

Enhancing the Impact of Online Learning: A Comparative Analysis of MOOC Platforms and a Proposed Open-Source Arabic Platform

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Abstract: Since a few years ago, online learning platforms like Coursera and edX have grown a lot and now have close to 200 million users, especially after the COVID-19 pandemic. Even though these platforms reach a lot of people, they don't have as much of an effect because learners don't use them much. In traditional face-to-face classrooms, teachers try to get students interested by asking them to take part in class discussions and talk about themselves and their ideas. But it's not clear how well these strategies work on online learning platforms. This paper examines and compares e-learning platforms, especially those associated with MOOCs. It also includes a proposal for an Arabic and open-source educational platform affiliated with the University of Mosul.

Keywords: *Massive Open Online Courses (MOOCs), E-Learning, Platforms*

I. INTRODUCTION

The introduction of online learning platforms significantly advances the global movement toward spreading education. Their development from their inception to the present can be analyzed from a variety of perspectives. Initially, these platforms were regional or local projects but they have now expanded to the national and international levels. Numerous of these systems were developed by well-known universities, including Stanford, MIT, and Harvard. Online learning platforms had no financial motivation; their original pledges included the provision of free education. Later, they evolved into legitimate corporations, in which venture capital (VC) funds made substantial investments for growth. [1]. E-learning platforms have emerged as indispensable resources for instructors and students alike, performing an important function in the educational process [2]. The e-learning platform gives access to databases containing materials for e-learning or online courses. Most platforms can be found on the internet. It provides access to study materials and exams and monitors their progress whenever and wherever they choose. There are a lot of these kinds of platforms on the market. Such platforms may be utilized by businesses, or they may construct their own. Developing such platforms can be costly, thus businesses typically utilize platforms that are already available. The platforms may be commercial or open-source. Commercial platforms will allow

businesses to tailor them to the demands of users. When selecting a platform, businesses need to understand their needs. It depends on various circumstances, including the pupils' needs and the instructors' technical expertise [3].

II. LITERATURE REVIEW

According to [4], MOOC platforms offer a wide range of educational courses to help individuals improve their knowledge and competitiveness. The choice of platforms was based on criteria such as accessibility to desired courses, geographic location, Internet access, and language options for the courses. The leading MOOC platforms include Coursera, EdX, and Udacity, offering users the opportunity to take various online courses for free or for a fee.

In [5] notes that e-learning is an ideal method of education for all individuals. The modern era has brought about significant advancements in accessing, processing, analyzing, and distributing information. The quality of an e-learning platform is determined by its underlying technology. The system quality can be evaluated from both the perspective of developers and end-users. Developers focus on the visual representation and accessibility of the platform, while end-users are more concerned with factors such as responsiveness, loading speed, and other relevant characteristics.

The study by [6] explains that online courses can be found on platforms such as Coursera, edX, FutureLearn, and others. As of 2014, approximately 40 MOOC platforms offered online language courses, a number that is constantly growing as new courses are developed in various countries, institutions, and universities. The majority of the content on well-known MOOCs is taught in English. However, there has been an increase in online courses that are available in multiple languages and on national platforms that offer content in the native language. The developers of online language courses face several important questions: "How can we make our online course more attractive to potential users?" "How can we increase completion rates among users?" "How can we accommodate different levels of language proficiency among users?" To address these questions, factors such as sustainability, the quality of educational content and MOOCs, interactivity, instructor involvement, learning analytics, and demographics must be considered.

The [7] study's results back up, led to the design and development of a free and open-source self-managed educational platform that supports the Arabic language. SML is especially useful for students who want to learn in Arabic because it lets them follow courses, take tests, and get certificates on their own. The proposed platform sets the order in which the exercises are done without the teacher's help. This method is very different from any Learning Management System that is currently in use (LMS). This is because SML can effectively guide what students do and how they act. Because this e-learning platform is open source, it can be changed and made easier for people with disabilities to use. This site may also have chat rooms where students can talk about their projects.

III. RESEARCH OBJECTIVES AND METHODOLOGY

The objectives of this study are:

- To conduct a comparative study of MOOC platforms.
- To design and implement a proposed MOOC platform through the use of a sequence and activity diagram.

This research uses the Scrum methodology to build the platform, which consists of a number of sprints. A sprint typically lasts between one and two weeks. Sprint planning meetings, during which the team members are assigned new responsibilities, mark the beginning and end of each sprint. New tasks can only be introduced during sprint meetings, not during an active sprint. The daily Scrum meeting is an integral component of the Scrum approach, lasting typically between five and fifteen minutes. Because of its advantages, Agile is preferable to Waterfall, especially in uncertain situations.

IV. WHAT IS A MASSIVE OPEN ONLINE COURSE (MOOC)?

MOOC stands for "Massive Open Online Courses" and was first practiced in 2008. They created and taught the first online program which is considered today as MOOCs [8]. MOOCs are classes that are held over the Internet and are free to anybody who wants to enroll. Content is delivered in massive open online courses through prerecorded video lectures, online readings, evaluations, and interactions between students and instructors [9]. Because there are so many people in the class and they all have different educational levels and ways of learning, it is difficult to create a course that fulfills every student's demands. Different ways to personalize MOOC platforms are used to solve this problem. Personalized learning makes students happier and helps them do better in education [10]. In MOOCs, the concept of self-directed learning (SDL) is becoming more popular because online learning is becoming more student-centered and autonomous [11]. SDL's goal is to encourage students to help themselves as much as possible throughout the entire learning process. Using instructional activities, students will gain the knowledge and abilities they need to design their learning strategies, put those strategies into action, locate relevant learning materials, and conduct their self-evaluations. As a result, SDL is frequently regarded as a necessary competency in today's dynamic culture [12]. MOOCs represent a new approach to education because of their self-directed learning environment. In recent years, MOOC platforms have expanded significantly due to the expansion of online space and the shift from traditional to virtual activities. People from all over the world were able to enroll in premier universities' open-access online courses [13]. Before developing a MOOC platform, scopes must be taken into consideration:

- Open-source.
- Cloud computing or traditional web hosting.
- Software provided or software as a service [14].

