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I dedicate this work, as a token of respect, gratitude, and appreciation to:

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khaoula

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General Introduction

In our current time, with the expanding use of the Internet and its application in the field of education, there has been a significant increase in the adoption of online learning, especially during and after the COVID-19 pandemic. Governments have heavily relied on digital platforms and applications for remote learning.

However, in Algeria, learners in online education face numerous challenges and difficulties. One of the most important challenges is the lack of comprehensive platforms that fully meet the learners' needs. Even the existing platforms suffer from deficiencies and shortcomings in certain features and content.

The objective of our project, as presented in this report, is to design and develop a mobile application that aims to provide education and evaluation in an easy and effective manner. Through our platform, students can access a wide range of educational materials, including lessons, exams, and their solutions. The application offers a user-friendly interface that allows students to navigate smoothly between topics and content.

Furthermore, our application provides a unique opportunity for teachers to contribute to the platform by uploading their own lessons and creating interactive learning experiences. Teachers can generate income from their content, as each lesson, exam, or exam solution they provide generates revenue for them. This feature not only serves as an incentive for teachers to actively participate in the application but also ensures a diverse and comprehensive set of educational resources for students.

Additionally, our application allows for the creation of video conferences to facilitate communication and interaction between teachers and students. Participants in virtual conferences can communicate through video and audio, enhancing the experience of remote learning and fostering interaction among all participants. Teachers can conduct live teaching sessions through virtual conferences, effectively exchanging knowledge and skills with students.

By combining the convenience of mobile technology with interactive learning and financial incentives for teachers, our application revolutionizes the access and delivery of education. It empowers students to learn at their own pace, provides a platform for teachers to share their expertise, and ultimately enhances the overall learning experience for all participants.

To achieve this, our work is structured as follows:

- In the first chapter, we will explore Concepts and Information about E-Learning.
- The second chapter presents the analysis and design phase of our application.
- The third chapter showcases the various tools and interfaces developed to accomplish our objective.
- The last chapter explain the Business Model Canvas (BMC) of the project.

Chaptre 1:E- learning

1 Intoduction :

Rapid advancements in all spheres of industrial, scientific, and cultural life have been a hallmark of our day. This is a result of developments in science and technology, notably information technology. In order to solve issues caused by these developments, such as the volume and quick change of information, an increase in the number of students, a scarcity of teachers, and distance, it has become imperative to stay up with educational procedures. As a result of these developments, new educational patterns and approaches have emerged, particularly in the area of individual or self-education, where students advance according to their aptitude, capacity, and rate of learning, depending on their prior knowledge and abilities.The idea of computer-assisted training, programmed learning.

1.2 The History of Distance Learning :

Distance education has its roots in the mid-19th century when postal services were established. The first mention of learning a language through the mail appeared in a Swedish newspaper in 1833. In 1840, Isaac Pitman was allowed to offer non-correspondence education in England through the postal service. The first institution dedicated to teaching by mail was the "Tu San" Institute for Correspondence Education, founded in Berlin in 1856. In 1858, distance education emerged in Britain at the University of London. The Hermods organizationwas founded in 1898 and became one of the world's largest institutions offering distance education. In 1969, the Open University was opened in the UK, which utilized correspondence, radio, and television as essential elements in the education process. The International Council for Distance Education was established in 1982, after receiving financial support from the World Bank and UNESCO.

Distance education has gone through four generations of support. The first generation is the Correspondence Education System, still in use in many developing countries, which relies on printed resources and regular mail for communication. The second generation is the Television and Radio Educational System, which uses satellites, television, and radio todeliver live or recorded lectures. The third generation is the Multimedia Educational System, which includes texts, audio, and videos, often used by open universities. The fourth generation is Internet-based, where educational materials

are electronically transferred and interaction between teachers and learners is possible through chat programs, videoconferences, discussion forums, and email.[1]

1.3 Defenition of Distance Learning:

" Distance learning is a mode of delivering education and instruction, often on an individual basis, to students who are not physically present in a traditional setting such as a classroom".[2]

1.4 The Importance of Distance Learning:

Distance learning has significant importance, including the following aspects:

1. Online learning can reach a lot of people with cultural programs.

2. Anyone can access online learning regardless of their age, gender, or location.

3 .Online learning offers many different academic credentials to learners.

4. Online learning is effective for teaching subjects that benefit society as a whole.

5. Online learning is a good way to promote cultural advancement.

6. Education is a powerful tool for promoting social change.

7. Online learning helps prepare skilled individuals to contribute to society and the economy.

8. Online learning is a great option for continuing education and general education for people with various social, financial, and physical obstacles. [3]

1.5 Types of Distance Education :

E-learning is regarded as one of the most crucial contemporary approaches utilized in the sphere of education. It depends on utilizing technology in all its manifestations to transmit knowledge to learners in the quickest possible time, with minimal exertion, and maximum benefit. Despite the variations among individuals working in the field of e-learning, whether it embodies a simulated environment or represents a practical environment, this heterogeneity has had a conspicuous impact on the variety of its genres. The most prevalent classifications

among those concerned are emphasized in accordance with the consensus reached by Salem (940, 2494), Ali El Sayed (984, 2441), and Demas (22, 2442).

And Al-Qahtani (2494) and Hassamo (2499) agree that différence education can be classified into three moufle types: [4]

1.5.1 Synchronous education :

enables the teacher and students to communicate in real time about classes, subjects, research, and conversations through chat applications and online classrooms. As a result, students can get fast feedback and interact with the teacher to get any questions answered. Nonetheless, because electronic education formats represent growth and complexity, it necessitates contemporary technology and reliable communication networks. Whiteboards, virtual classrooms, video conferencing, audio conferences, and chat rooms are some of its primary tools.

1.5.2 Asynchronous education :

Is a form of indirect electronic education that doesn't involve student-teacher interaction and doesn't follow a real-time curriculum. Several forms of communication, including email, bulletin boards, discussion groups, forums, mailing lists, CDs, and more, promote information exchange and interpersonal contact. Students can study using this type of online instruction at their own pace and with as much or as little effort as they like. Students can also read over the study material several times and return to it as needed. High levels of self-motivation for learning and commitment to the learning process are frequently necessary for this sort of schooling. Yet, the quick feedback issue is noted at along with the phenomena of introversion and isolation that may manifest in the learner's personality.

1.5.3 Blended learning:

In addition to several learning tools including virtual learning software, online courses, and self-learning courses, this style of learning includes a variety of media that are created to enhance one another and learning and its applications. It can also refer to self-learning, which combines synchronous and asynchronous learning, as well as learning in conventional classrooms where teachers interact with students in person.

Figure 1 : Blended Learning .

1.6 Methods of Distance Learning:

There are many methods of distance learning, and each method represents a certain stage of the educational interaction during the development of distance learning. Due to the increasing development of information technology and communication, which has reflected on the expansion of their educational uses, new and more effective methods of distance learning have emerged. Among the most successful methods of distance learning are: .[5]

1.6.1 Correspondence approach:

This approach involves sending printed material to the learner, who then comments on it, asks questions, and returns it to the teacher. Nowadays, email is the primary means of communication on the Internet, and this method is one of the traditional methods of distance learning, as it separates the teacher and the learner in a physical space in order to fill the educational gap. This approach can provide adults with the opportunity to learn at the university level, as well as provide workers with a database at their workplace.

1.6.2 Multimedia approach:

The multimedia approach in distance learning involves incorporating audio and visual recordings along with written text, using various tools such as flexible or integrated disks, phones, and broadcasting through radio or television. Printed materials form the foundation of distance learning curricula and are used in various forms like textbooks, references, study

guides, and more. It is considered a fundamental method for delivering distance education services.

1.6.3 Visual conference approach:

The visual conference approach is a learning style that is similar to traditional classroom learning, but with learners being physically separated from their teachers and colleagues and connected through electronic communication networks. In this approach, learners can see and hear their teacher, ask questions, and interact with the subject being presented. However, this method requires more preparation and time than traditional classes due to the need for preparing scientific material and the reliance on the speed of acquiring the learner's attention and their interaction with the media. Additionally, effective use of technology requires training for both the teacher and learner.

1.6.4 Printed material approach :

All systems or methods of delivering educational curricula depend on this basic approach. The printed materials used for this purpose include various types of materials, such as textbooks, course outlines, exercises, summaries, exams, and others.

1.6.5 Virtual learning approach:

This method involves using the internet and email to convey educational content and enable communication between the teacher and the learner. Despite being a recent approach, it's becoming more and more popular, particularly with the rise of distance learning, and has now become the primary method of delivering education. Interaction between teacher and student can occur either in real time or at different times.

1.6.6 CD approach:

This method is a valuable and efficient way to convey information as it can store a large amount of data and playback in high quality. It is widely used in distance learning, but the materials are limited by the program designer and cannot be adjusted by the learner. CDs also support self-learning, but their creation and preparation require more time and cost.

1.6.7 Interactive distance learning:

In this method, the teacher and the learner interact with each other remotely through audio and visual communication, as well as educational channels that are broadcasted through satellites.

2 E-Learning :

"A method for teaching using modern communication mechanisms such as computers, networks, and their various multimedia tools such as images, graphics, search engines, electronic libraries, as well as internet portals, whether remotely or in the classroom. The important thing is to use technology in all its forms to deliver information to the learner in the shortest time, with the least effort, and the greatest benefit."[6]

his definition emphasizes on the idea that e-learning refers to any type of education that employs contemporary technologies in various ways. It does not matter where the learner is physically located as long as they can connect to the appropriate channels to receive the necessary educational materials.

2.1 E-learning Requirements :

E-learning is a multifaceted and intricate concept that has an impact on several areas of life and necessitates the integration of diverse components to attain educational objectives. It is not just about transferring data or information from a traditional paper-based environment to an electronic medium, as some people assume. Therefore, the Ministry of Education is seeking to secure the necessary support to fulfill the demands of e-learning by establishing partnerships with pertinent ministries, supporting organizations, and the private sector. These needs involve: [7]

2.1.1 Infrastructure and Technical Support:

The infrastructure mentioned consists of various components, such as the National Educational Network that links universities, the structural framework of the network which identifies the electronic devices for connection, computer equipment for communication and browsing, and software that includes educational applications to make it easier to handle educational content.

2.1.2 A high-capacity network (Broadband: Network) :

To guarantee fast download speeds for learning materials and applications, as well as efficient data exchange in interactive learning settings, a high transmission capacity is necessary. This trend is rapidly gaining popularity due to the speedy development of technology and the growing need for extensive e-learning content and applications. Additionally, a fast electronic environment can be established through a centralized system, resulting in cost savings on peripheral devices that are typically numerous and economically feasible.

The infrastructure depends on the use of the Thin Client model, which is centered around centralized processing using powerful computational servers and peripheral computers. To avoid the hassle of downloading and maintaining software on peripheral computers, a fast network is necessary for quick transmission of applications and content. Although establishing a high-capacity educational network requires a significant initial investment, it is cost-effective in the long run. The system comes with educational software that offers applications for electronic content management, learning management systems, and network control and monitoring systems.

2.1.3Human Resources:

Although there are various material resources available for a continuous and integrated e-learning system, the most crucial factor is the human element. There should be an adequate number of qualified individuals who can monitor and maintain the system while ensuring the smooth flow of information. Additionally, teachers and employees must be proficient in technology and use it to support the educational process. Innovation is also essential in teaching methods and technology usage, not just for gaining knowledge but also for creating it as a fundamental aspect of education. However, implementing such a system requires a significant shift in the thinking patterns of both teachers and students. Therefore, a strategy for change and transformation must be developed, along with management systems to avoid chaos and confusion. This strategy should be dynamic and adaptable to technological and economic variables, with continuous training and incentives to support the process of change. It's important to note that strategies developed in the West or other countries may not be suitable for all regions due to political, social, and economic differences. Instead, various e-learning strategies should be adopted and tailored to fit the specific circumstances of each country and its environment.

2.1.4 true determination :

If all the previous requirements are fulfilled, there must be a feasible environment that promotes the implementation of the national e-learning strategy. This environment is characterized by a complete understanding of the necessity and significance of this concept at all levels, ranging from politicians to the average citizen. Moreover, the success of the new system requires the support and collaboration of everyone, establishing the framework of e-learning in educational institutions at various levels, and ensuring that the new data imposed by such a system is accepted and handled. Legislative requirements, which form part of the feasible environment, are noteworthy due to the legal protection they provide for the mission's success.

2.2 Means of achieving e-learning:

Currently, researchers and experts in the field of education agree that education and learning consist of three pillars: the teacher, the student, and knowledge, also known as the educational triangle. These three elements are crucial in the modern educational process, and this process cannot achieve its desired goals unless these elements work together in harmony. To integrate electronic learning services effectively, several mechanisms must be available to ensure a successful and continuous achievement of its objectives. The requirements for electronic management are divided into several categories:[8]

2.2.1 Technical mechanisms :

The technical aspects of electronic management consist of four interconnected elements:

2.2.1.1 Hardware: computer equipment, including computers, peripherals, and having the latest hardware from the world's best hardware manufacturers is essential for any organization to achieve two basic goals: cost-effective development and maintenance costs, and hardware compatibility with software developments and information systems software.

2.2.1.2 Software: Electronic education services require electronic management and software systems, but these systems must be developed over time in line with the developments in this field and the services provided to the recipient.

2.2.1.3 Network communication: This element may be the most important from a technical standpoint, as without it, there is no electronic management or electronic concept currently in

existence. It includes a set of computers organized together and connected by communication lines so that users can transfer and exchange information between them.

2.2.1.4 Knowledge workers: These are the experts and specialists who represent the human and functional structure of the electronic management system.

2.2.2 Human and administrative mechanisms :

Human resources are deemed a crucial asset that can significantly affect the success of management implementation, particularly in the area of electronic workers consisting of specialized professionals. In the realm of technology knowledge and administrative personnel, a collection of factors must be accessible for effective administrative mechanisms, such as:

-Creating strategic blueprints and devising proposals for projects in electronic management.

-The structure of implementation necessitates modifications in the organizational framework pertaining to leadership and administrative support, with the requirement for endorsement from top management to introduce information technology.

-Providing education and training to employees is necessary for electronic management, which involves significant changes in enhancing the knowledge and skills of human resources.

-It is important to regularly review and revise laws and procedures related to electronic management to ensure they are up-to-date and support the transition to digital systems. This helps to establish trust and legitimacy in the outcomes of such systems.

3 Computer devices are a supportive tool for promoting e-learning :

3.1 a computer as a tool for online education. :

This concept focuses on the use of wireless communication technologies to deliver education outside of traditional classrooms, where it was discovered that this approach was suitable for the shifting global conditions affecting the process of education and learning that have been impacted by the phenomenon of globalization. Computers are among the most crucial supporting technologies for elearning since they offer characteristics that allow for many sources of education and learning. It is also a solution to many issues that

the process of education and learning currently faces If we don't give students the information technology skills they need to interact with a varietyof knowledge sources, we can't assume they can learn what they need on their own.

3.2 The computer as an incentive for e-learning :

The following are the most crucial elements that support this style of learning:

1. There are so many more students today than ever before, and traditional schools are unable to accommodate them all.

2. The usefulness of this sort of education for working people whose jobs prevent them from attending class sessions.

3. Particularly in Eastern civilizations and among housewives who are occupied with taking care of their homes and raising their children, this sort of education is thought to be promisingfor educating and enlightening women.

4.Preparing students for future employment because many jobs today demand computer technology, which necessitates teaching students how to work with computers and their programs.

5.Creating a generation of students who are accountable for their own education and enhancing learners' capacity for self-learning.

6. Overcoming the difficulty of general equations of cognitive explosion.

7. Coping with the rapid rates of expression in diverse professions' and jobs' employment requirements.

8.Encourage the idea of lifelong learning and development [9]

4 Remote learning tools:

4.1 Social media networking:

These tools allow for both real-time and self-paced learning through the use of chat functions and the exchange of educational materials, including videos, audio files, and other relevant files.

(Chatgroup, WhatsApp, Telegram, Hangouts, FB, Google docs, Wiki…)

4.2 Learning Management Systems (LMS):

Learning management systems provide integrated tools for managing remote learning that enable teachers to document and generate reports. These systems offer synchronous and asynchronous platforms that facilitate the creation of virtual classrooms, file sharing, discussion rooms, subject-specific channels, and features for submitting and grading assignments and assessments automatically. Some LMSs also provide electronic libraries and educational attachments, and allow for direct communication with learners through live meetings and scheduled lectures. There are also features for learners with special needs, such as automatic readers, adjustable font sizes, and text-to-speech options. Moreover, some LMSs offer the capacity to build e-learning content according to SCORM standards, which allow learners to import, share, reuse, and export educational content to any other learning system. Learning management systems enable teachers to create classroom accounts, upload student accounts, and collaborate with each other in one virtual location on the internet. These systems offer a comprehensive solution to manage assessments, assignments, and track students' academic progress, rather than using multiple applications separately, like a wiki site or an interactive wall. Many educators have been encouraged to use these platforms, where they can perform all these tasks in a single space.

