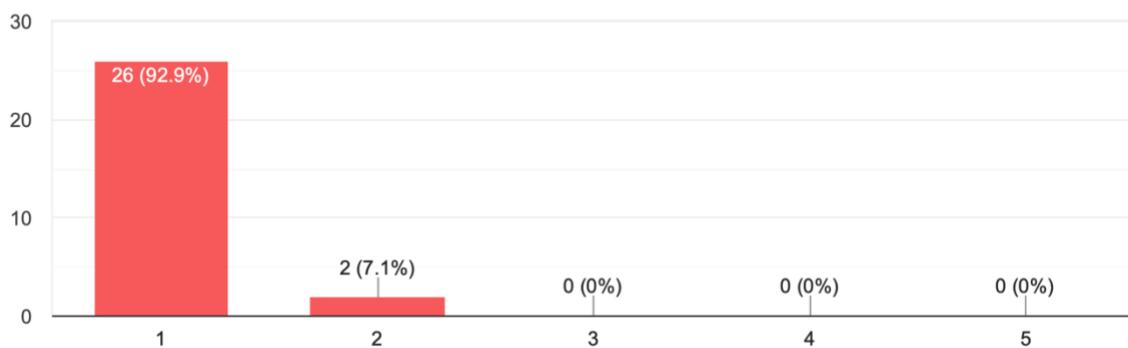


Figure 48 - UAT Question (8) Results



ما هو أفضل ما تجده في منتجنا؟ What do you find best about our product ?

27 responses

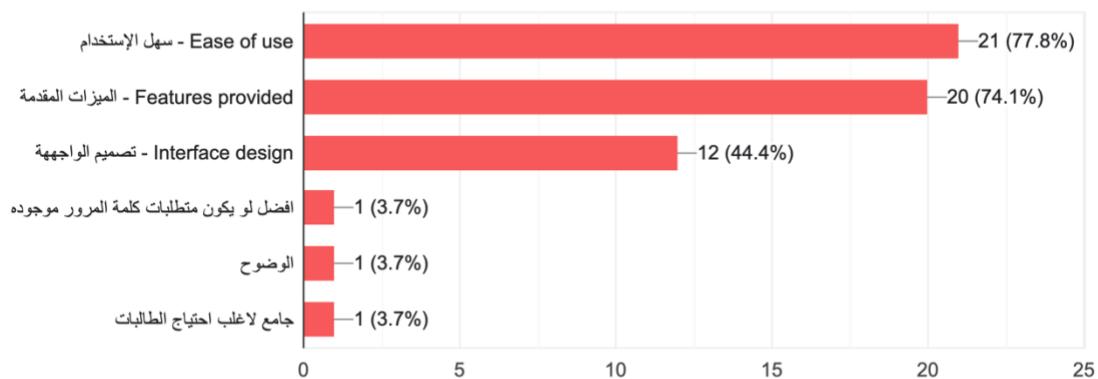


Figure 49 - UAT Question (9) Results

سأقوم باستخدام التطبيق بشكل دوري | I would use the application frequently

28 responses

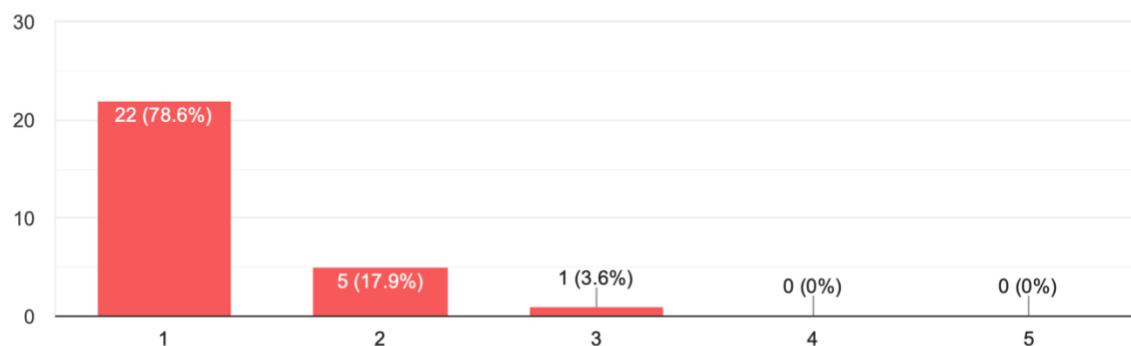


Figure 50 - UAT Question (10) Results



| سأقترح التطبيق لآخرين | I would suggest the app to others

28 responses

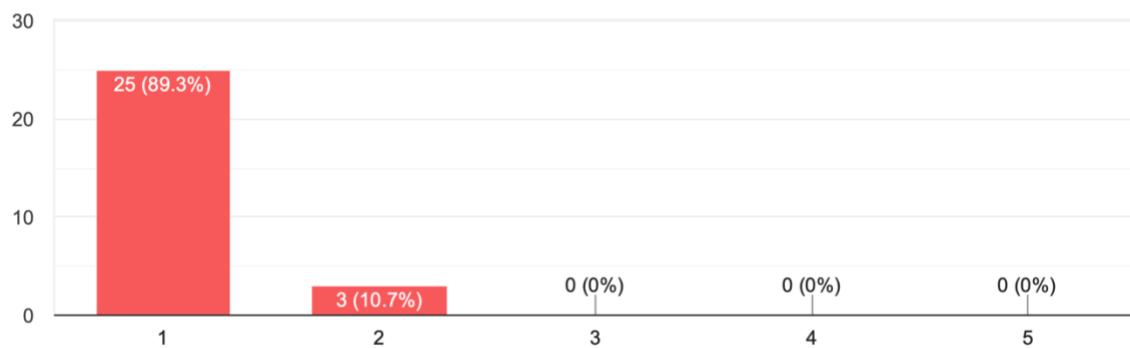


Figure 51 - UAT Question (11) Results

إقتراحاتك وملحوظاتك محل اهتمام وتقدير

Your suggestions are highly appreciated

7 responses

تطبيق جميل وفكرة مميزة، اقترح اضافة خاصية المجتمعات التي تشارك الاهتمامات ذاتها

Putting the event's communication email or social media account would be useful and will make the communication with the event's owners if needed easy

ان يكون في التطبيق خانة لاسباب رفض الفعاليات

لا يوجد ملاحظات

أعجبني التطبيق كثيراً وكان سهل الاستخدام جداً ، الخلفيات بسيطة وسهلة عبي الغين بالإضافة إلى تقسيم الانشطة الواضح ، اشكركم على عمل تطبيق لطيف ومميز

جداً جميل الله يوفقكم ويسهل اموركم

استطيع النقر عليه والانسحاب من الفرصة التي شاركت بها button ايضا اضافة ، اشعاري حين يتم قبول طلبي في خانة (فرصي)

Figure 52 - UAT Question (12) Results