MOOC platforms are the driving forces behind the expansion of online education, providing a variety of pedagogy, personalization, and evaluation options. Most MOOC platforms are profitable trading platforms, mention some of them:

a) *Coursera*

Coursera is a global online learning network that offers online courses and degrees from top-tier universities and corporations to anybody, anywhere. Coursera was launched in 2012 by Daphne Koller and Andrew Ng with the mission of providing transformative learning experiences to students worldwide. 107 million learners and over 7,000 colleges, companies, and government institutions use Coursera for anytime, anywhere access to world-class learning. Coursera collaborates with more than 275 top institutions and corporations to provide flexible, accessible, and career-relevant online education to individuals and organizations worldwide. It provides a variety of educational possibilities, ranging from projects and practical courses to certifications and degree programs.

Course types: Text and video.

The number of learners: 107+ million users.

Courses specialization: physics, informatics engineering disciplines, humanities and art, economics, medicine, biology, mathematics, and business.

Price: Coursera has lots of free courses, however, if you want to earn a Certificate and gain full access to courses, then you will have to pay for them. Courses start from as little as \$39. For this price, you don't just get the course itself. You also gain access to mobile learning (learn wherever you can as long as you have a compatible device), technical support, a learning community, graded assignments, feedback from teachers, and Certificates.

Free Trial: Yes (7-day free trial for subscribers).

Library: 7000+ courses.

There are courses available in many languages: English, Spanish, Russian, French, Chinese, Portuguese, Arabic, German, Korean, Vietnamese, and Japanese.

Coursera Pros and Cons

Pros

- A wide range of subjects is available including computer science, business, and design.
- A variety of qualification levels from beginners' short courses to full-length Master's degrees.
- Courses available from top-rated institutions.
- 7-day free trial on Coursera Plus subscription.
- Courses in many different languages.
- Different pricing models for different needs.
- Around 1,700 free courses.
- Low prices on Coursera Plus subscription.
- You can earn certificates when you complete a course.
- Flexible schedule - learn whenever you like.
- Possible to apply for Financial Aid or a scholarship.

- Hands-on learning approach.
- Can download courses for offline learning.
- High-quality courses taught by experts in their fields.

Cons

- Don't offer courses managed by instructors like learning management system platforms.
- Few courses are old.
- Higher-level courses can be expensive

b) Udemy

Since its founding in 2007, Udemy has become one of the most popular online educational platforms, delivering over 130,000 courses and assisting over 30 million students (as of 2019). Udemy is a global online educational platform, with courses available in more than 60 languages and students from more than 190 countries. Access is available everywhere on any device.

Udemy differs from other online learning platforms in that it provides equal assistance to teachers and students. Instructors can design and deliver whole online courses (after quality checking and other processes first). This allows individuals to exchange their expertise and abilities without ever needing to meet. You will not only be allowed to participate in these courses, but you will also receive instructor feedback and, in most cases, be required to demonstrate your newly acquired skills. Recently, Udemy expanded to serve businesses and larger organizations, enabling independent instructors to deliver courses to entire enterprises and improve the abilities of their teams.

Course types: video.

The number of learners: 54 million users.

Courses specialization: development, business, design, finance and accounting, music, IT & software, office productivity, personal development, marketing, lifestyle, photography and video, health and fitness, teaching, and academics.

Price: The cost of Udemy courses varies widely, and while many of them are priced around \$200, you will find that Udemy offers discounts, coupons, and promotions to help you save money. You may also discover these discounts on their website, Facebook page, and Twitter feed. Whether you find a course you enjoy, you should check the instructor's website to see if they also provide a discount code. These codes can occasionally reduce the price by \$100 or more.

Free Trial: no.

Library: 204000 courses.

There are courses available in many languages: English, French, German, Spanish, Brazilian Portuguese, Hindi, Arabic, Mandarin, Turkish, Indonesian, Italian, Japanese, Russian, Korean, and Polish.

Udemy Pros and Cons

Pros

- Very reasonable price, beginning at \$10.99.
- Good quality.
- Highest Number of Courses.
- Highest Number of Subjects;
- Highest Number of Learners.

Cons

- Udemy does not offer free online courses.
- Udemy is considered a for-profit company.
- Leading universities support the remaining platforms like Coursera

c) *EDX*

The EdX platform offers a variety of education and training tools for online education, including texts, online office hours, lecture videos, and projects using conventional writing, laboratories, and exams. In addition, The EdX online learning platform is comprised of the following key elements: They can certify that online learners have finished a course; courses can be taken online at any time and from anywhere; courses can be taken for free; a large number of courses from top universities will meet the needs of online learners [15].

Course types: Text and video.

The number of learners: 110+ million users.

Courses specialization: physics, engineering disciplines, economics, humanities and art, medicine, informatics, biology, mathematics, and business.