Several platforms were discussed, including G Suite for Education (edu.google.com), which enables the creation of classrooms, distribution of assignments, and enhanced collaboration, among other things. Many digital support applications are available through G Suite, making it an integrated solution. Another commonly used platform among teachers is Edmodo (edmodo.com), which offers a professional library and learning community where teachers can access helpful materials. Additionally, there are numerous systems available through platforms such as Blackboard, Canvas, and Schoology, each with unique advantages and strengths that make it an attractive option for specific educational institutions.

4.3 Educational applications through smart devices - Mobile Learning:

The focus of modern advancements in smart device technology has been primarily on generating digital content, particularly digital books that can be accessed easily. As mobile phone technology continues to develop, it will play an increasingly significant role in evaluating education and developing software platforms that make educational resources accessible through mobile devices. Educational applications will also be developed to create

learning content, assessments, and interactive activities such as interactive walls, videos, and educational games.

There are various tools available for creating digital educational content, such as Google and Microsoft products, Padlet, Prezi, Edpuzzle, Smart board, and Free Mind. Google and Microsoft tools can be used by both teachers and learners to create presentations, design content and digital files like PowerPoint, Google Drawing, Sway, and OneNote. These tools also enable users to share content privately through learning management systems or social media. EdPuzzle, on the other hand, allows users to create interactive videos that include questions to assess learners' comprehension. It also provides options for merging, cutting, and modifying videos.

Popular applications and software used in academic, professional, and technical education provide simulation technologies, interactive tools, and tests that learners can use to link real-life phenomena to various sciences that explain these phenomena.

One example of such an application is Padlet, where learners can organize conceptual mind maps to clarify a subject or collaborate by sharing their ideas and understanding of the educational material through an electronic wall.

There are various educational apps available that enhance the learning experience. It's worth mentioning that the use of new technologies and apps in education is on the rise, which support and complement the educational process. Examples of such apps are Raway for children in Egypt, Kitabi app from Lebanon designed for visually impaired learners, and Shaa'la, Logi, and Noor Play - Arabic smart games that promote learning through play and are effective tools for introducing students to different learning approaches.

4.4 instructional support platforms:

Various online educational platforms, like MOOCs (Massive Open Online Courses), offer global access to a wide range of educational resources such as lessons, courses, and specialized lectures. However, they do not offer the ability to participate in virtual classrooms with a full syllabus and assessments, which is an advantage provided by Learning Management Systems (LMS). Popular platforms in this category include MIT, Edx, Future Learn, Udacity, Open 2 Study, Idraak, and the Educational Portal.[10]

	Learners	Courses	Microcredentials	Degrees
Coursera	45 million	3,800	420	16
edX	24 million	2,640	292	10
Udacity	11.5 million	200	40	1
FutureLearn [2,4]	10 million	880	49	23
Swayam [2,3]	10 million	1,000	0	0

Figure 2 : Data of courses and enrollment of some paltforms.

- The table shows the online courses provided by these platforms and the number of students enrolled in them for the year 2019.

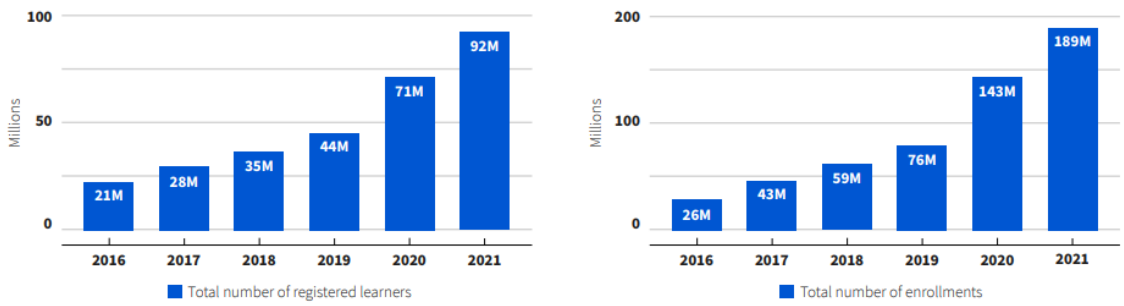

Figure 3 : The image shows the enrollments on Coursera.

- In 2016, there were 21 million student registrations for Coursera's online courses, which increased annually by around 7 million over the next two years. The pandemic caused a three-fold increase in new registrations, bringing the figure to 71 million in 2020, and 92 million in 2021. Course enrolments for online learning followed a similar pattern, with enrolment numbers more than doubling in 2020 and increasing by 32% in the following year, peaking at 189 million. These increases demonstrate the growing global acceptance of online teaching, including higher education courses and remote learners from vulnerable or remote communities.[11]

5. The impact of covid-19 on education :

The COVID-19 pandemic has had a major effect on education, causing schools and universities to close their doors and transition to online instruction. UNESCO reports that

school closures impacted more than 1.5 billion students in 190 countries at the height of the pandemic in 2020. Developing countries have been hit particularly hard, with many students lacking access to reliable internet and necessary devices for online learning. According to a World Bank report, over 460 million students in low- and middle-income countries were unable to access remote learning during the pandemic. The pandemic has also worsened existing educational inequalities, disproportionately affecting students from disadvantaged backgrounds, including those from low-income families, those with disabilities, and those residing in remote areas.[12]

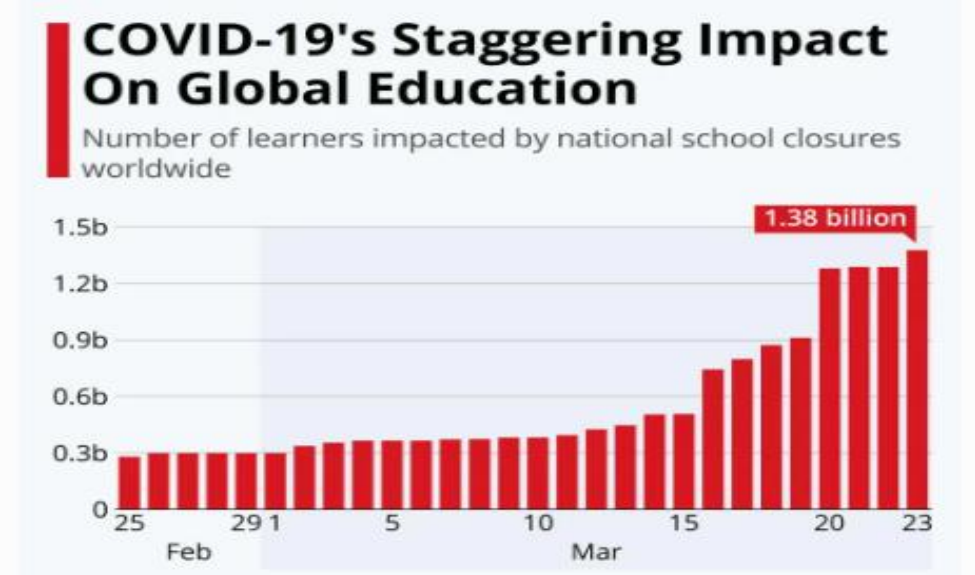

Figure 4 : image show the number of learners impact by national school closures worlwide .

6.Challenges of e-learning post-COVID-19 pandemic :

The current literature indicates that education and research are crucial for national security, and traditional education methods cannot adequately fulfill this need. Thus, elearning has become increasingly important. For recognized educational institutions to succeed in providing successful e-learning, they must establish short- and long-term visions for e-learning adoption and incorporate e-learning policies into their educational practices. This will require careful planning, taking into account the technological resources and equipment available, as well as statistics and studies on the use of electronics and educational technology. Electronic theft and viruses pose a threat to remote learning platforms, making electronic security crucial.

The e-learning market is expected to reach $325 billion by 2025 due to the COVID-19 pandemic, and it is necessary to find ways to improve e-learning quality and performance in accordance with global standards. A separate budget is needed for remote learning and online research. Moreover, it is necessary to shift the educational culture of both teachers and students to transition successfully from traditional to remote learning, and to develop new approaches for students with special needs. It is also important to address the issue of high internet connection costs, which can be a challenge for families with limited incomes.

It is important to acknowledge that e-learning has provided many benefits and advantages, however, its challenges cannot be ignored. Among the most important of these challenges are:

6.1 Educational Content:

In order to produce instructional materials that produce excellent results, many educational institutions go through a process known as "Instructional Design." The success of this design depends on recognizing the crucial educational requirements of the students, outlining the goals and strategies to fulfill them, offering tools to gauge the level of learning, and understanding test results. Distance learning is not an exception to the recognized instructional design methodologies, which include ADDIE and ASSURE.

But what exactly is the problem here? Before implementing e-learning, there are a number of issues that must be resolved, the most crucial of which are:

6.1.1 Educational Tools:

Using educational tools to increase student engagement by involving them directly as participants, rather than just as passive listeners, is a significant challenge in both traditional and online learning instructional design. However, online learning instructional design presents a greater challenge. Better outcomes will follow and the activation factor will be increased. Here, the teacher must make a special effort to define acceptable and effective tools for each purpose. It is difficult, but not impossible, to engage kids who are spread out throughout the country and keep their attention while using technology. The evaluation procedure is the same, especially for summative assessment; despite the fact that written examinations are the most common method, particularly for midterm and final exams, and despite Electronic assessment

looks to be tough because it is difficult to monitor and prevent cheating using the same devices, contributing to the apparent shift towards other assessment methods.

For student interaction in the learning process, both individually and in groups, there are numerous software programs and applications available on the Internet. These include Quizziz, Socrative, Padlet, Kahoot, and Mindmaps, as well as applications provided by companies like Google, Microsoft, Apple, and other communication companies. For each educational objective, the instructor only needs to have a solid plan, but this may not be enough to assess the experience's overall quality and provide grades to the students.

6.1.2 Meeting Needs and Various Forms of Education:

Creating a fair and effective curriculum requires a thorough understanding of the many modes of education. The four fundamental and significant modes of education are auditory learners, visual learners, kinesthetic learners, and read/write learners, according to the VARK model created by Fleming and Mills.

It is the duty of the instructor to adapt their teaching strategies in order to cater to the demands of various learner types. For aural learners, emphasizing modernism during a class may be appropriate, but for visual and kinesthetic learners, it might be tedious. As a result, educators must select the right software and tools to combine instructional materials that cater to various learning styles.

6.2 Teacher Readiness:

Those born between 1944 and 1964 are referred to as "Baby Boomers." The generation's willingness to absorb technological developments in education is one of its toughest obstacles. Although it doesn't lessen their powers, this is a result of numerous technological innovations and uses being only recently discovered.

While others have not, others have seen the significance of embracing this technology revolution and have learned how to do so. The need of lowering paper use generally and other associated issues has been brought about by the development of technological advancements, generations' devotion to them, and intellectual awareness.

This generation has been horrified by the slow and quick move toward technology that has occurred from all of this. They are now forced to use technology in ways that may go much

beyond downloading and sharing things on electronic networks. There is a third group, which is neither of these two generations but rather "Generation X" and "Millennials," who had previously avoided adopting technology to some part due to their state of disbelief and disregard of all these changes. They are currently dealing with the same issue, but thanks to their understanding of the fundamentals of technology, they might do better than the preceding generation.

As a result, the COVID-19 epidemic led to the announcement of teacher training programs in the area of e-learning and its different forms. To a doubt, they will have an odd obstacle due to how quickly students are adopting technology in comparison to them. They must accept the fact that "the crisis the education sector suffered due to the spread of the coronavirus has pushed e-learning to the forefront, becoming an option with no choice (except) in the absence of infrastructure" and do it with a lot of fun and an open mind. Teachers will have a difficult time keeping up with this abrupt change. Yet, if you work hard and are persistent, They are capable of overcoming these obstacles and adjusting to the changing conditions in education.

6.3 Technology Dissemination:

Without it, every notion for remote learning will remain simply a pipe dream. Technology distribution is a crucial component for the success of any remote learning proposal. This problem can be broken down into other layers, such as equipment accessibility, internet networks, and internet speed, each of which might be difficult either individually or collectively as a community. For instance, the student (or even the teacher) might have access to the gadget, but they might not have basic internet service. If they have, it might be subpar or come with an inadequate package to cover large-sized movie and file offerings. Here, the instructor must be aware of the social and financial situations of all of their students in order to select the approach that will work for everyone. For instance, if the issue is that there isn't a reliable internet connection for students, files and movies can be prepared in sizes that will maximize internet speed. It may also be preferable to use less video in live meetings or only use it briefly in favor of chat and text messaging.

It is undeniable that the problem the coronavirus epidemic has caused with educational institutions generally has put remote learning at the forefront and made it a solution that cannot be avoided (except in the absence of electronic infrastructure). It will be difficult for

educational institutions to keep up with this abrupt change, but many of these challenges can be handled with careful planning. Many people still have this very significant issue in their heads: will online education continue after the coronavirus pandemic, or will things go back to how they were before? The responses are mixed; some think—or perhaps hope—that things will go back to how they were, while others think there is no going back from the eagerly anticipated computerized learning. [13]

7 Conclusion :

In conclusion, e-learning has become a major player in the educational landscape, providing a range of benefits and opportunities for learners and educators alike. Its flexibility, accessibility, and scalability make it a powerful tool for reaching diverse populations, while its potential for personalization and interactivity opens up new avenues for engagement and learning. The COVID-19 pandemic has only accelerated the shift towards remote and hybrid learning models, reinforcing the importance of e-learning in modern education. While there are certainly challenges and limitations associated with e-learning, it is clear that it will continue to play an increasingly important role in shaping the future of education.

Chaptre 2 : conception

1 Introduction:

This chapter consists of representing the global structure and detailed architecture of my system by detailing its operation using UML diagrams, including UML use case and sequence diagrams.

2. Presentation of the UML:

2.1 Definition:

UML (Unified Modeling Language), is defined as a graphical and textual modeling language intended to understand and define needs, specify and document systems, sketch software architectures, design solutions and communicate points of view.

UML models all the data and processing by developing different diagrams. Clearly, UML should not be designed as a method (the approach is missing) but rather as a toolbox that serves to improve working methods. [14]

2.2. The usefulness of UML :

UML uses the object approach by presenting a universal description language. It allows thanks to a set of very explicit diagrams, to represent the architecture and the operation of complex computer systems taking into account the relationships between the concepts used and the resulting implementation. UML is above all a support for effective communication, which facilitates the representation and understanding of solutions. [15]

2.3 object :

- Its graphic notation makes it possible to visually express an object solution, which makes it easy to compare and evaluate solutions.
- The formal aspect of its notation limits ambiguities and misunderstandings. Epresentations
- It makes it possible to speak a common language, standardized but accessible, because visual.

- He represents a happy medium between mathematical and natural language, not too much complex but sufficiently rigorous, because based on a meta model.
- UML makes it possible to represent a system according to different views complementary: diagrams.

2.3. UML diagrams:

2.3.1 Definition of a diagram :

A UML diagram is a graphical representation, which is interested in a specific aspect of the model. It's a perspective of the model, not "the model". Each type of UML diagram has a structure (the types of the elements of models that make it up are predefined). A type of UML diagram conveys precise semantics (a type of diagram always offers the same view of a system). Combined, the different types of UML diagrams provide a view comprehensive static and dynamic aspects of a system. By extension and abuse of language, a UML diagram is also a model (a diagram models an aspect of the global model).

2.3.2 Characteristics of UML diagrams :

The Characteristics of UML diagrams encompass the following aspects:

- UML diagrams support abstraction. Their level of detail characterizes the level of abstraction of the model.
- The structure of UML diagrams and the graphical notation of the elements of modeling is normalized.

Reminder: the semantics of the modeling elements and their use are defined by the UML meta-model.

2.4 UML views:

UML provides a nifty way to present various projections of the same representation thanks to the views. A view is made up of one or more diagrams. There are two types of views:

2.4.1 Static views:

They make it possible to represent the system physically. We then find the following diagrams:

- The Class diagram: it represents the static structure in terms of classes and relationships between them, it also represents a set of interfaces and packages and their relationships.

- The Object Diagram or the Instance Diagram: represents an instance possible from the class diagram.

- **The Component diagram:** represents the pieces of packaged applications in the form of components with interfaces. It allows to describe these

-components which are: the subsystem, the module, the program and the sub- program, process and task

-The Deployment diagram: complementary to the component diagram, it describes the physical distribution of instances of components, processes, and objects of a distributed application.

2.4.2 Dynamic views:

The five behavioral (or dynamic) diagrams represent dynamic views of the system:

-**he user :** Their purpose is to identify the players in the field, their responsibilities respective ones and describe their needs.

- **The Collaboration diagram:** it describes the interaction modeled by the exchanges of messages between objects or between actors and objects.

- **The sequence diagram:** it differs slightly from the sequence diagram collaboration by adding a temporal dimension by specifying the chronology message exchanges between objects.

- **The state transition diagram:** it describes all the states of the objects in the system and the transitions that trigger the passage from one given state to another state.