Price: You can take any edX course for free, except for those in professional education. To sign up for the course without payment, you would have to choose the "audit" course information page. You'll have access to all course materials, including lectures, videos, readings, and non-graded assignments, but you won't obtain a certificate or have your assignments graded. You would have to join the verified track to get a certificate. Each course has a different fee, which ranges from \$50 to \$300. You can include credentials in your curriculum vitae, applications to colleges or jobs, profiles on websites like LinkedIn, etc.

Free Trial: no

Library: 3600+ courses.

There are courses available in many languages: English, Spanish, Chinese, French, Turkish, and Hindi.

Edx Pros and Cons

Pros

- Provides certifications that have been verified.
- Instruction ranging from the most basic to the most expert level.
- Self-paced courses make it simple to learn anytime, anywhere, at your own pace ("Women Making History", "Cyber Security and Privacy", etc.).
- It is possible to acquire a degree while working full-time.
- There is available financial assistance.
- MicroBachelor's and MicroMaster's programs are of the highest quality.

Cons

- To get a certificate, you are required to enroll in the verified paid track and finish a course with a grade of at least 50 percent.
- If you lack self-discipline, studying online may be difficult. In this situation, I recommend enrollment in instructor-led classes that follow a predetermined curriculum.
- Master's programs are highly pricey.

d) Edraak

It is a project of the Queen Rania Foundation for Education and Development and is an electronic platform for open-source group courses, also known as MOOCs, the platform is available in the Arabic language. The purpose of open online group courses is to move the educational process from the traditional classroom to an accessible online learning environment for anyone who wants to advance their knowledge and abilities. You can enroll in these classes and take the following actions:

- Taking part in training lectures.
- Talk with your coworkers and the instructors in your courses.
- Test your understanding of the material by completing assignments and tests.
- If the course is successfully completed, a certificate of completion is given.

Course types: Text and video.

The number of learners: 5+ million.

Courses specialization: science, language and literature, business and entrepreneurship, health and nutrition, education for citizenship, design and media, education and teaching, personal development, technology, humanities, and science & technology.

Price: free.

Free Trial: yes.

Library: Hundreds of courses.

There are courses available in many languages: Arabic and English.

Edraak Pros and Cons

Pros

- A completely free Arabic distance learning platform.
- The site's wide range of courses and academic specializations.
- The ability to save educational videos.
- Each course is introduced in its own program.
- Discussions with trainers and trainees are possible.
- Periodic assessments to assess progress.
- Obtaining a certificate of completion after passing the passing grade.

Cons

- There is no search box in the mobile application.
- Not being able to join some courses (finished courses).

e) Rwaq

An online learning community dedicated to disseminating high-quality academic resources in Arabic across a variety of fields and disciplines. These resources have been created by eminent scholars from across the Arab world who are eager to share the fruits of their research and teaching with a wider audience.

Course types: Text and video.

The number of learners: 2.9+ million

Courses specialization: computer science and digitization, economics management and marketing, education, Islamic studies, social and human sciences, Arabic literature and language, medicine and public health, languages, and translation, curricula and teaching methods, creativity and innovation, the law, engineering, science and mathematics, and skills and hobbies

Price: Free, paid, and paid certificate

Free Trial: yes

Library: 929 courses.

There are courses available in many languages: Arabic.

Rwaq Pros and Cons

Pros

- Most of the courses are free.
- The possibility of registering for more than one course.
- Brief explanation of the content of each course.
- Video lessons and interactive exercises.
- The ability to view the finished materials.

Cons

- Although the site's logo is free content, we find a number of important materials and lectures that require the payment of certain fees before obtaining them, such as the content writing material for designing the user experience provided by the consultant, Moamen Zakaria. Registration for this course requires the payment of 632.5 Saudi riyals.
- The displayed visual content is of high quality, which may represent a problem for those with weak communication, as they are forced to lower the quality to follow the content, and this may negatively affect the recipient's desire to complete the follow-up.

V. PROPOSED MOOC PLATFORM

This article develops a free Arabic-language MOOC platform for the University of Mosul which is open source and self-managed. The platform is designed to be fast, flexible, and efficient for using React JS to develop front-end user interfaces. The platform also supports caching (a feature that enables the browser to save a copy of a resource and serve it again on demand), which is important in areas with poor internet connectivity such as Iraq. Because the platform uses the Node.js language for back-end development, it is characterized by fast performance while maintaining efficiency. It uses asynchronous, non-blocking, event-based requests, which makes it faster to respond than other languages in the same domain with fewer errors. In addition, one of the advantages of this language is that it can call the libraries you are working with at any time, which leads to better utilization of resources. This platform has three categories of users: The administrator user is used to run and manage the website. The administrator is in charge of adding teachers and students to the system, giving teachers permission to create courses, and giving students access to courses. The main job of the software is to help the instructor user create and manage online courses and find and recommend the best learning support materials. The teacher will also be in charge of making the course syllabus by scheduling and planning the activities based on how the students act. The teacher must also come up with ways to measure and judge how well students are doing. A trainee user is a place where students can log in and take courses of their choice, watch videos, read lectures, and do activities based on how well they did in previous activities. Also, at the end of the course, after he has finished all of the lectures and activities on time, give him a final test and a certificate if he passes.

A. *Sequence Diagram*

The sequence of special operations in the platform is illustrated in the sequence diagram. These diagrams represent the behavior of the platform as a set of sequential steps during a

specific period. The diagrams were divided into three sections depending on the users of the system:

- **Admin:** the sequence diagram for the admin is represented as shown in figure 1.

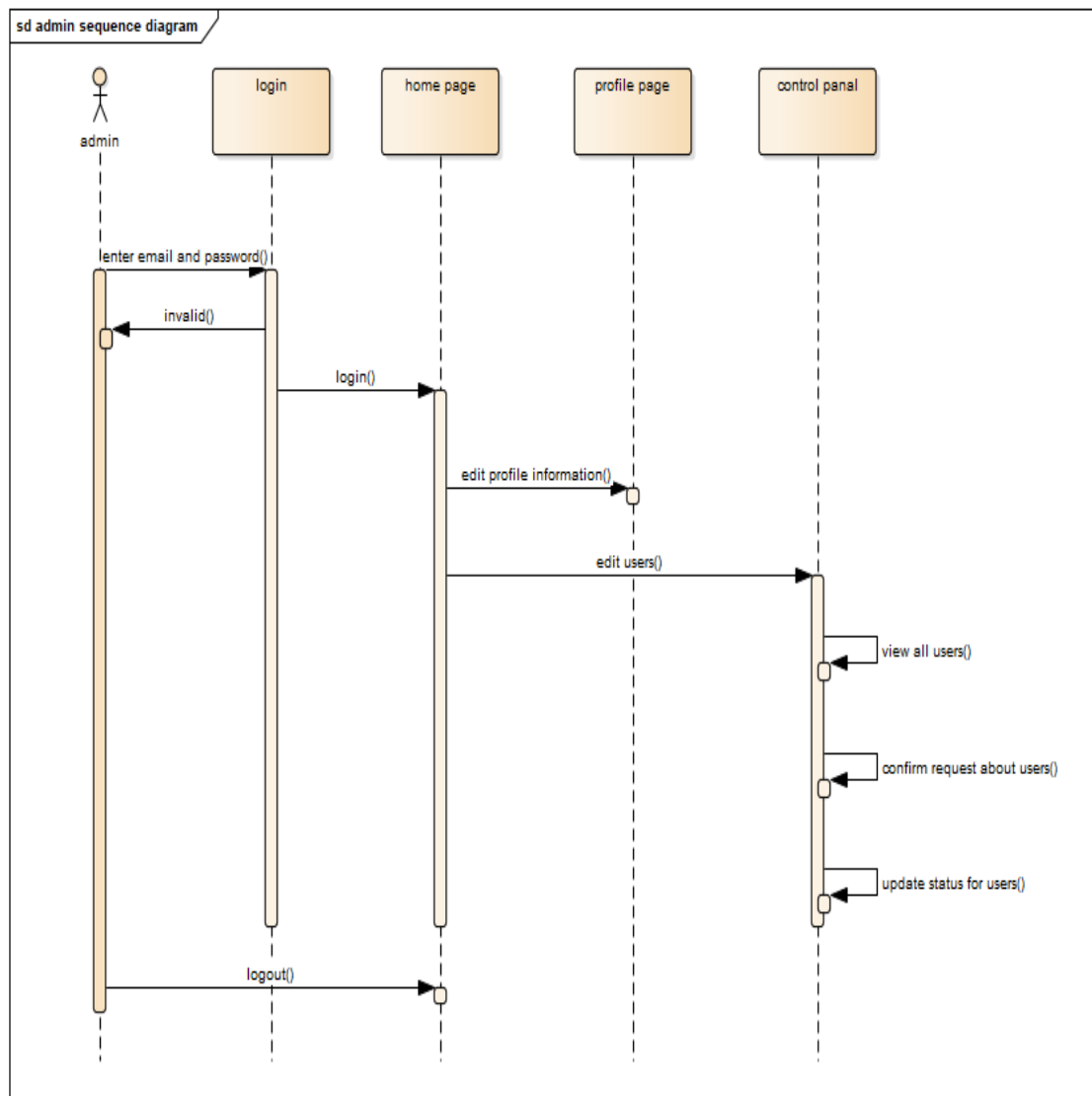


Figure (1) sequence diagram of the admin

It is seen from figure (1) that the actor (admin) sign-in with an e-mail and password, and then browse through it to the home page or personal page to change or modify information. it can also go to the control panel to view the users (instructor, trainee) and approve them, and change their status such as deleting users or disabling their accounts.

- **Instructor:** The following figure (2) shows the sequence diagram for the instructor (the course creator).