- **The activity diagram:** is a variant of the state-transition diagrams. He describes all the activities carried out by the actors of the system bybreaking down into sub-activities and specifying the constraints relating to the sequence of these.[16]

2.5.1 Use Case Diagram:

Here are the use case diagrams of our analysis:

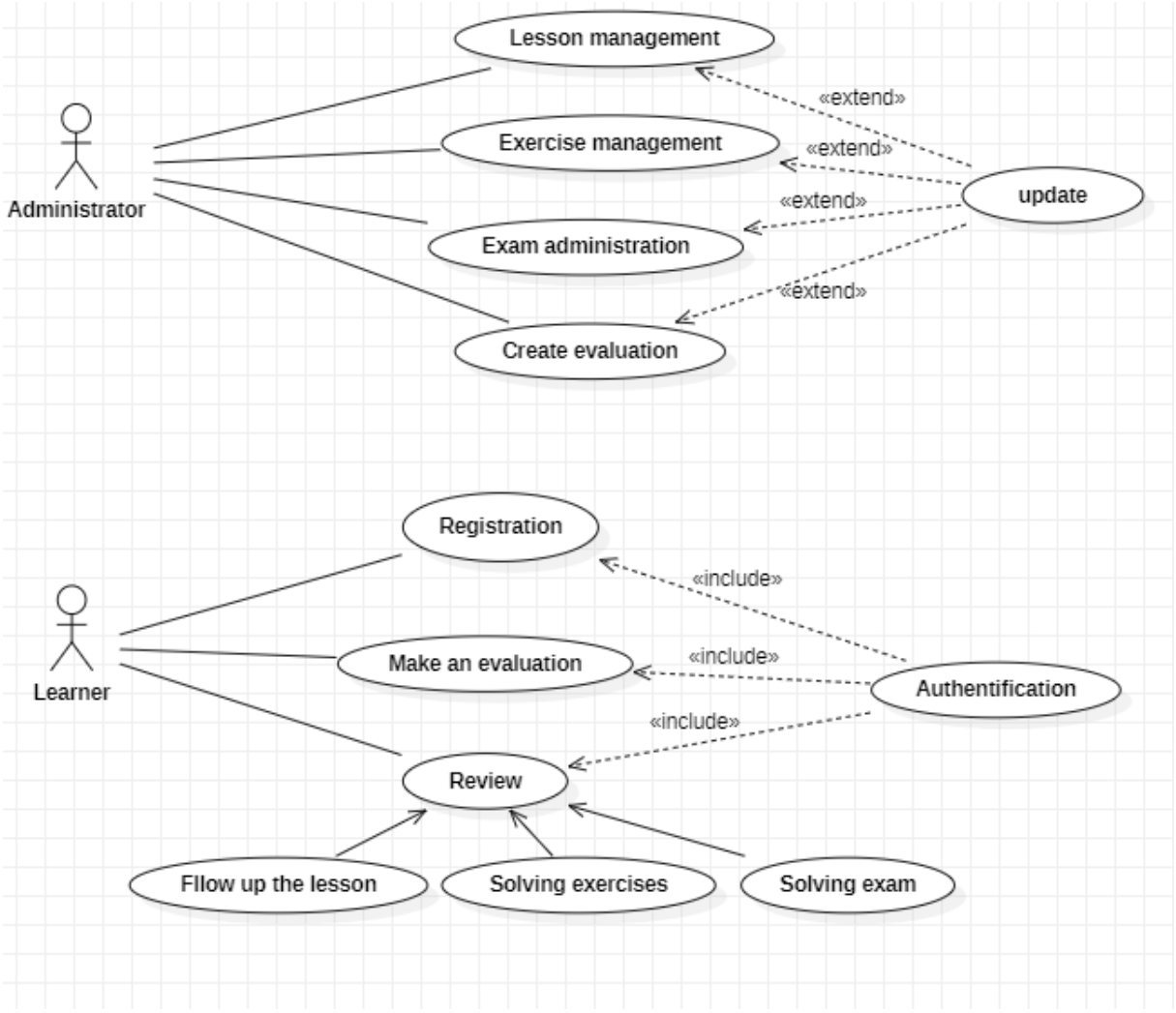

Figure 5 : Use case diagram

2.5.2. Class Diagram:

Here is the class diagram :

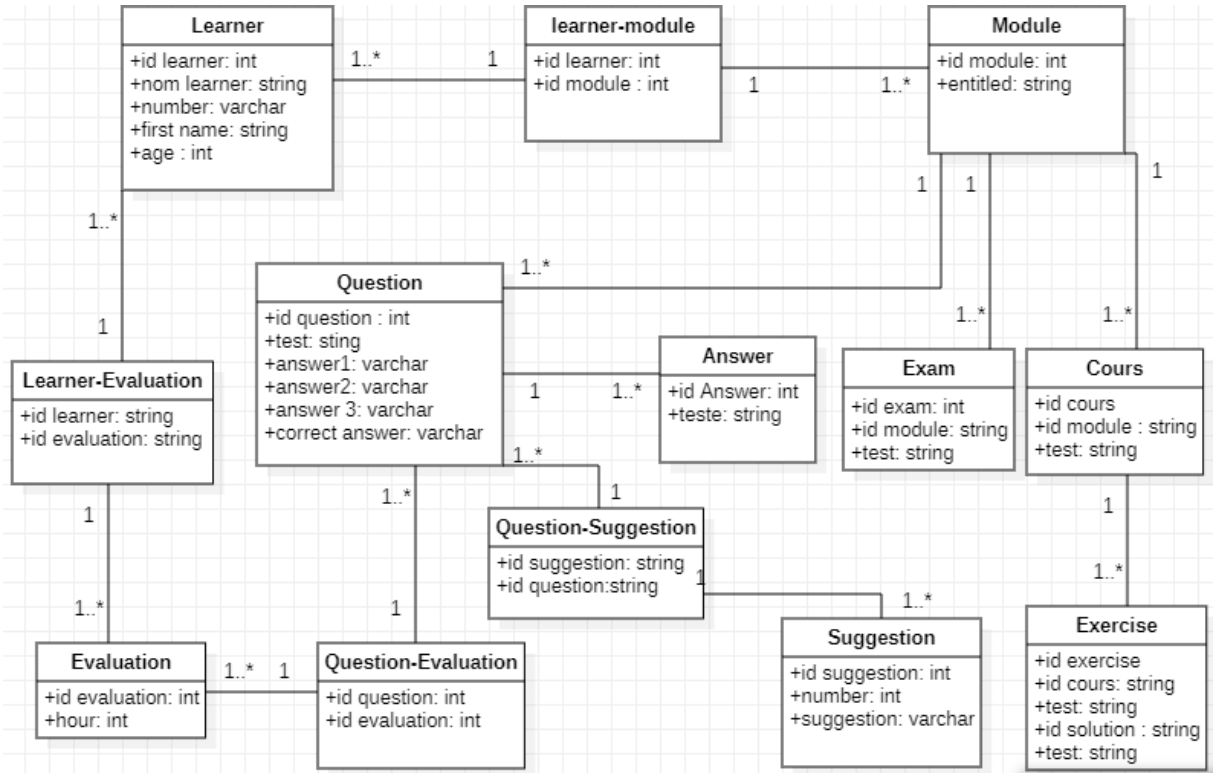

Figure 6 : Class diagram

2.5.3. Sequence Diagram:

- Authentication:

  Here is the sequence diagram of Authentication :

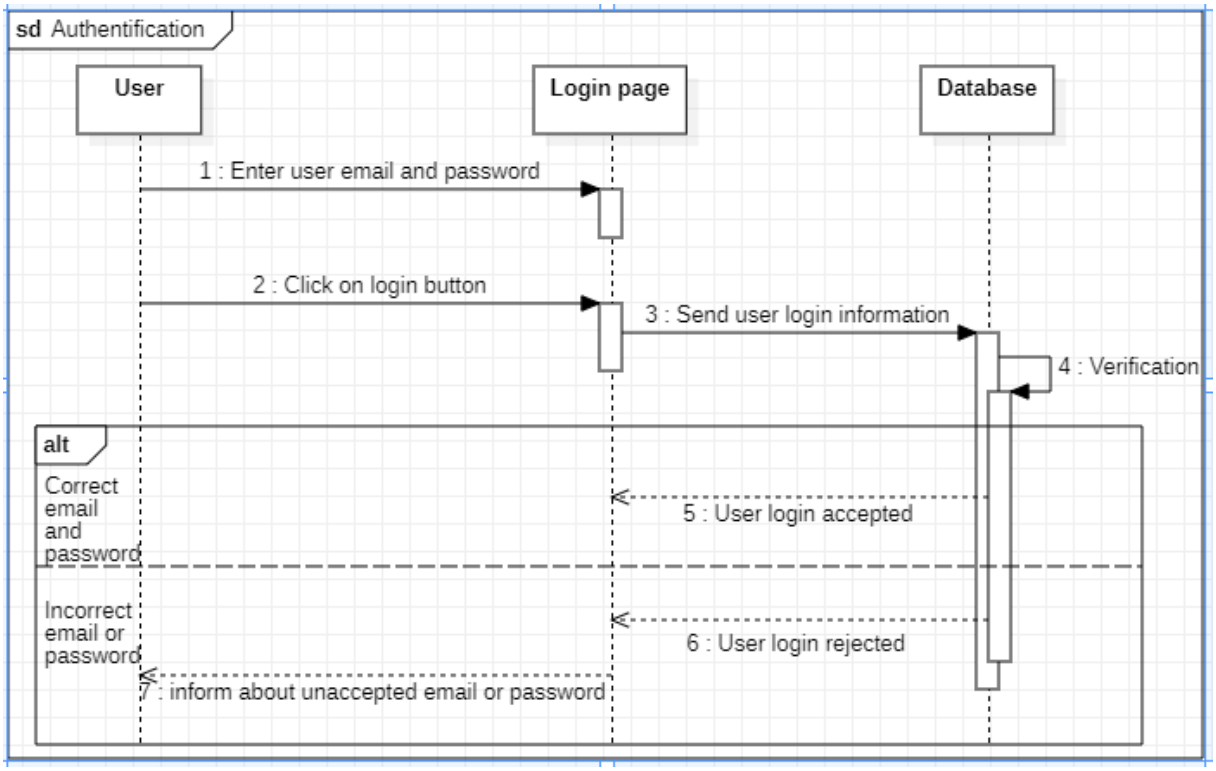

Figure 7 : Diagram of Authentication .

- Registration :

  Here is the sequence diagram of Registration :

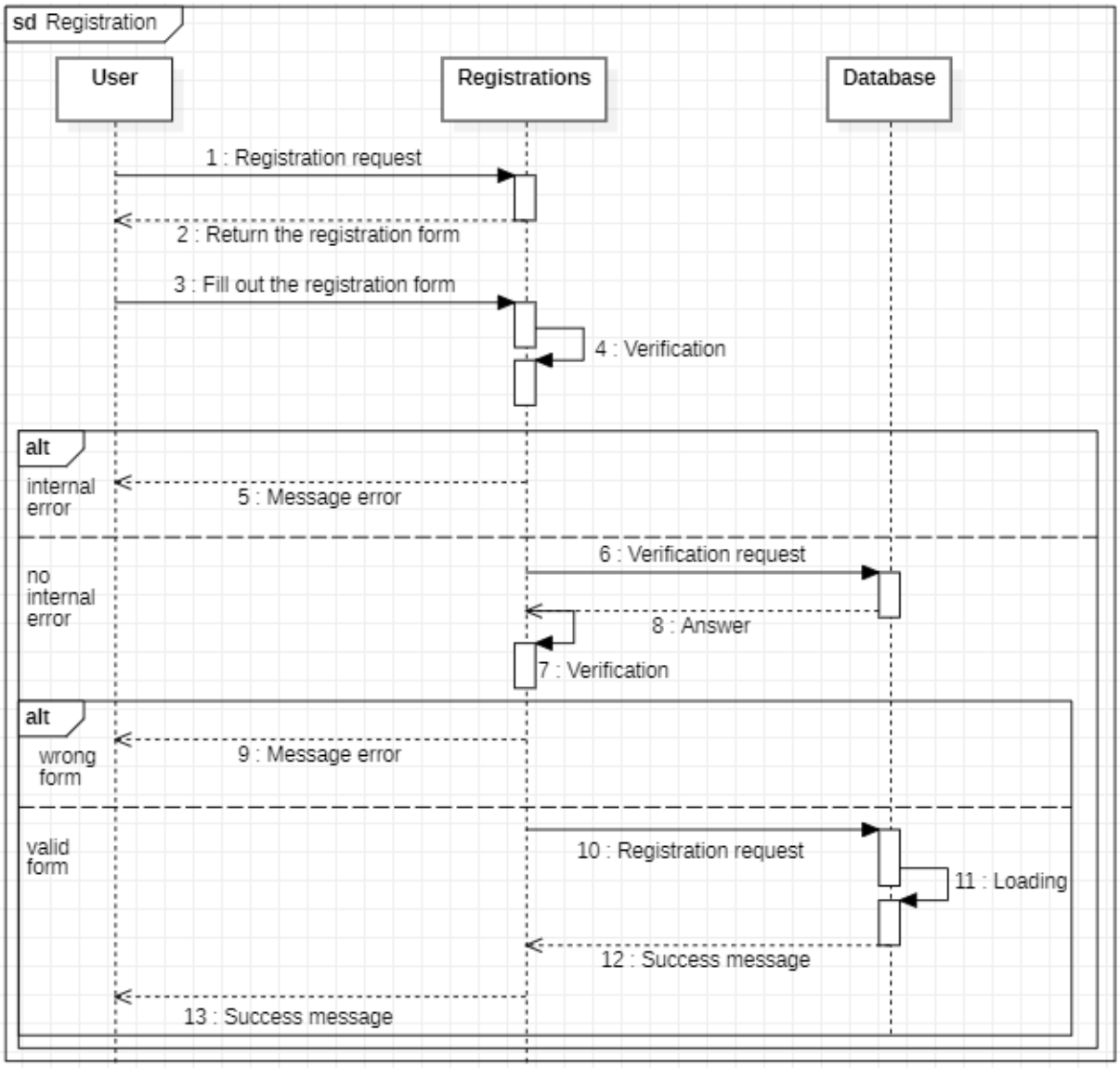

Figure 8 : **The sequence diagram of registration.**

- Lesson management :

Here is the sequence diagram of Lesson management :

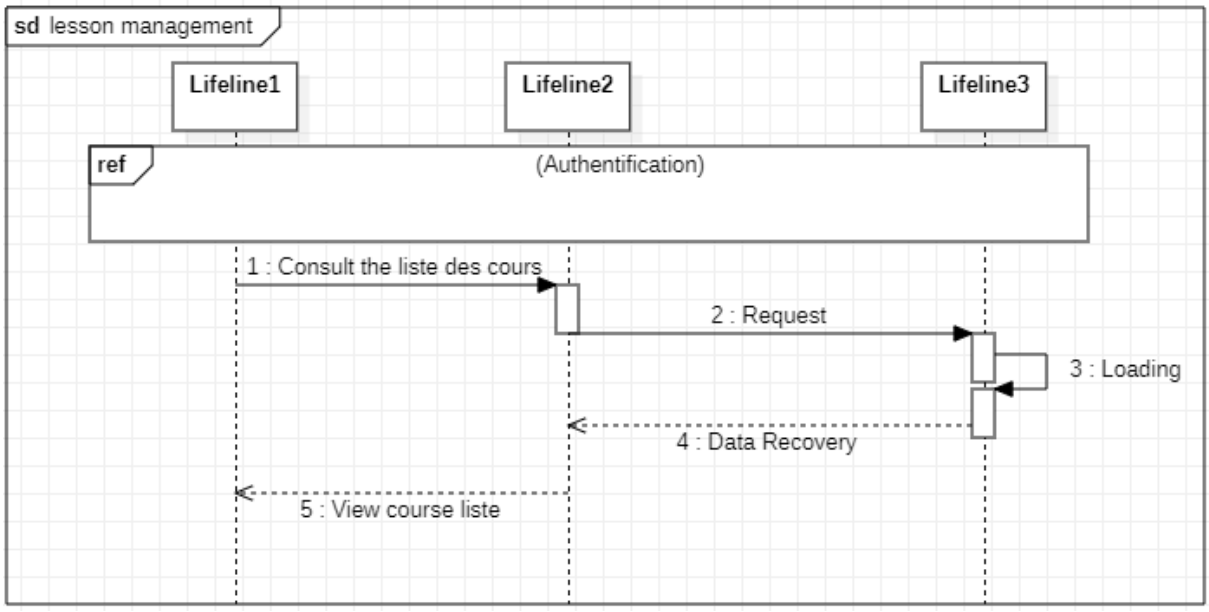

Figure9 : The sequence diagram of lesson managment .

3. Conclusion:

In this chapter, we have seen the tools used for developpement , and to create our application, and defferent diagram .

Chapter 3 : Implementation

1.Introduction :

The final section of this thesis, which tries to reveal the implementation phase, is addressed in this chapter after we have elaborated the concept of our application.

In this chapter, we will explain the development environment we used, the tools we need to make the application we used, and some samples from our application interfaces.

2.Development tools :

2.1 The development machine :

The following attributes of the microcomputer used to create the program are:

- Operating System: Windows10 Home Edition.
- Processor: Intel(R) Celeron(R) CPU 847 at 1.10 GHz.
- Memory (RAM):4.00 GB.
- System type: 64bit operating system.

2.2 The tools :

Here, we share some of the software that was used to create our mobile app:

2.2.1 Kodular :

Kodular is a cloud-based software development tool that allows developers to create mobile applications. It provides an integrated environment to build native Android applications, based on visual programming blocks (Visual Programming Blocks).

Without any prior programming experience, developers may construct intuitive,personalized, and dynamic apps using preconfigured blocks.

Kodular offers a variety of features, including as pre-defined design templates, simple programming blocks, themes, APIs, and more, to assist developers in swiftly producing applications of a high level of quality.

2.2.1.1 the users of Kodular software :

A team of independent developers created the Android and iOS application building tool Kodular from an open source initiative. It enables users to easily construct mobile applications without the need for programming knowledge and is designed for amateurs and novices. Students, company owners, and entrepreneurs may all design mobile applications using Kodular that are of a high caliber.

2.2.1.2 the features of Kodular :

The features of kodular are :

1. Developing native Android apps using simple WYSIWYG blocks.
2. To design feature-rich apps, use both custom and pre-defined components.
3. Simple integration of in-house and external APIs.
4. Quick and limitless updates for programs that have been released.
5. Share apps with friends and quickly view updates by using the Kodular client.
6. Control user profiles, permissions, and remote builds.
7. To test and carry out optimizations, use the console.
8. To control how programs look, use the Oxygen theme editor.
9. Including extra peripherals and modules to process huge games.

2.2.1.3 Advantages of Kodular software:

- It is open source and free.
- Even if you have no prior computer experience, it is rather easy to understand and use.
- It is a cross-platform program that works with Android, iOS, and the Web.
- It offers a user-friendly environment for developing applications together with strong tools.
- Removes the need to learn how to construct applications using HTML, CSS, and JavaScript.[1]

2.2.2 Airtable :

Airtable is a SaaS solution that combines database and spreadsheets.Multiple team members can collaboratively store, share, and edit information using this no-code application.[18]

2.2.2.1 These are the primary characteristics that Airtable provides:

A.Data modeling:

Databases are safe, dependable to one another, adaptable, and responsive to many formulae. The tool also functions as a CRM.

B.Custom views :

Calendar, Kanban, Gantt charts, and other views that are most appropriate for the data collected are available for selection and sharing using the tool.

C .Automation scenarios:

The program enables the automation of many workflow activities (automatically generate reports, send emails, etc.). JavaScript allows you to create your own automation scenarios.

D. Integrations:

The tool may be connected to other web-based programs like Typeform, Salesforce, Slack, Miro, etc.

Airtable is available through your web browser and as an Android and iOS mobile application. For individuals or teams interested in learning more about the tool, the program provides a free edition with minimal functionality (up to 5 users).

2.2.4 Star Uml :

StarUML is a UML modeling software, released as open source by its publisher, at the end of its commercial exploitation, under a modified GNU GPL license. It will be possible to create diagrams of classes, components, objects, packages, structures, modules, activities, states, sequences, communications, interactions, time, etc. using StarUML, a publisher of a highly full chart for programmers to construct UML diagrams.[20]

2.2.4.1 These features include:

• Support for UML 2.x, including diagrams of the following types: Class, Object, Use Case, Component, Deployment, Composite Structure, Sequence, Communication, Status, Activity, and Profile;

• Its assistance in the development of data flow diagrams, flowcharts, and entity relationship diagrams (ERD).

• The capacity to produce code and do reverse engineering using popular programming languages including Java, C#, and C++.

3 Some interfaces of our application:

In this section, we will present the main pages of our mobile application.

3.1. Splach page:

Figure 1 0 : Splach.

- It represents our Splach page and after 3 seconds the registration page opens.

3.2. Registration page :

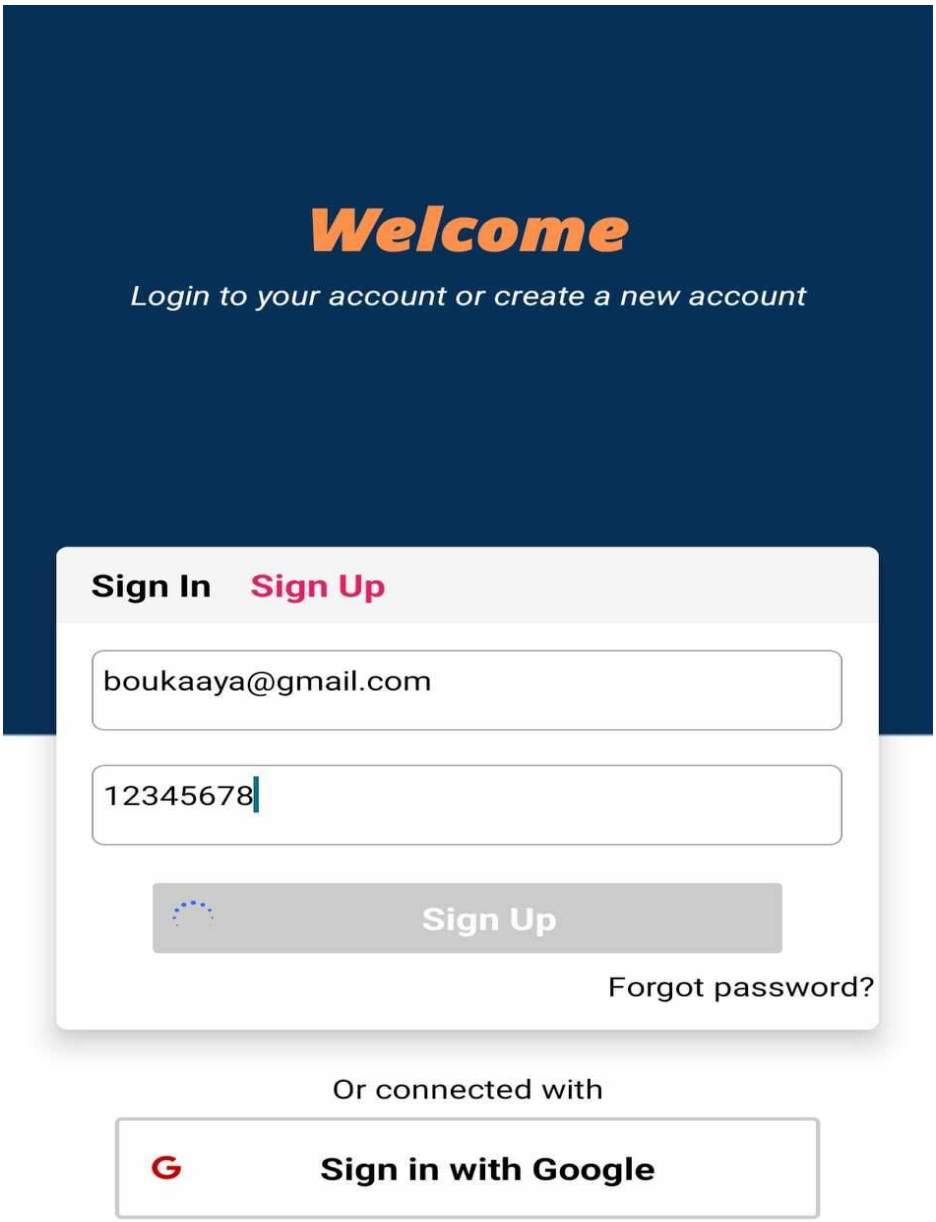

Figure 11: Registration page .

- Presents the registration page, which allows the learner to create an account on our application mobile, and they can register directly through google.

3.3. Forget password :

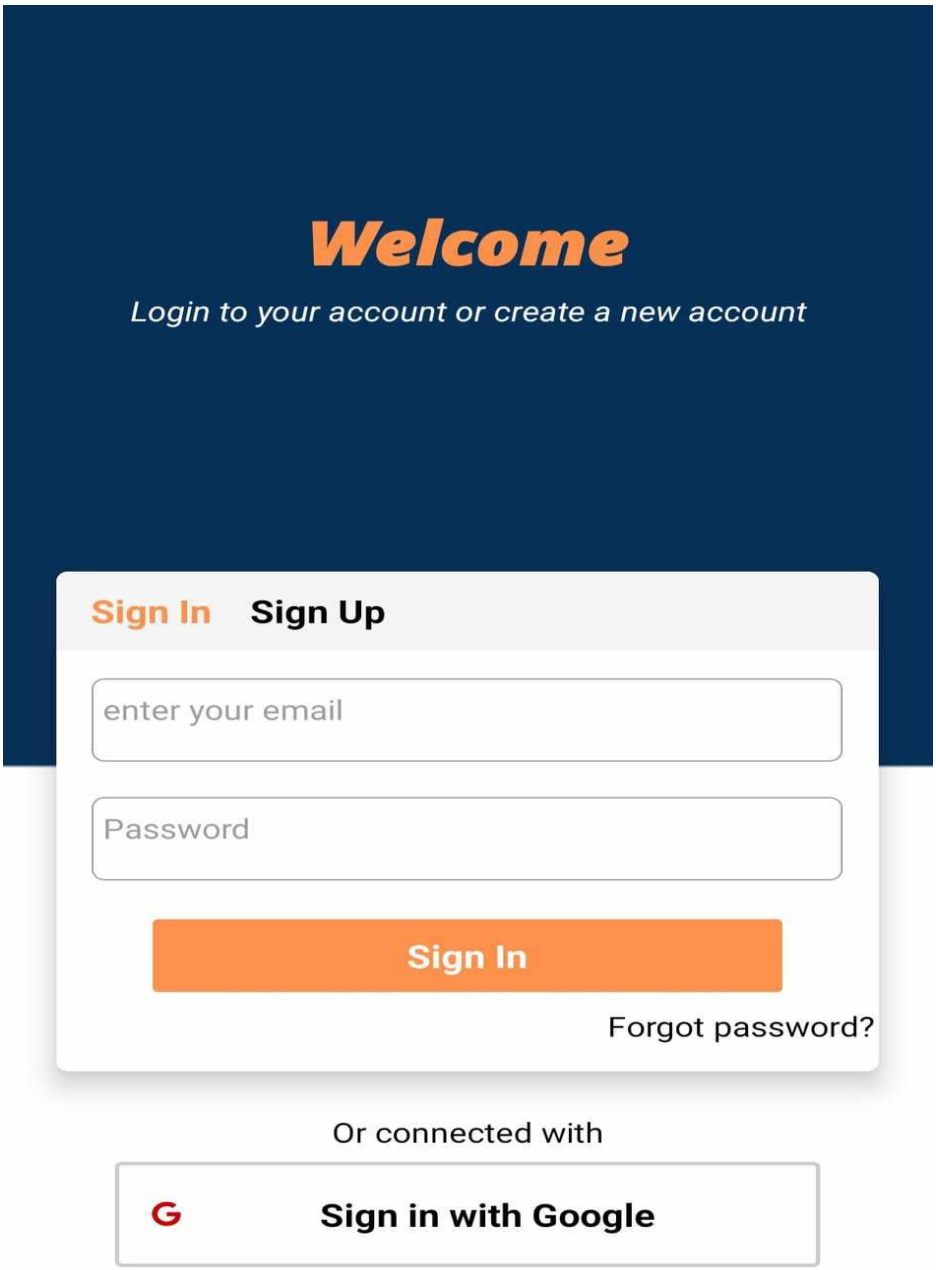

Figure 12 : Forget passeword

- In case you forget your password.

3.4. Home page :

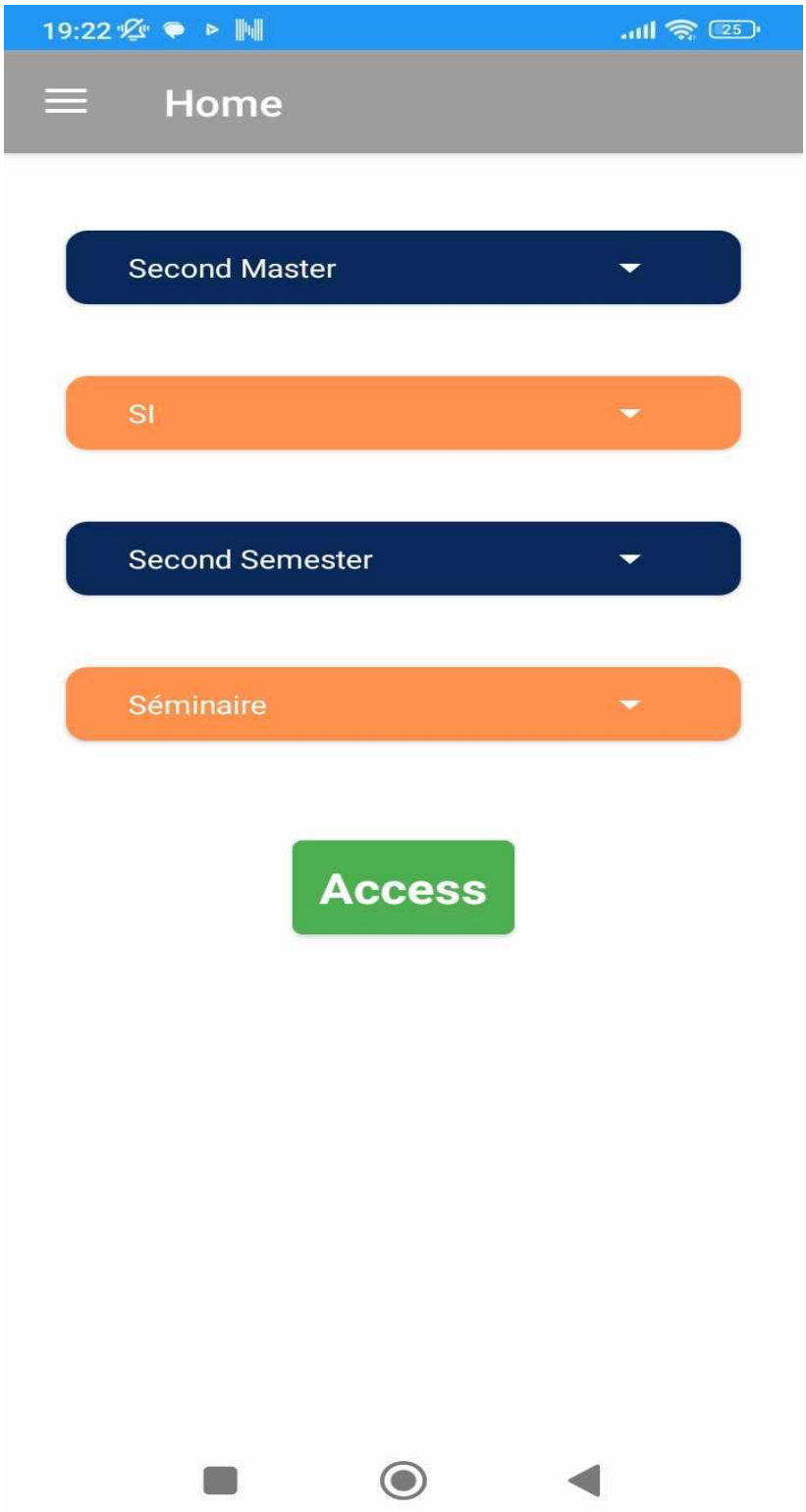

Figure13 : Home page.

- Presents the home page, this page displays the years specialization , semester, and module. After selecting, click on Access, and the module page will open.

3.5. Module page :

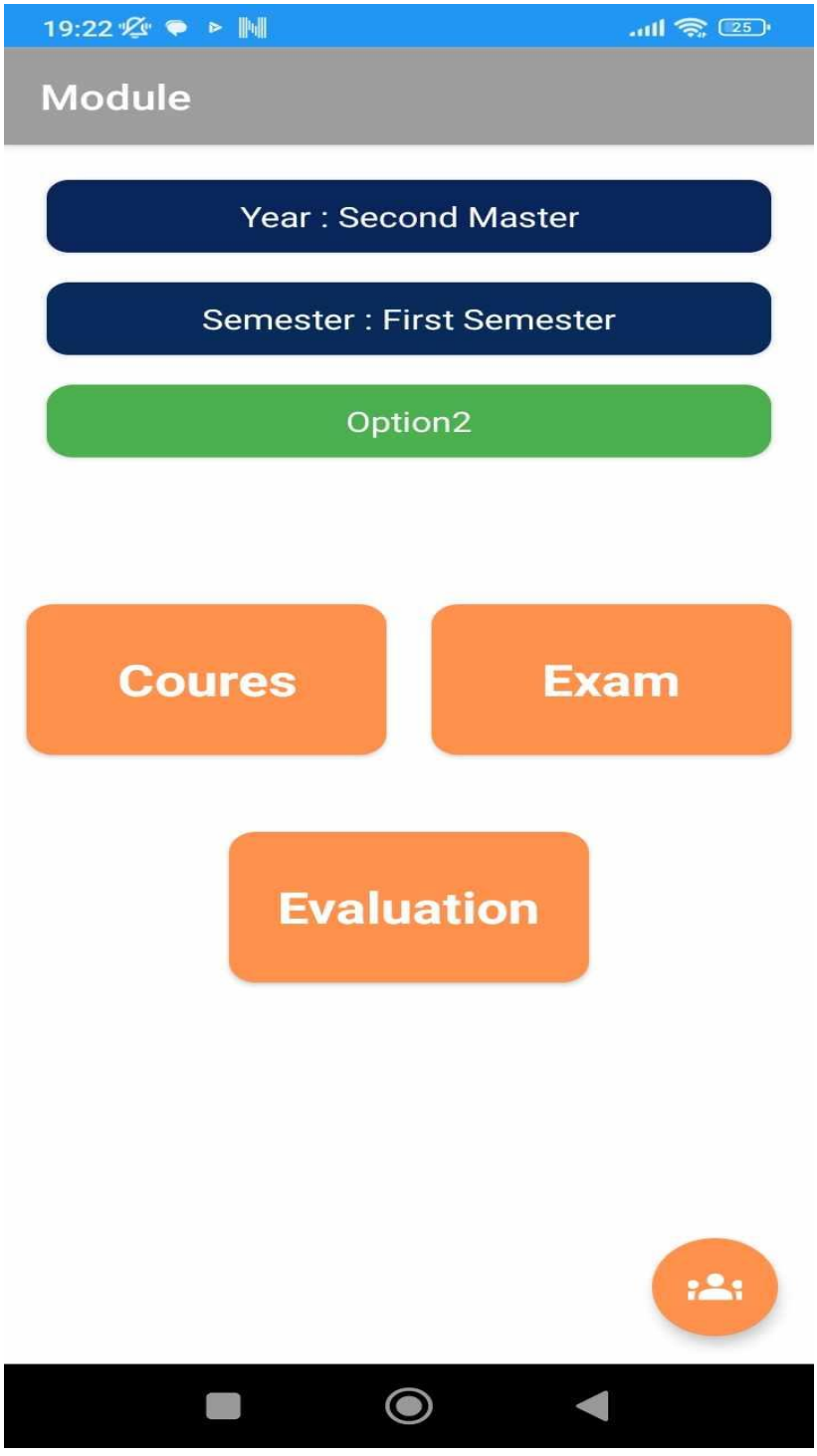

Figure14 : Module page .