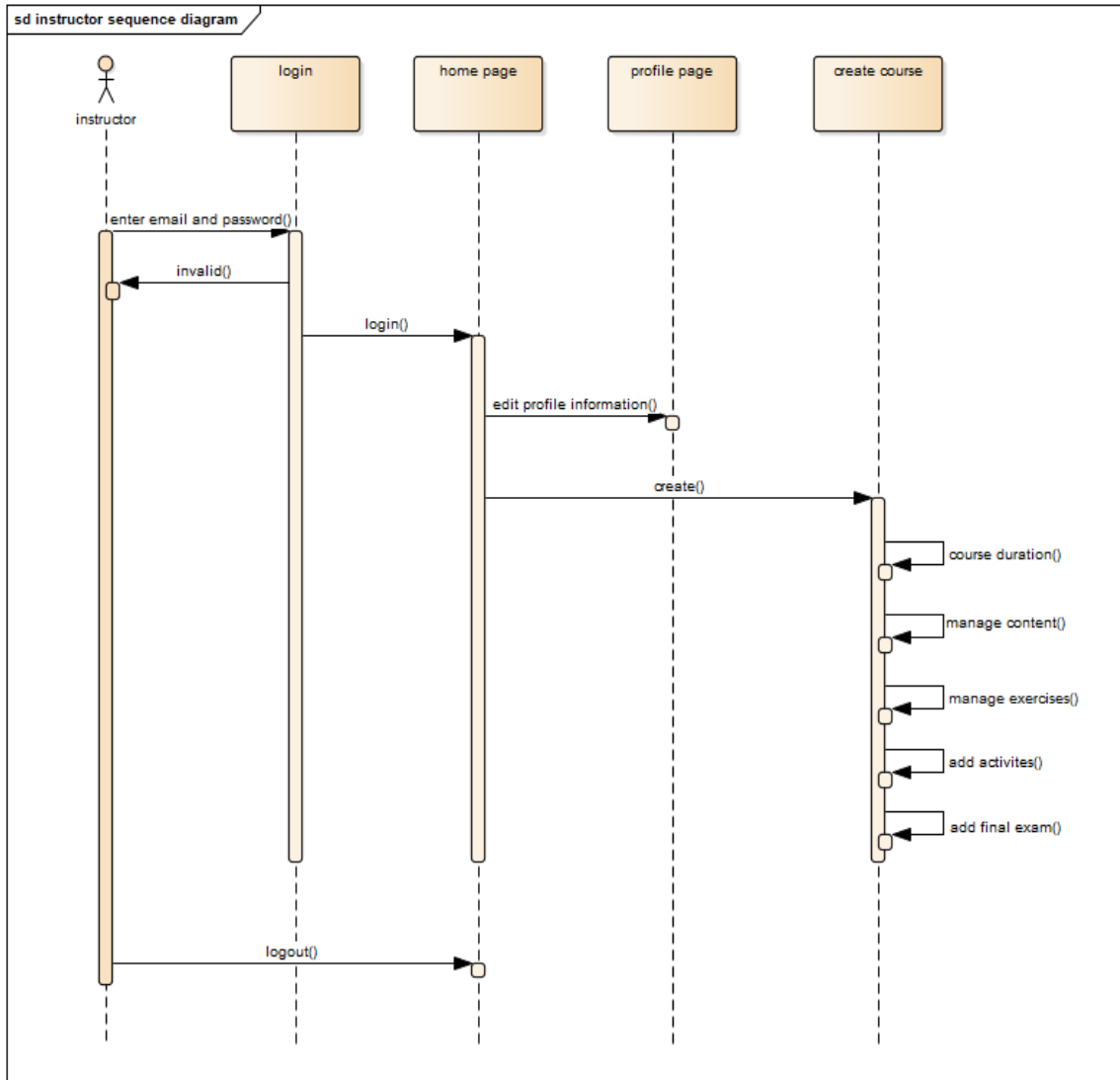


Figure (2) sequence diagram of the instructor

After creating the account for the first time, the instructor waits for approval from the admin to sign in to the platform. Where it logs in, then navigates to the home page or the personal page through which the course and its lectures are uploaded. Where each lecture contains a name, an explanatory video, a text file, and pictures of the illustrations of the lecture, then a simple test about the lecture. After completing the download of all the lectures, adds a final test for the course, and determine if the trainee passed this test or not.

- **Trainee:** The sequence diagram for the trainee is illustrated in figure (3).

• **Admin:** Figure (4) shows the main activities of the admin. After signing in to the platform, he notices whether there are requests to join the trainers and trainees for approval. It can also disable or delete some user accounts and view the number and names of users.