- Presents the module page, and the learner can choose the study by clicking on courses or review through exams, and if they want to evaluate themselves, they must click on the evaluation.

3.6. Module courses page:

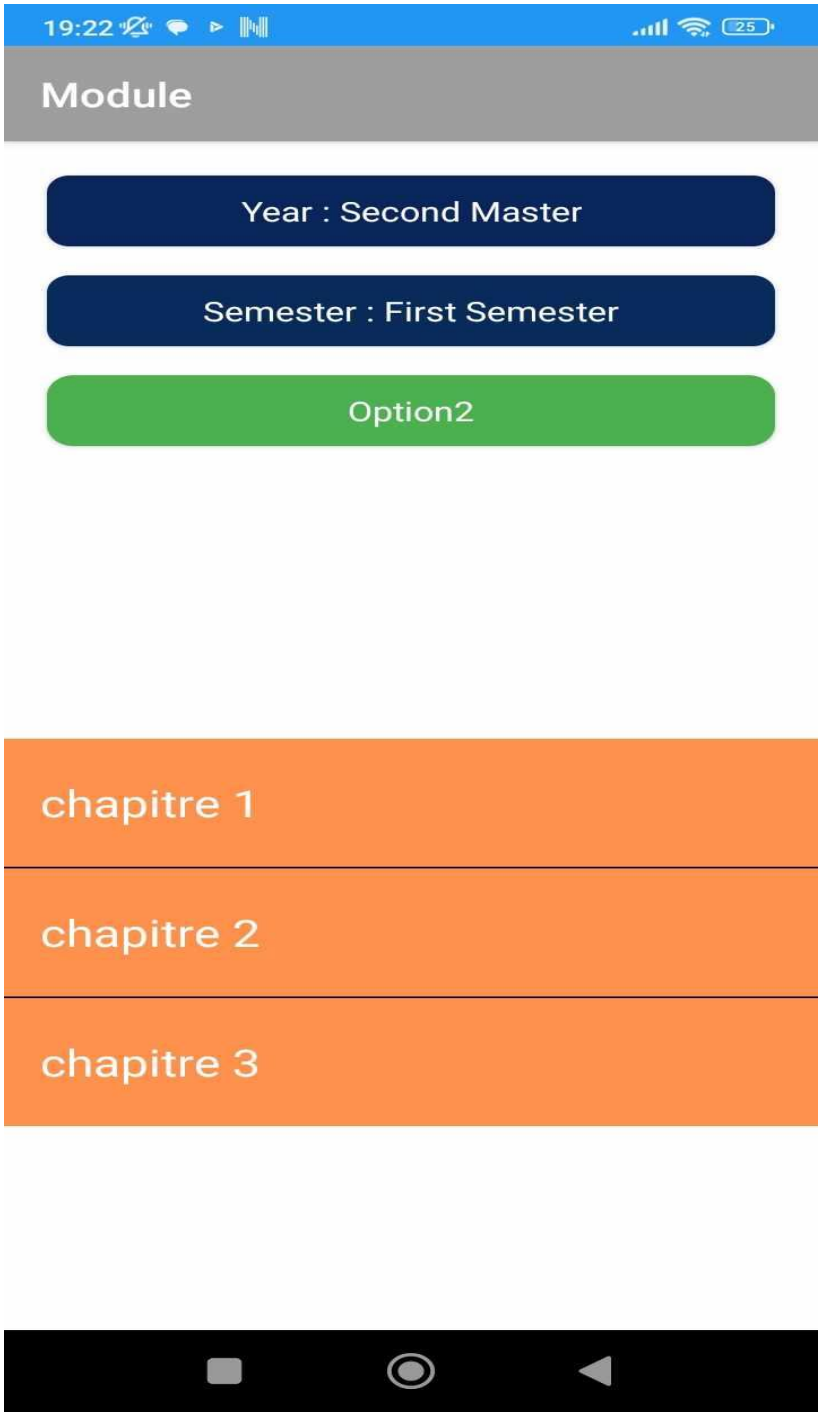

Figure 15 : The module courses .

- Presents the module courses page , after selecting the course,You will find all relevant chapters.

3.7. Course :

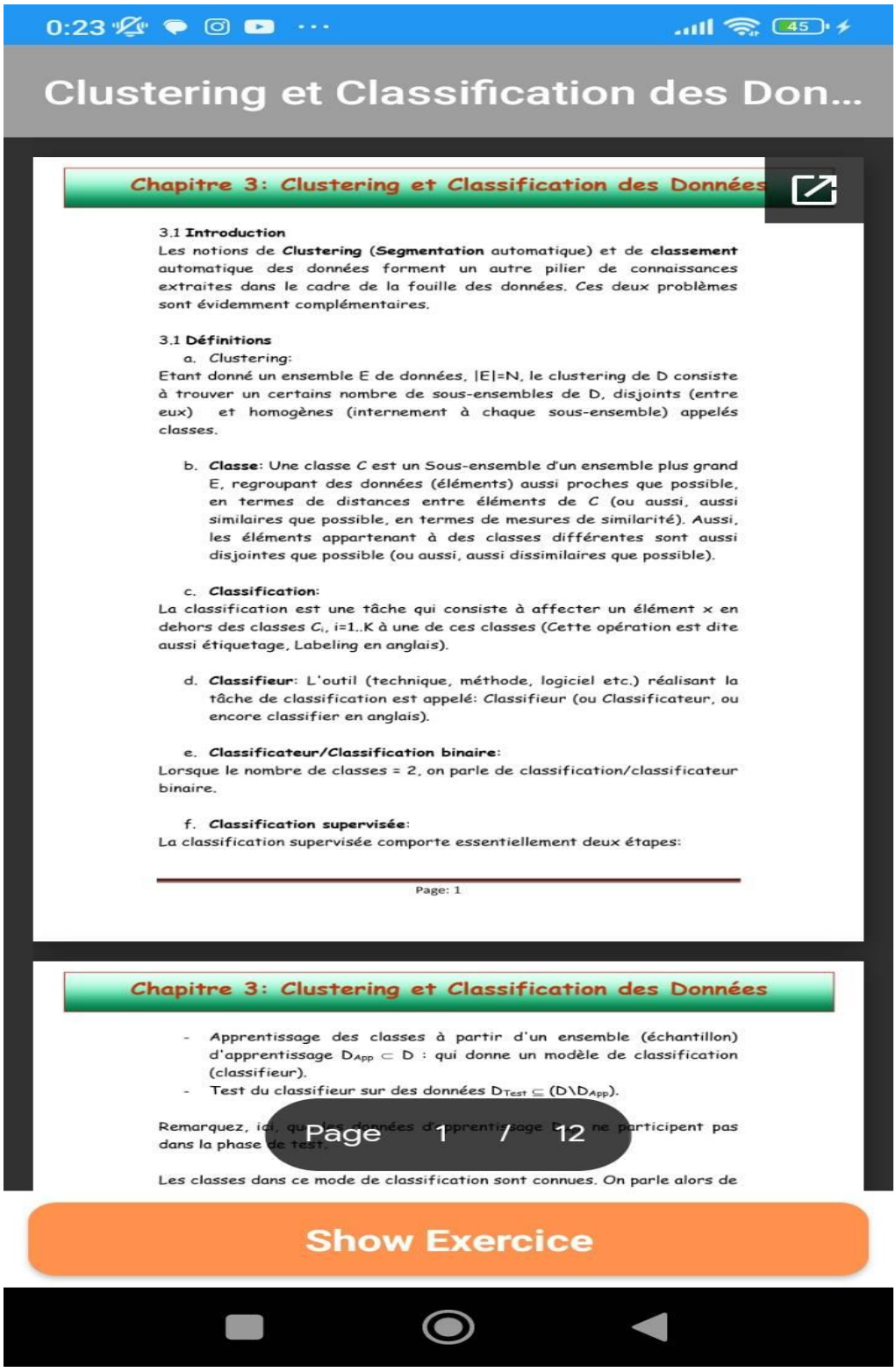

Figure 16 : The course .

- Presents the course in pdf. the learner also finds exercises specific to the course with the solution and can refer to the course if he wants to.

3.8. Exercise :

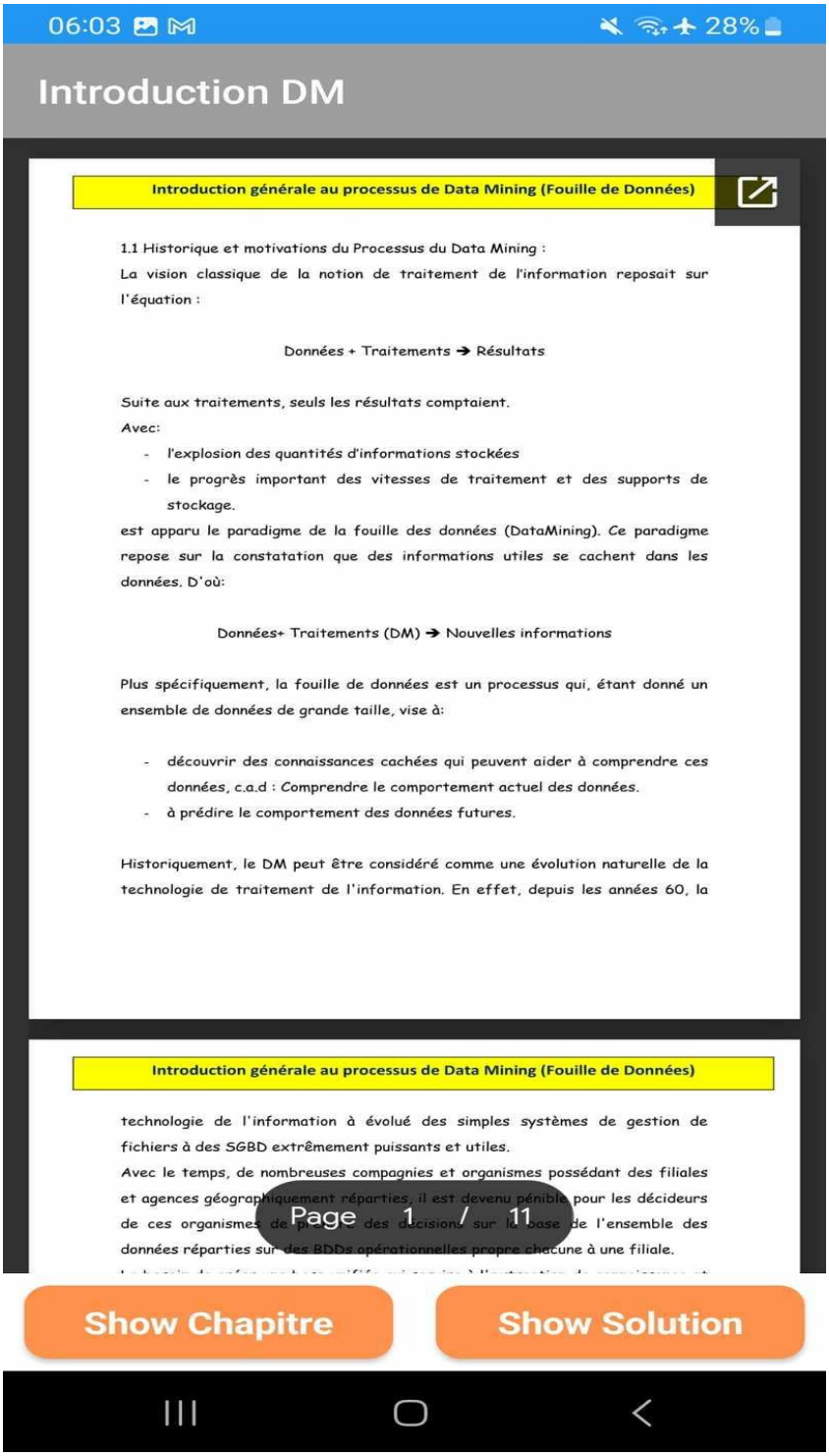

Figure 17 :The exercise.

- Presents the exercise.

3.9 Solution the exercise :

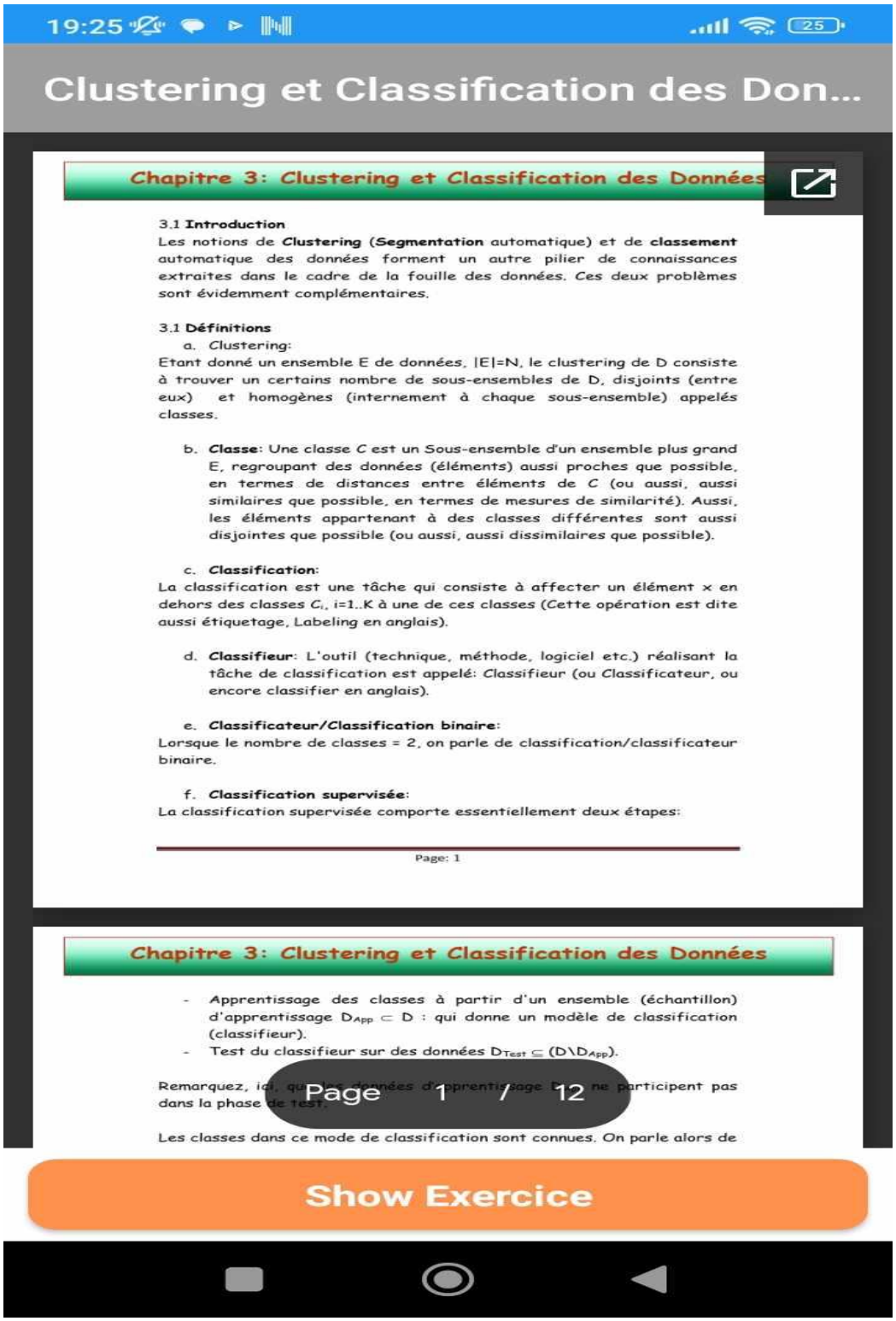

Figure 18 : The solution of exercice .

- Presents the Solution of the exercise.

3.10. Module exam page :

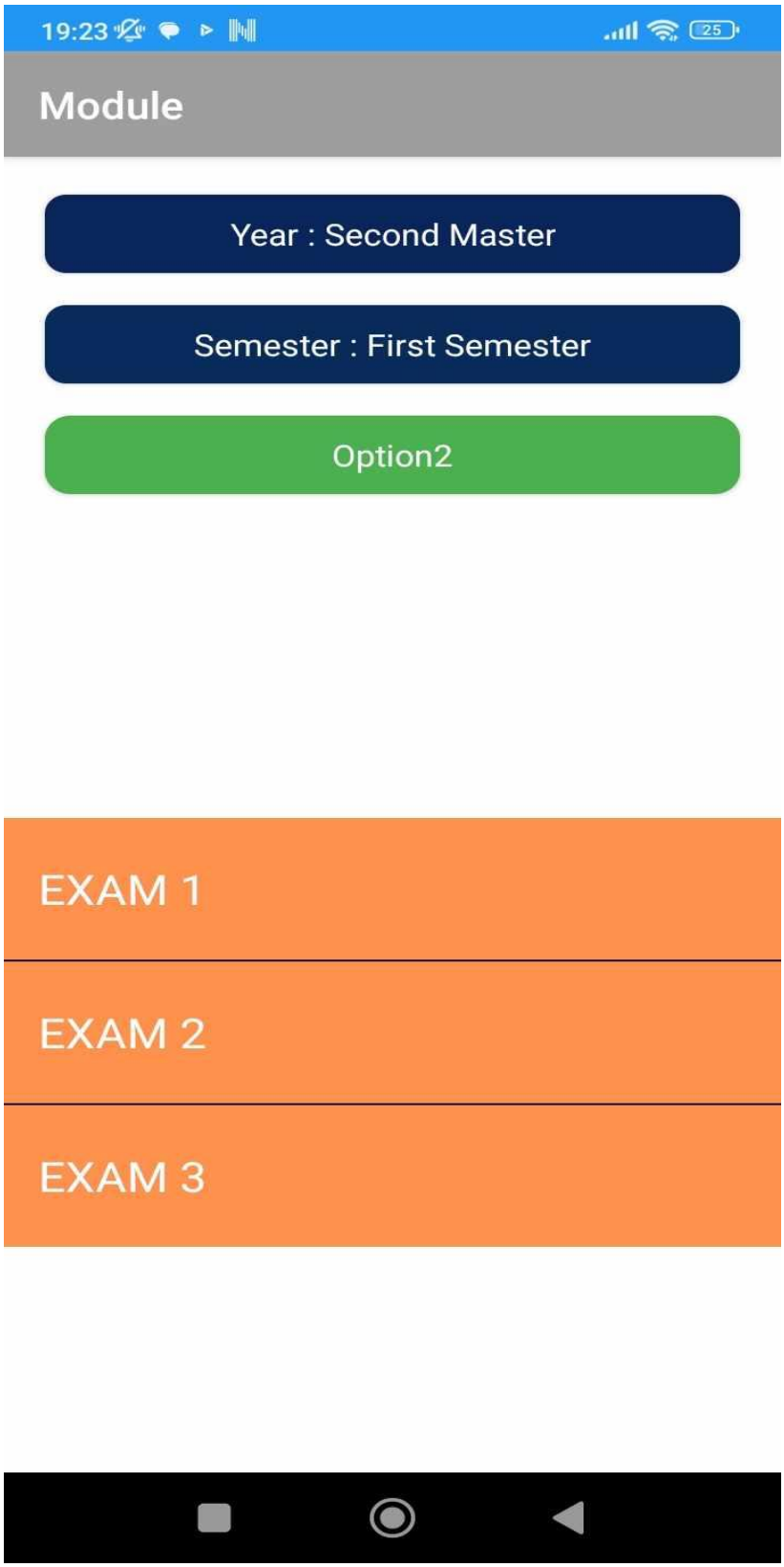

Figure19 : Module exam page .

- Presents the module exam page.

3.11. Exam :

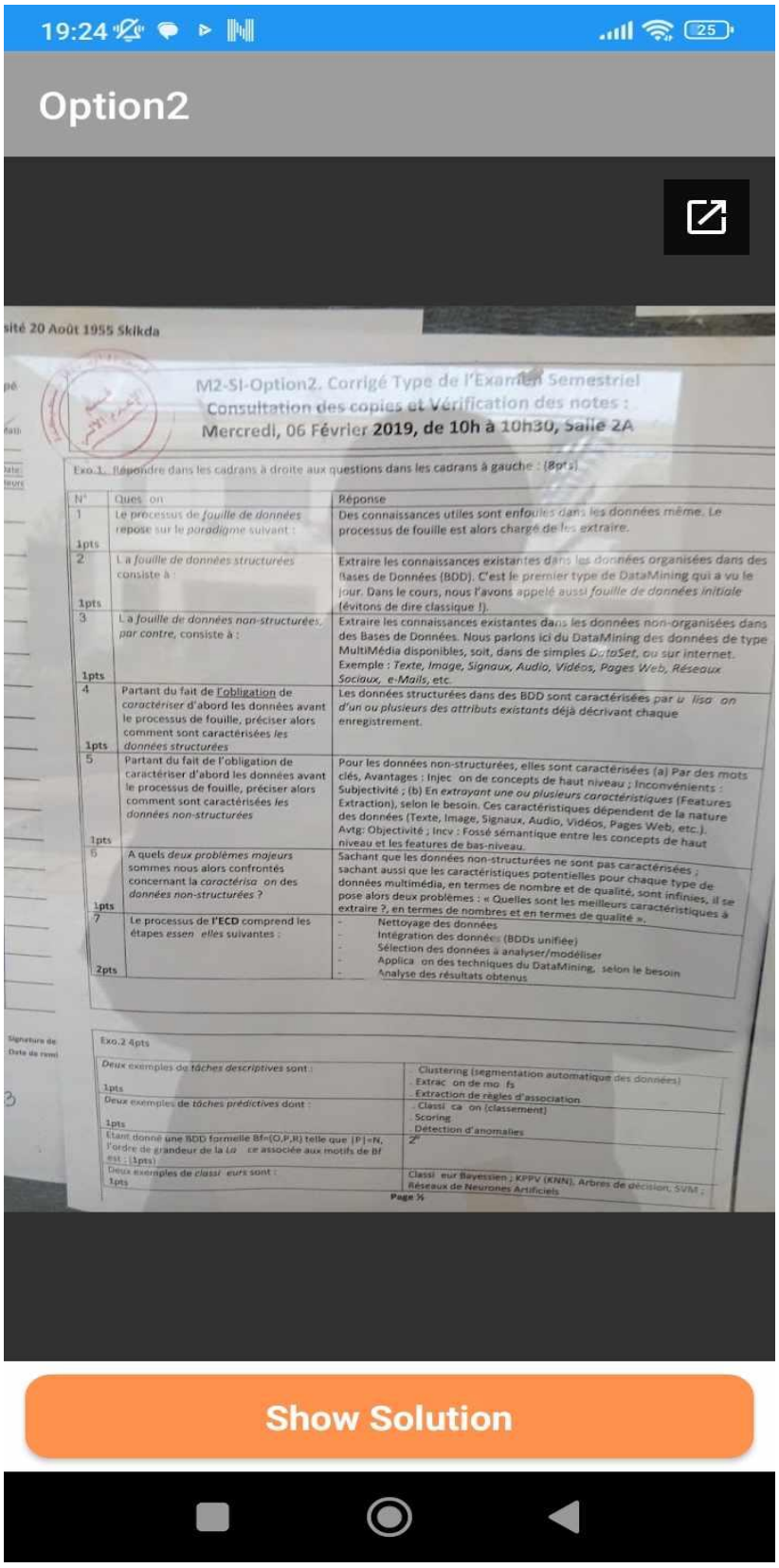

Figure20 : The exam .

- Presents the exam.

3.12 Solution the exam :

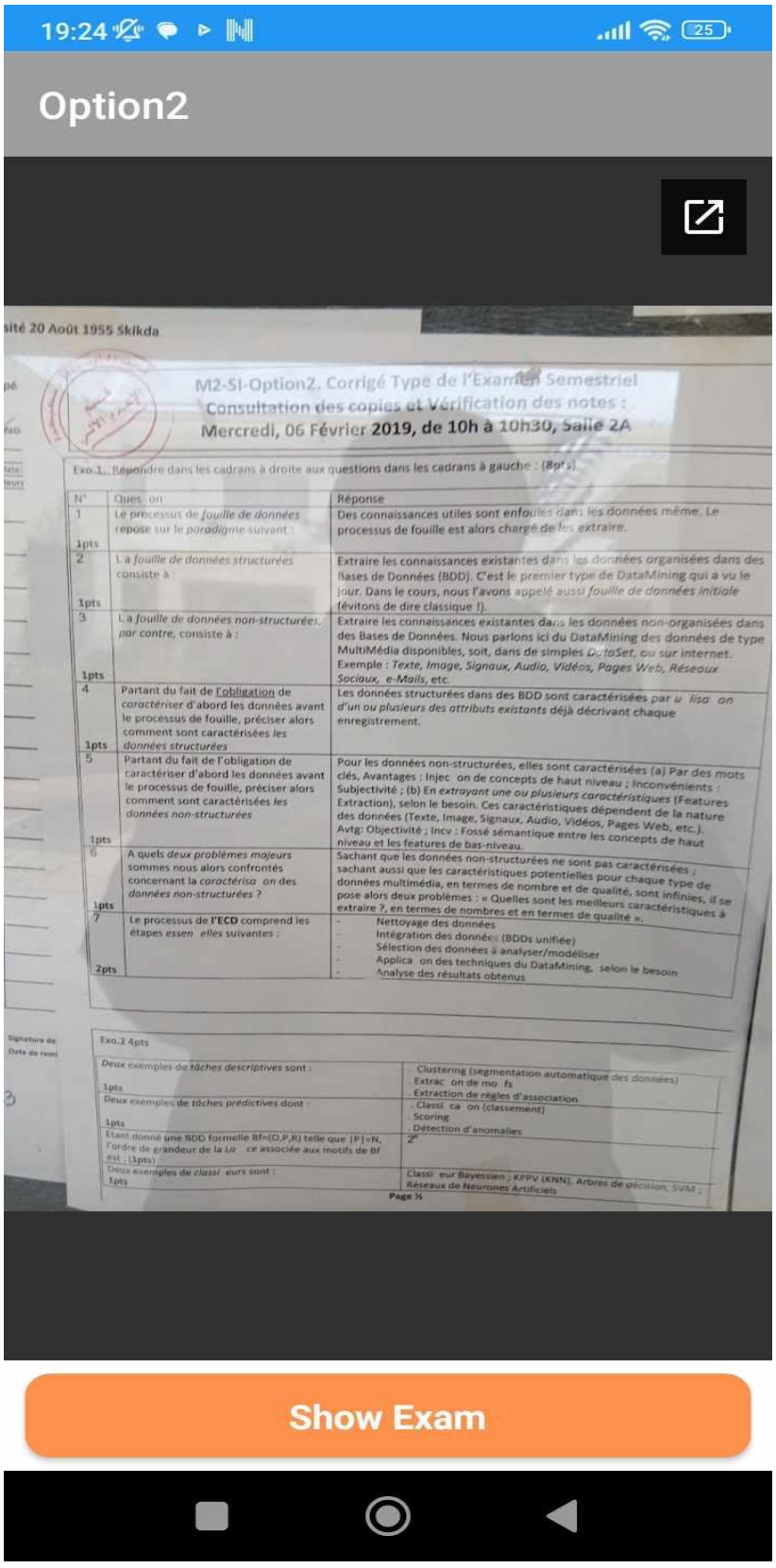

Figure 21:**Soltion of the exam .**

- Presents the solution exam.

3.13. Module evaluation page :

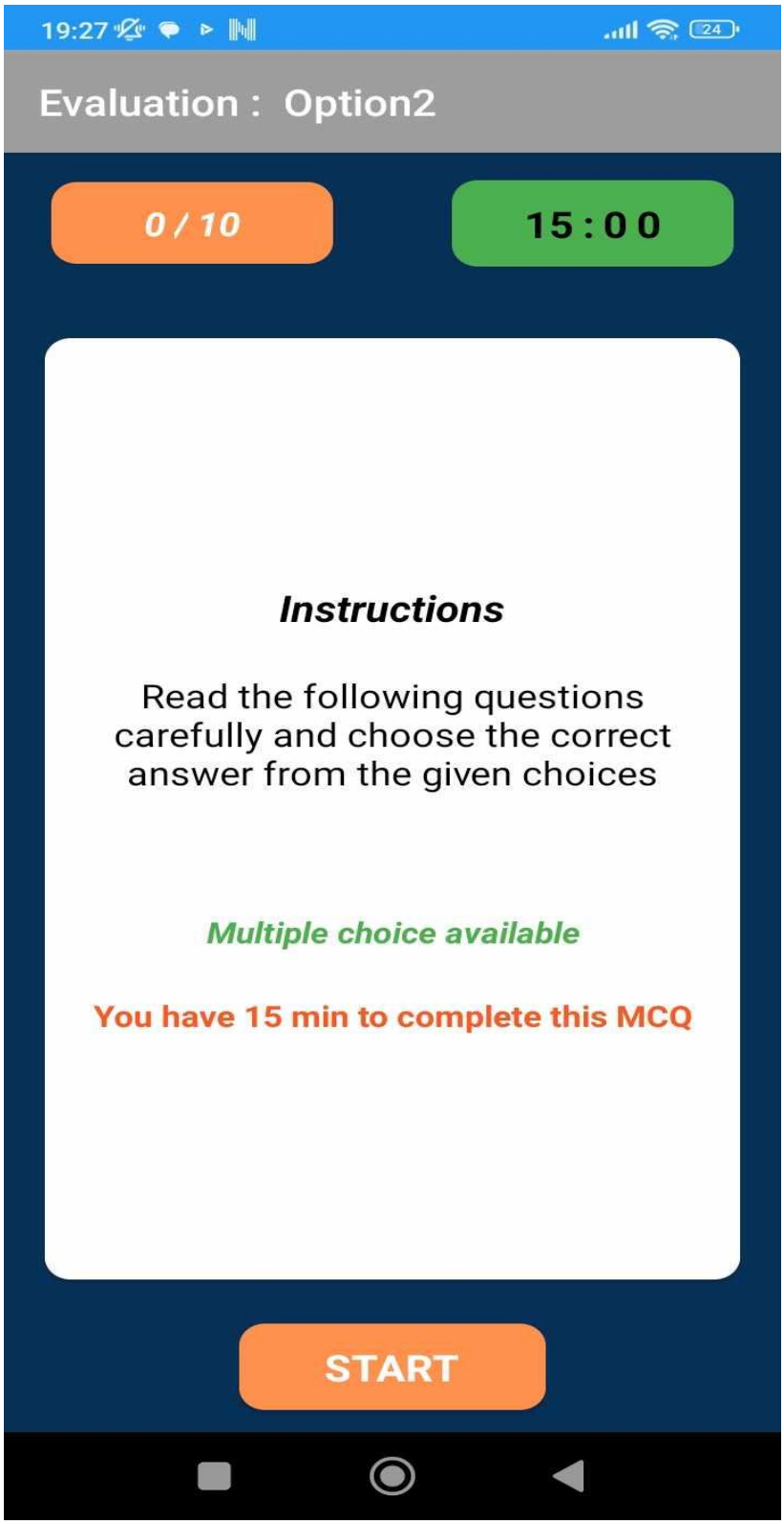

Figure 22 : The module evaluation page .

- Presents the module evaluation page, After selecting the evaluation, this page will appear to him and he will have to click start for the self-evaluation.