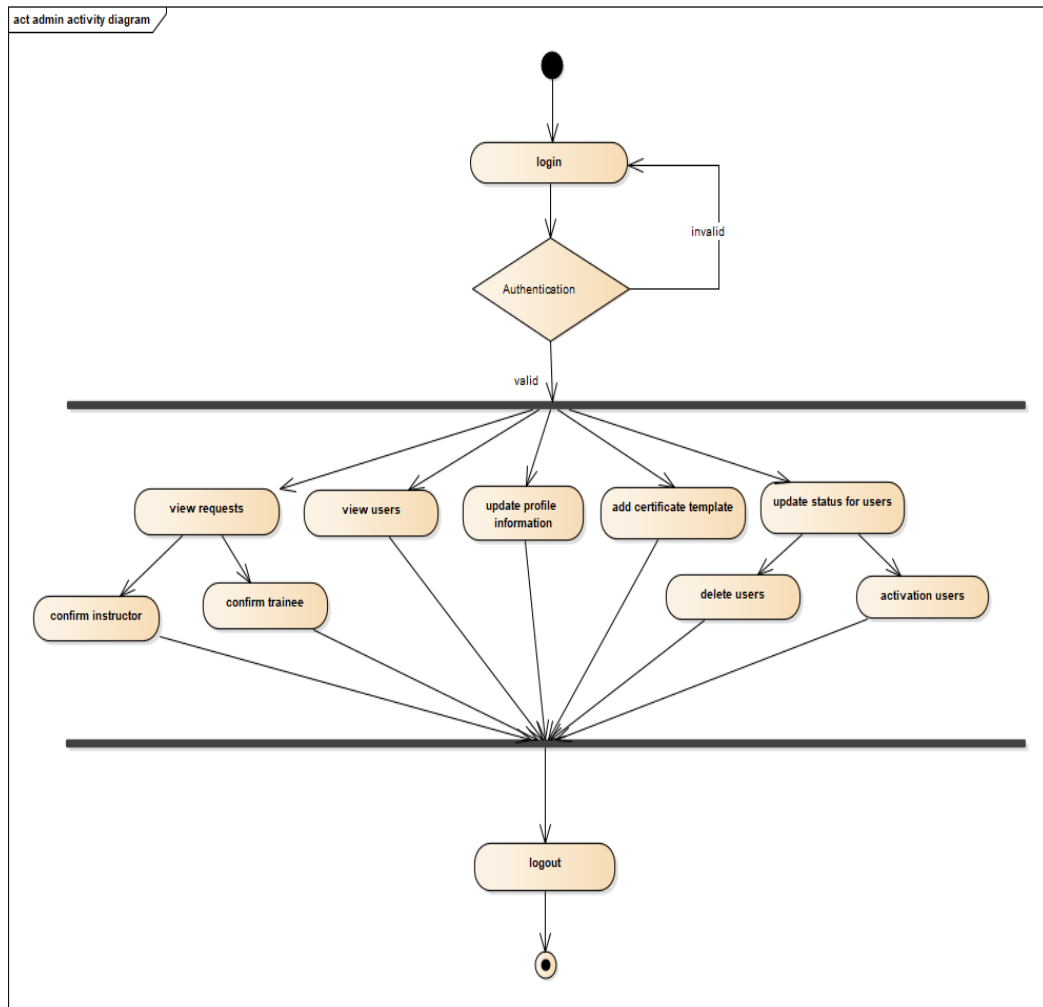


Figure (4) activity diagram for admin

• **Instructor:** Figure (5) shows the main activities of the instructor. After signing in to the platform, it creates the course and all lectures and activities related to it.

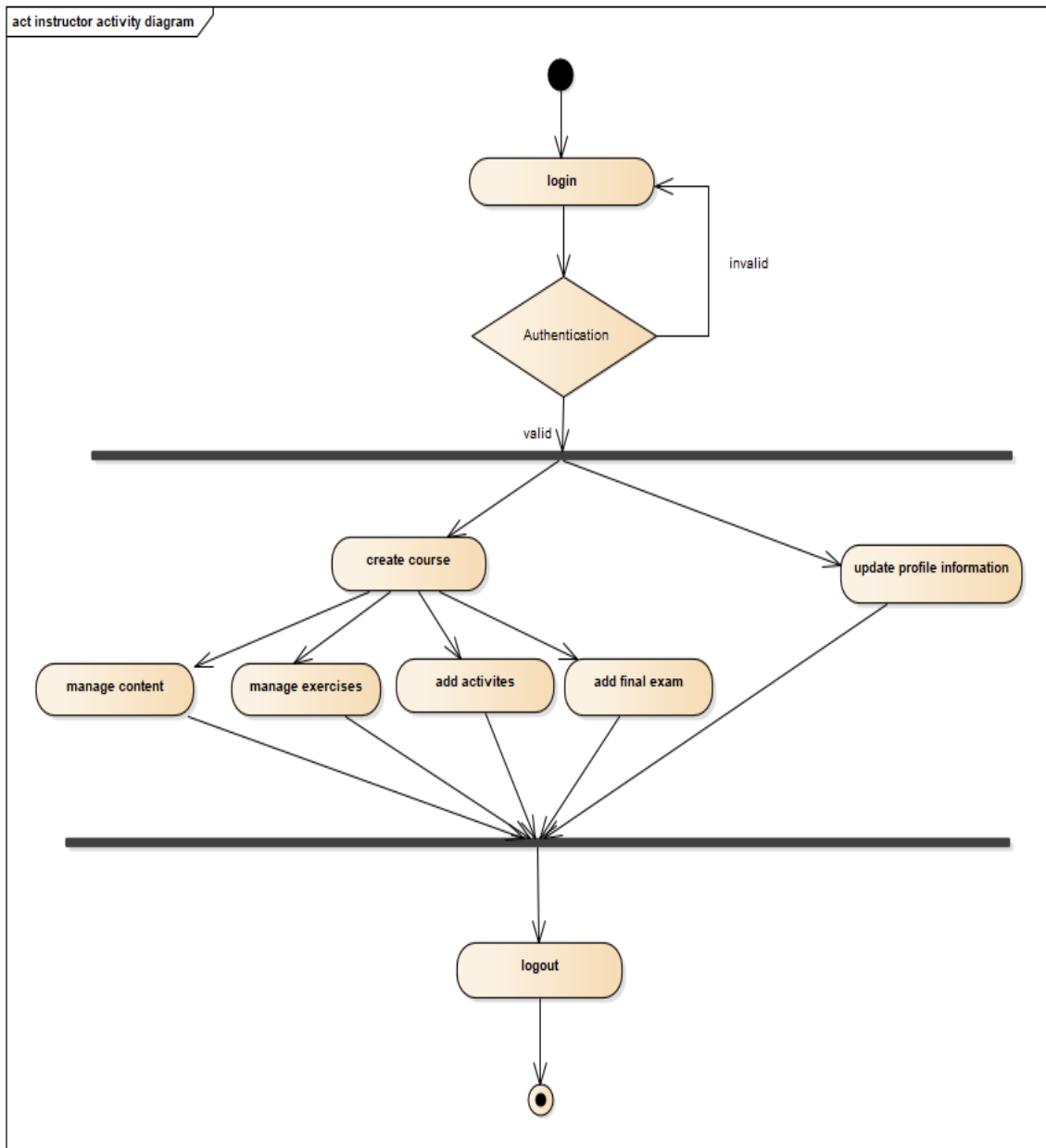


Figure (5) activity diagram for the instructor

- **Trainee:** Figure (6) displays the primary activities that the trainee is responsible for, such as registering for an account on the website and looking for courses that meet needs.