3.14. Evaluation start page:

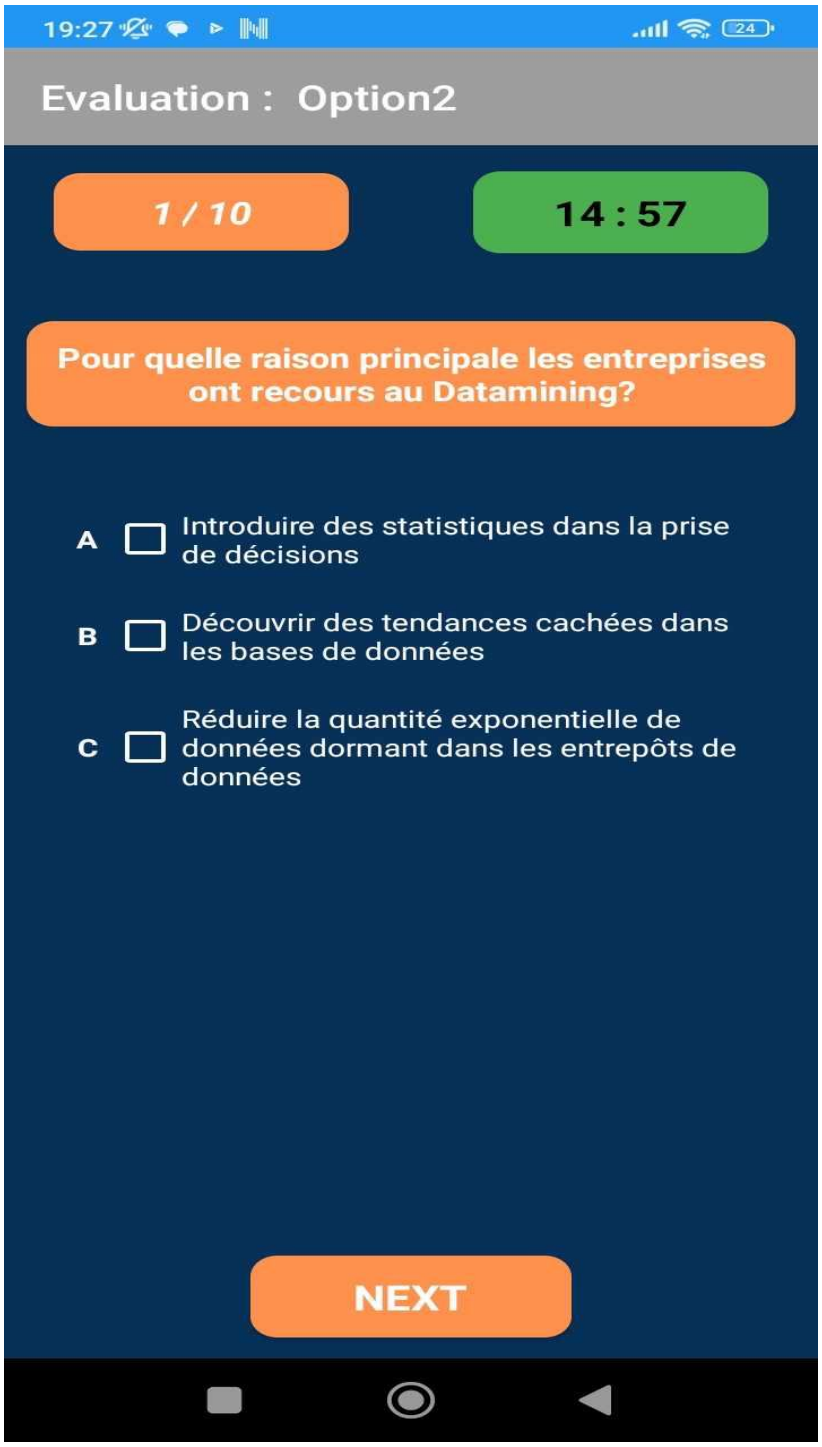

Figure 23: The evaluation start page .

- Presents the evaluation start page, After clicking on the start of the evaluation , we find a set of questions associated with this module, once inserted, the countdown begins, after completing the answer to each question, proceeds to another question by pressing the next button.

3.15. Evaluation solution page:

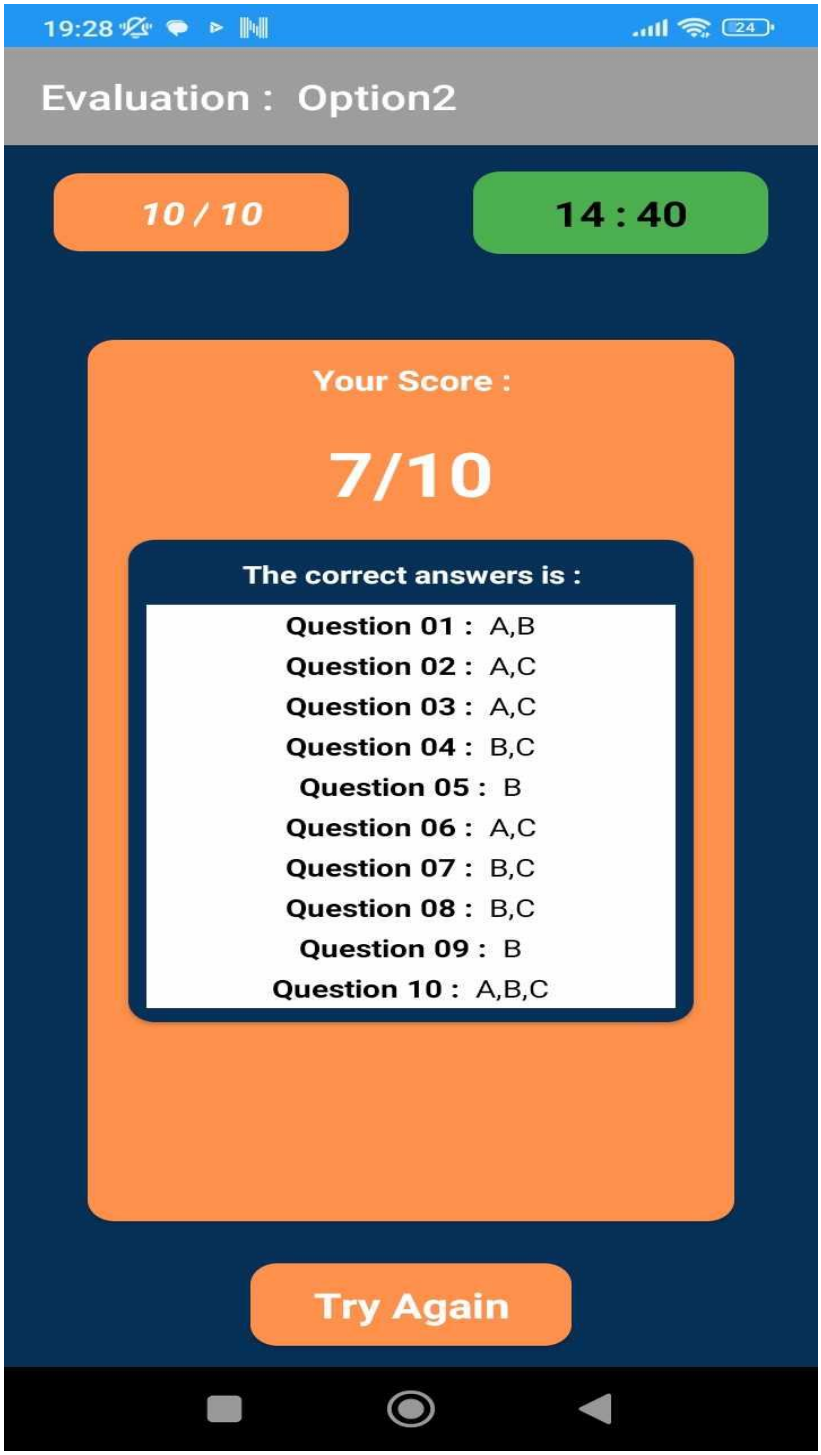

Figure24 :The evaluation solution page .

- Presents the evaluation solution page, After completion of the evaluation, the correct answers are presented and the results of his answers to the questions will also be shown and he can reassess by clicking on try again.

3.16 Video conference :

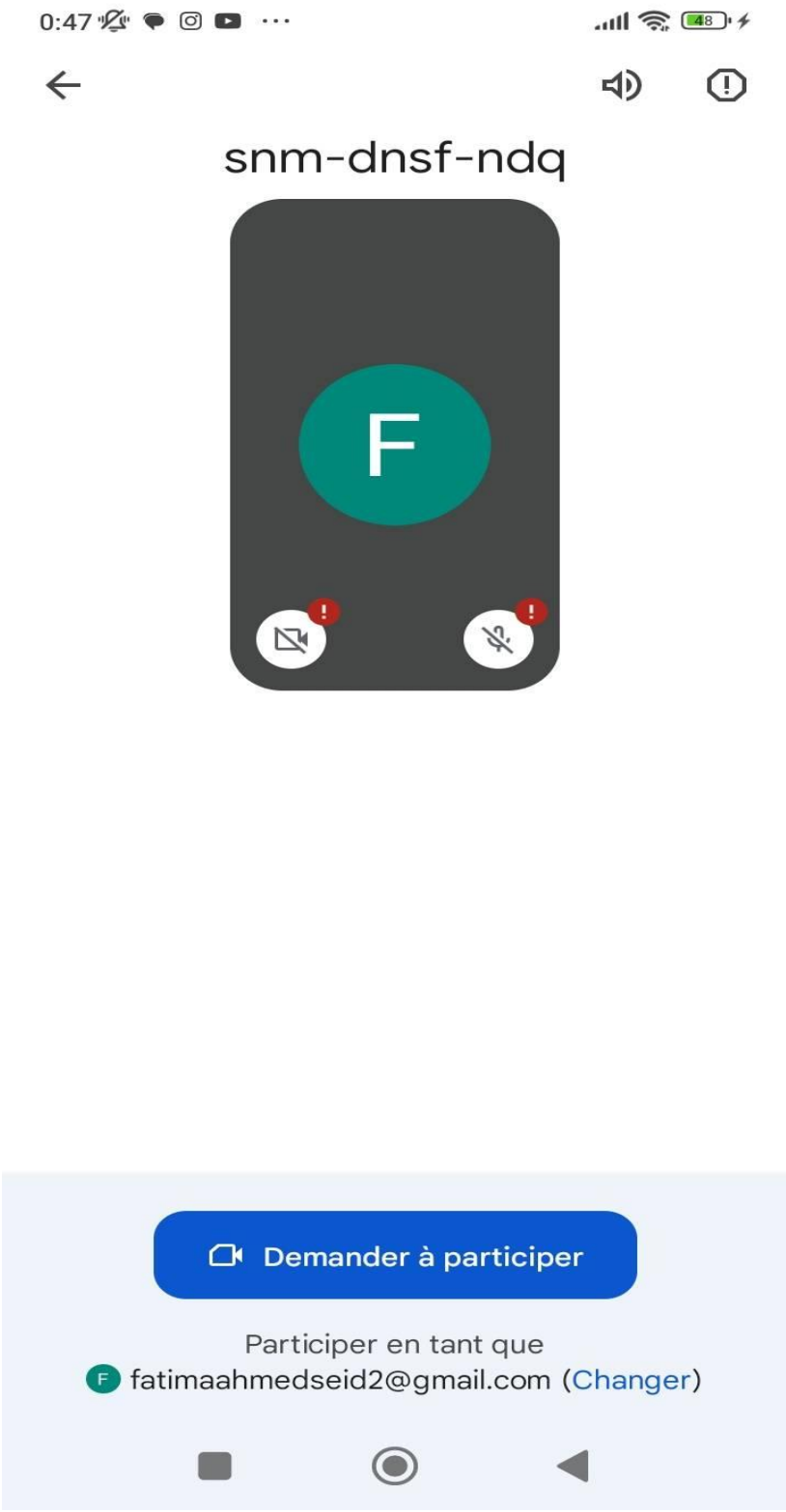

Figure25: Video conferance .

- If he wants to enter a video conference.

3.17. The navigation menu:

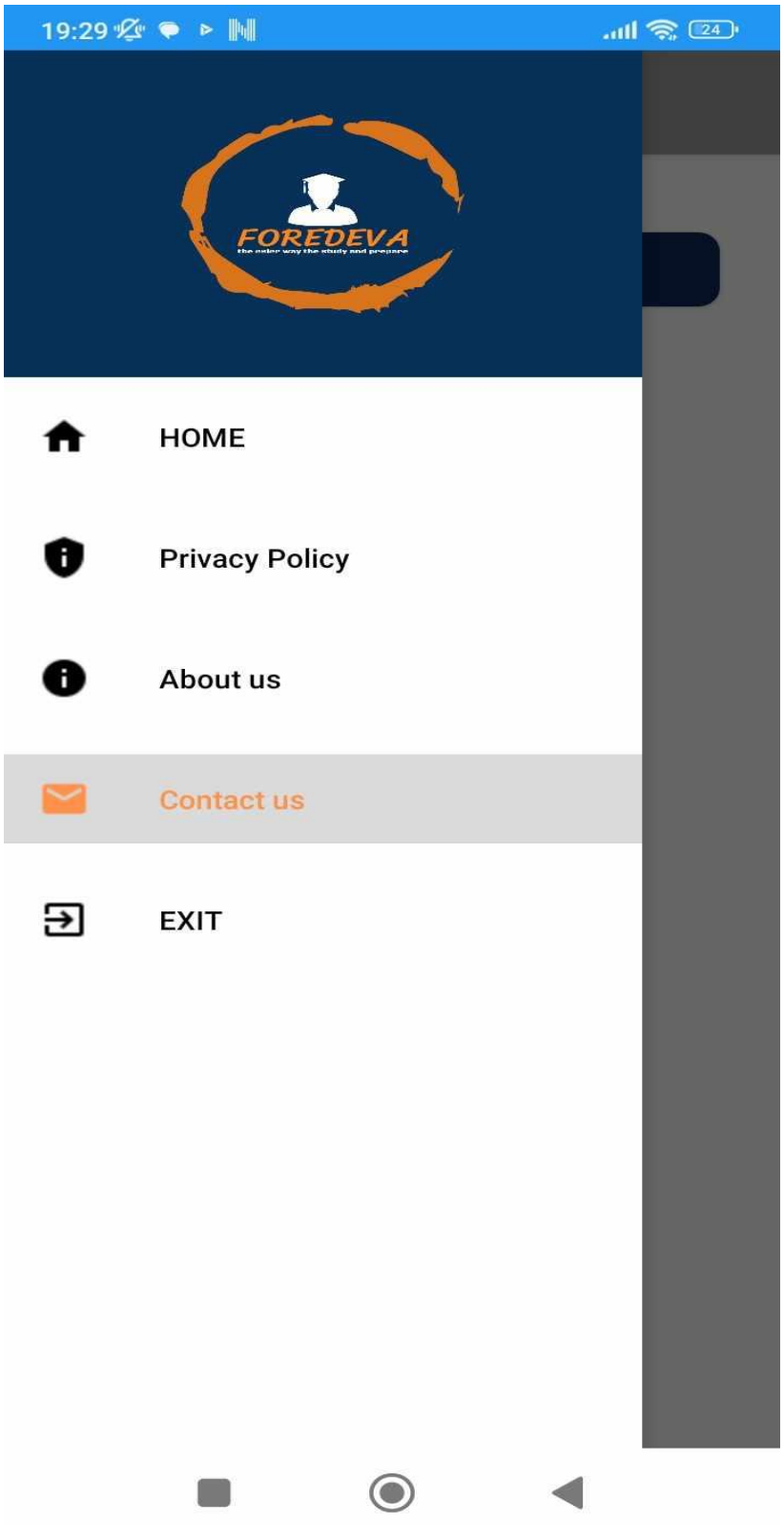

Figure 26:**The navigation menu**

- Presents the navigation menu.

3.18. Privacy policy page:

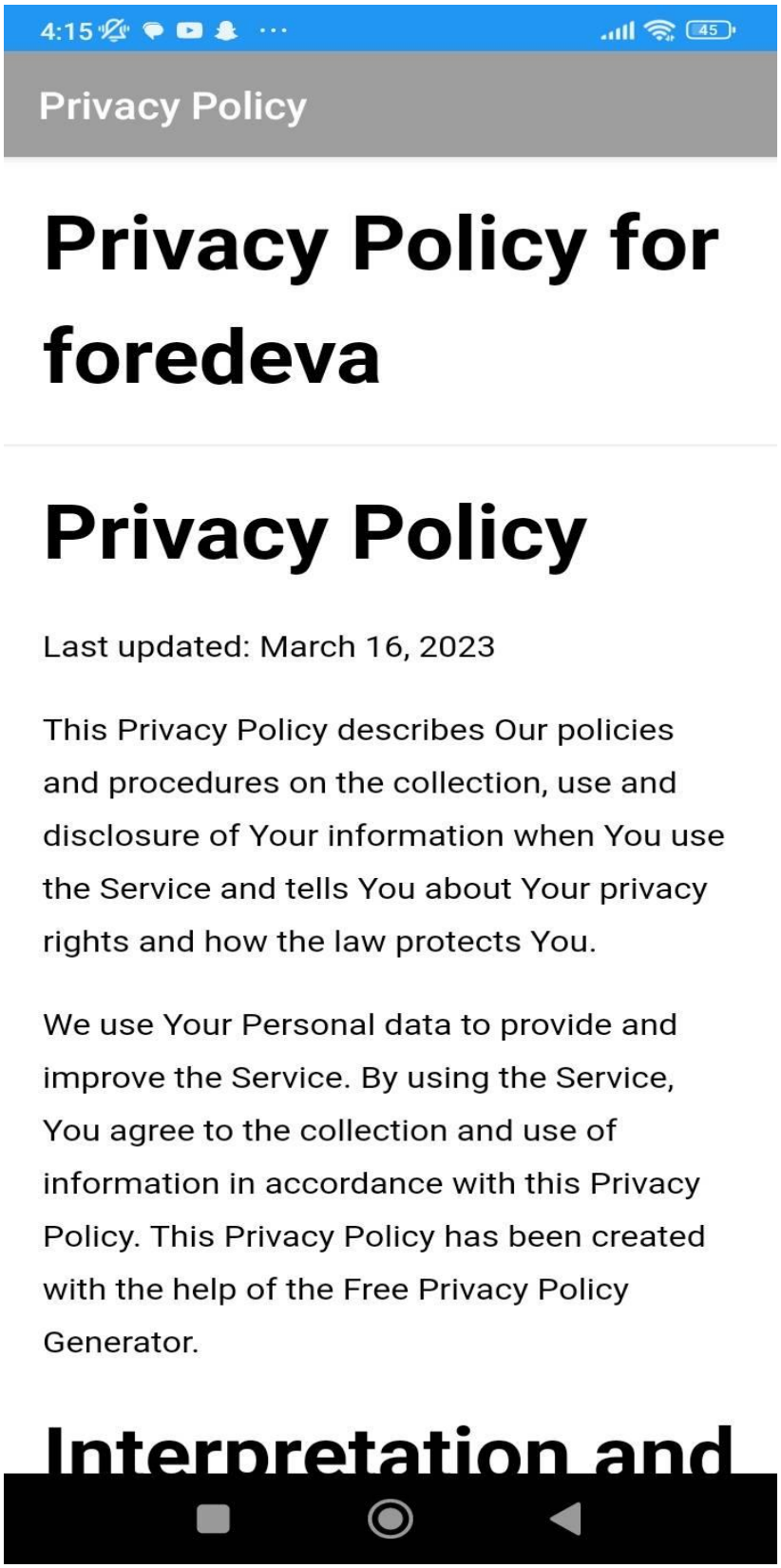

Figure 27 :The privacy policy page .

- Presents the privacy policy page.

3.19. About us page:

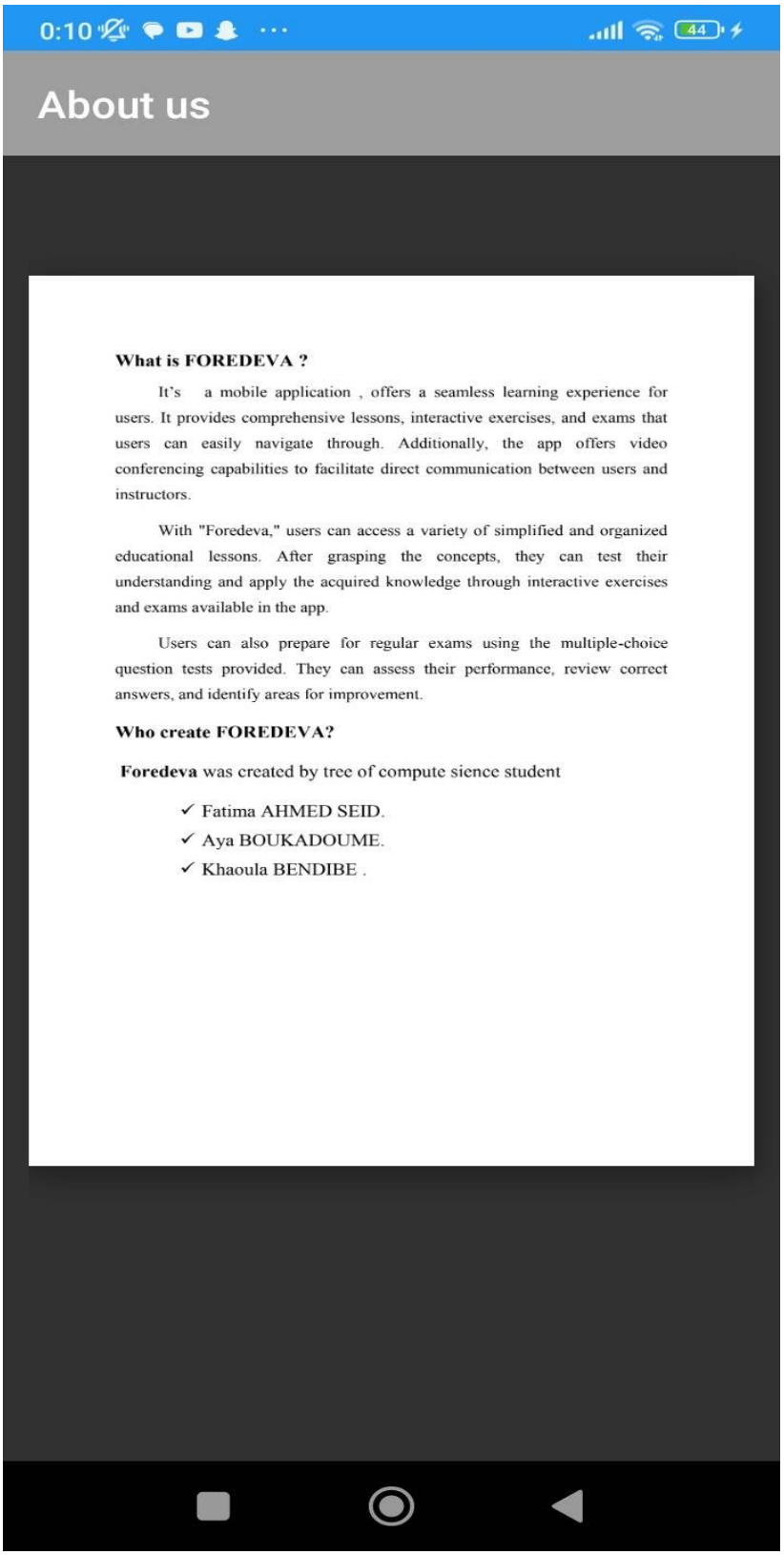

Figure 28 : About us page .

- Presents the about us page.

3.20. Contact us page:

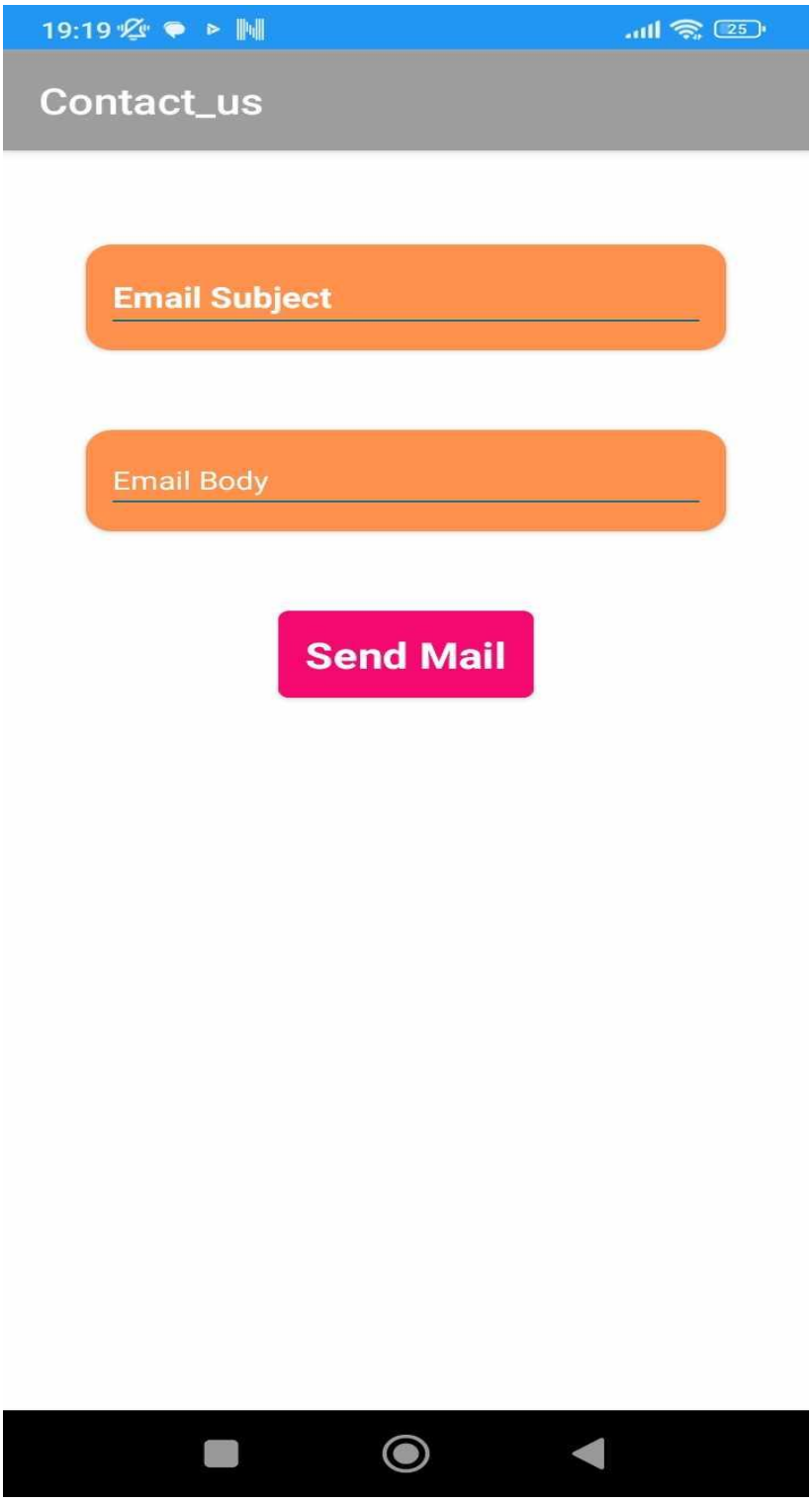

Figure 29:Contact us page .

- Presents the contact us page, This allows the learner to contact us in case of a problem.

3.21. Exit:

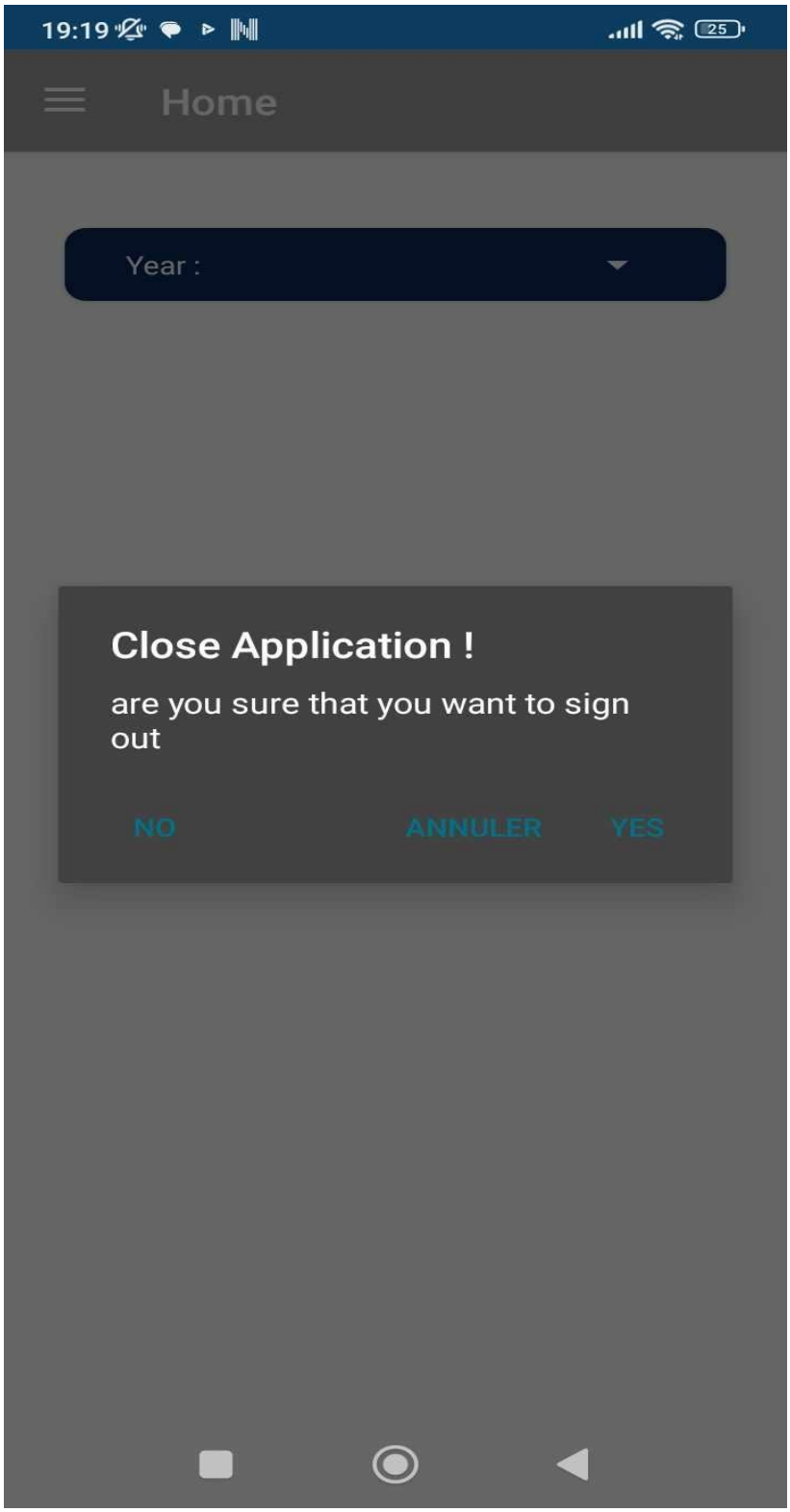

Figure 30:Exit page

- If he wants to exit the application.

3 Conclusion:

In this chapter, we provided a brief description of the process of making our application by identifying the development environment, tools used and the implementation of the database. Finally, we close this chapter by offering some of our app interfaces. In fact, we completed the implementation while respecting the elaborate design. In other words, we own the final version of the app, installed in our developmental environment.

Chaptre4 : Business Model Canvas

1 The BMC of our project :

Presenting below ,The BMC showcasing all aspects of our project :

<table>
<tr>
<td rowspan="3">Key partners :

-University</td>
<td>Key activities :

-Create application

-Collection of lessons and exams</td>
<td rowspan="3">Value propositions :

-Use of artificial intelligence .

-Learn in easy and effective way .

-Good preparation for exams and competitions.

-Teachers can upload lesson and exams and solution to the application.</td>
<td>Custumer relationship :

-Personal Assistance</td>
<td rowspan="3">Customer Segments

-Students.

-Whoprepred for competitions (PHD for example)

-teachers</td>
</tr>
<tr>
<td rowspan="2">Key resources :

-Programmers

-Machines

(computers)</td>
<td>Channels

-Any place where he can downlaod the application like PLAY STORE.</td>
</tr>
<tr>
<td colspan="2">Cost structure

1000000DA</td>
<td colspan="2">Revenue Streams

-throught an annual subscription value, in order to receive updates, the subscription must be renewed.</td>
</tr>
</table>

2 The cost table :

Below is the cost table outlining the financial aspects of our project:

Year	Task lists	Employees	Costs
First Year	✓ **Create application mobile.** ✓ **Mareketing .** ✓ **Development.**	**4**	**1000000 DA**
Second Year	✓ **Mareketing .** ✓ **Development**	**4**	**500000 DA**
Third Year	✓ **Mareketing .** ✓ **Development .**	**5**	**800000 DA**
Forth Year	✓ **Mareketing .** ✓ **Development.**	**9**	**1500000 DA**
Fifth year	✓ **Mareketing .** ✓ **Development.**	**12**	**2500000 DA**

Table 1 : The cost table .

3 The profit table :

And here is the profit table that illustrates the financial aspects related to our project:

Year	Subscribers	Subscription price	Profit
First Year	**300**	**2000DA**	**600 000 DA**
Second Year	**700**	**2000DA**	**1 400 000 DA**
Third Year	**5000**	**2500DA**	**10 000 000 DA**
Forth Year	**12000**	**2500 DA**	**30 000 000 DA**
Fifth Year	**20000**	**3000 DA**	**60 000 000 DA**

Table 2 :The profit table .

Generale Conclusion

The development of the internet and communication tools has enabled the advancement of education through the emergence of the new term: e-learning or distance learning. The objective of online learning is to replace outdated methods of time, space, and predefined educational content with fast, open, and personalized learning processes.

After the COVID-19 pandemic, there has been a significant increase in the demand for online learning, and it has been adopted in most countries around the world.and in Algeria, we face many challenges in e-learning.

The objective of this work is to solve a real problem faced by thousands of students here in Algeria and to contribute to the development of e-learning in the country.

"Foredeva" is a versatile educational app that offers a wide range of features to enhance the learning experience. Users can easily navigate through the app to find lessons, exercises, and exams. With just a click of a button, they can seamlessly transition from a lesson to its corresponding exercise. This interactive approach enables users to apply the knowledge gained and reinforce their understanding.

One of the key highlights of the app is the self-evaluation feature, allowing users to assess their own progress . They can test their knowledge and skills through the QCM test or through the available exams and evaluate their performance. The app provides solutions for exercises and exams, ensuring comprehensive learning and offering guidance for improvement.Furthermore, "Foredeva" empowers teachers by allowing them to contribute their own content. Teachers can create and upload courses, exercises, and exams, and each time they add new content, they are rewarded financially. This incentivizes active participation from teachers and ensures a diverse range of educational resources for the users.

Overall, "Foredeva" offers a user-friendly platform that enables learners to access lessons, engage in interactive exercises, evaluate their knowledge, and benefit from the expertise of dedicated teachers. It provides a comprehensive learning experience that promotes both academic growth and the continuous development of valuable skills.

This work, being a human creation, is not a unique and perfect model. That is why we remain open to all criticisms and are ready to receive any suggestions and remarks aimed at further improving this study. Given that every work in the field of information technology has always been the result of a team effort.

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