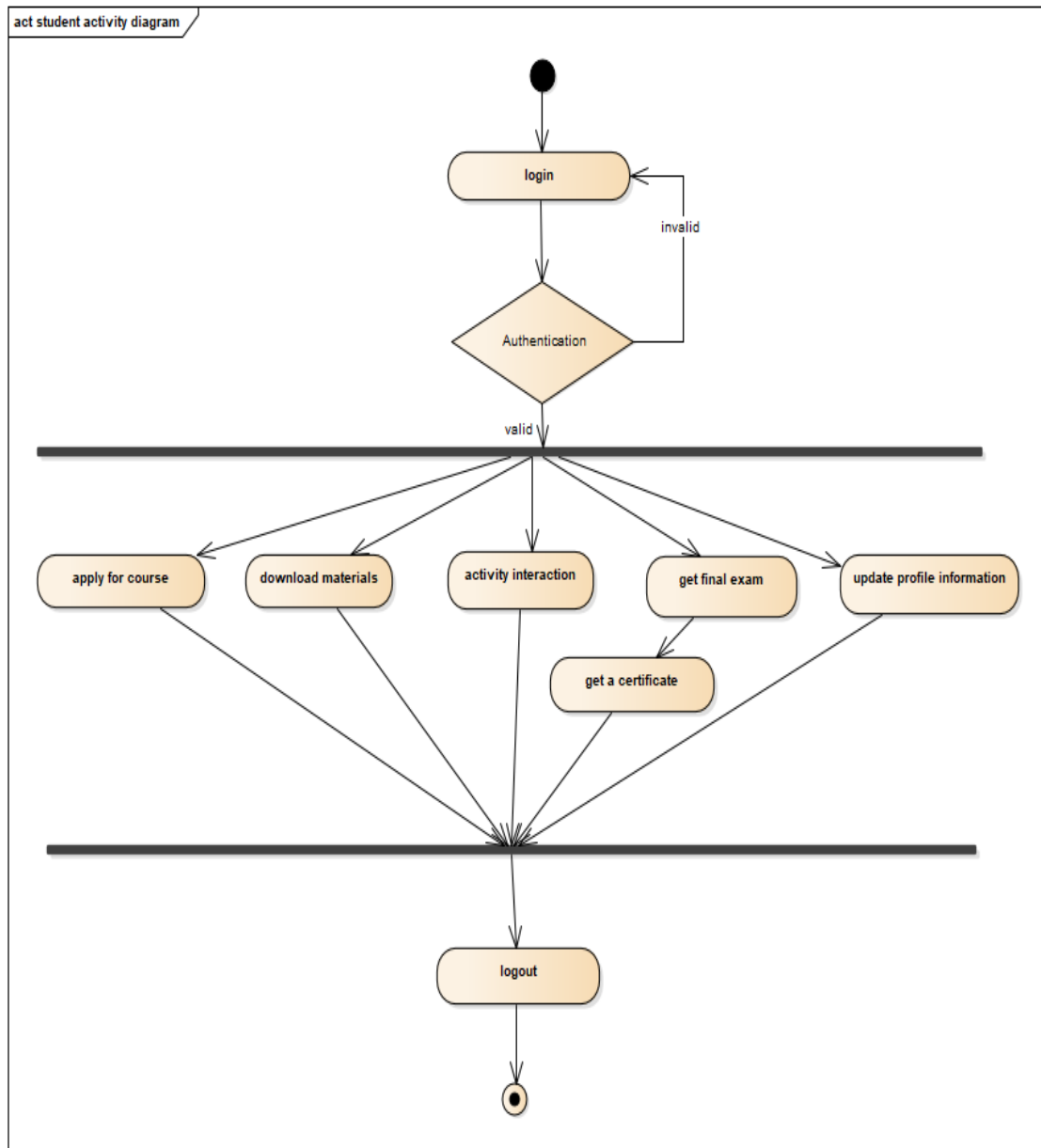


Figure (6) activity diagram for the trainee

After selecting the course, completing the lectures, and submitting activities (video, text, and quizzes), the trainee submits a final exam that, if passed, will get a certificate as shown in figure (7).

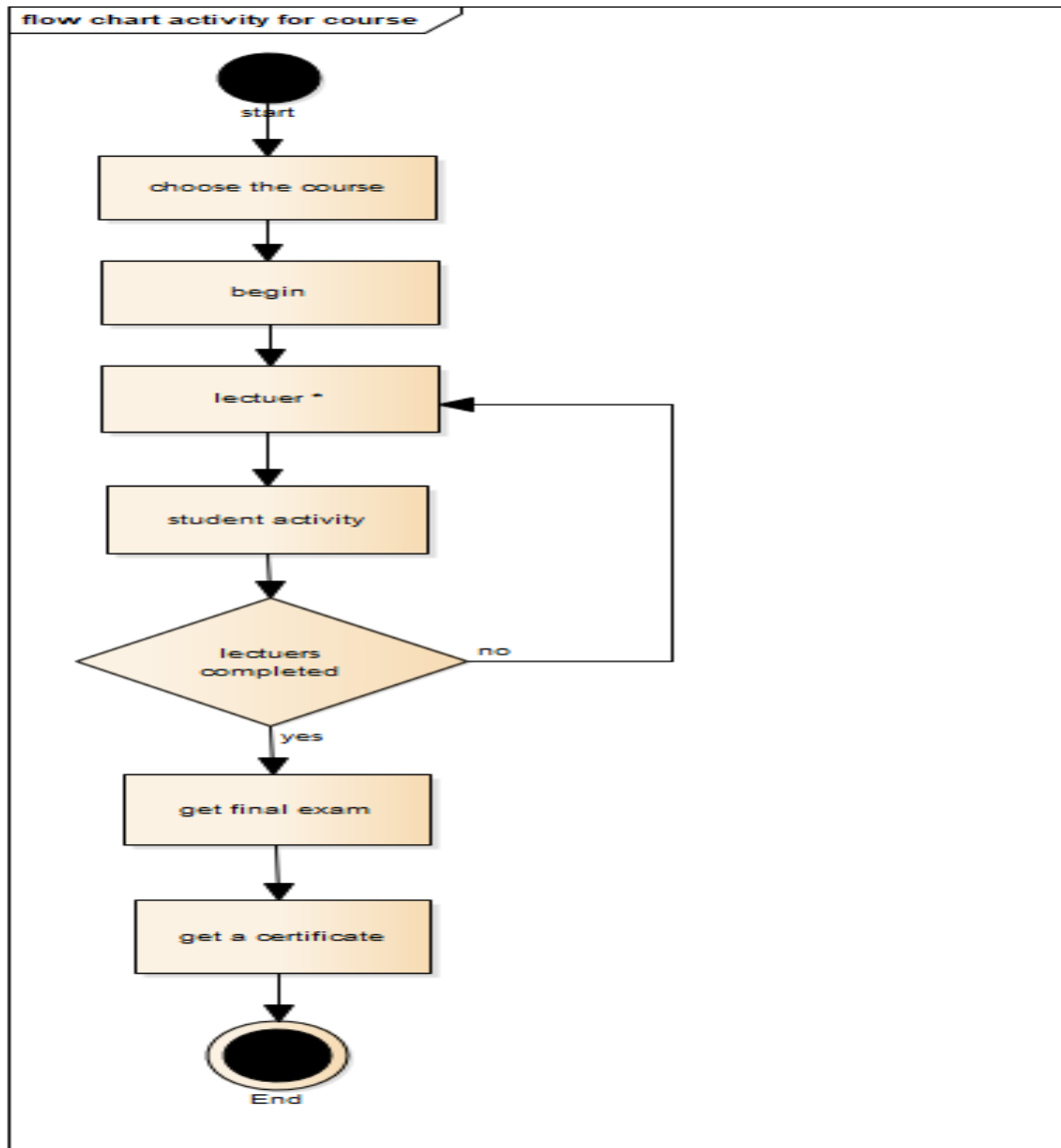


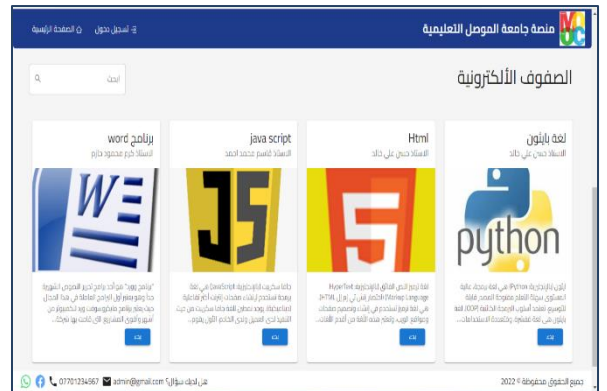
Figure (7) flowchart activity for courses

VI. RESULTS OF THE DEVELOPMENT OF THE MOOC PLATFORM

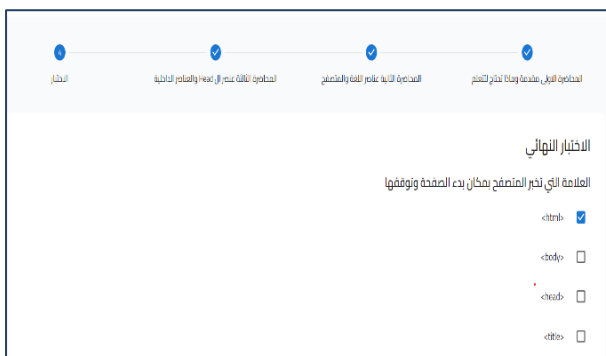
The instructional approach in constructing the MOOC platform must align with the principles and concepts of this type of education. This method utilizes technology to foster and develop digital literacy skills among students, empowering them to take control of their learning journey and assess their progress independently. The implementation phase focuses on providing students with an interactive and user-friendly environment, and for this reason, the proposed system utilizes React, a JavaScript library for creating user interfaces (front end). This will provide students with a familiar and responsive interface for engaging with course activities, as illustrated in Figure 8.



(a)



(b)



(c)



(d)

Figure 8: The developed MOOC platform - selected screen captures

VII. CONCLUSION

The use of online education continues to be an effective way of acquiring knowledge and developing skills from a remote location. It is accessible to anyone who has an internet connection and a desire to learn. Among the various forms of online education, MOOCs stand out for their ability to offer a vast selection of information on a wide range of subjects. This paper presents an overview of five popular MOOC platforms, highlighting their number of users, available courses, and course components such as videos, text, photos, and quizzes. Additionally, a proposal for a MOOC platform for the University of Mosul, featuring support for the Arabic language and the ability to be scaled using open-source technology, is presented.

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