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Academic Social Network Application

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Abstract

Social network applications have become one of the most popular communication tools that have developed over the past decade, making it a powerful new resource for sharing information in the community. As a communication tool, its effectiveness is already showing in the millions who use these networks to communicate on a daily basis. But we see that the social network applications currently in place do not cover all the needs in the designated field.

Due to the importance of social networks in our present and future lives, this dissertation comes for highlighting on what social networks stand for, and developing an android mobile application for social networks in an educational environment and management of academic practices [1].

Keywords: Social Network, Education network, Android application.

ملخص

أصبحت تطبيقات الشبكات الاجتماعية واحدة من أكثر أدوات الاتصال شيوعاً التي تم تطويرها على مدار العقد الماضي، مما يجعلها مورداً جديداً قوياً لمشاركة المعلومات في المجتمع. كأداة اتصال، تظهر فعاليتها بالفعل في الملايين الذين يستخدمون هذه الشبكات للتواصل على أساس يومي. لكننا نرى أن تطبيقات الشبكات الاجتماعية الموجودة حالياً لا تغطي جميع الاحتياجات في المجال المدروس. نظراً لأهمية الشبكات الاجتماعية في حياتنا الحالية والمستقبلية، تأتي هذه الرسالة لتسليط الضوء على ما تمثله الشبكات الاجتماعية، وتطوير تطبيق اندرويد للهاتف المحمول للشبكات الاجتماعية في بيئة تعليمية وإدارة الممارسات الأكاديمية.

الكلمات المفتاحية: الشبكة الاجتماعية، شبكة التعليم، تطبيق اندرويد.

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Abbreviations list

- **SNA**: Social Network Application.
- **XML**: eXtensible Markup Language.
- **UML**: Unified Modeling Language.
- **WWW**: Word Wide Web.
- **DB**: Database.
- **FB**: Facebook.
- **OSN**: Online Social Network.
- **CMS**: Content Management System.
- **SDK**: Software Development Kit
- **JDK**: Java Development Kit.
- **BBS**: Bulletin Board System.
- **IRC**: Internet Relay Chat.
- **CMC**: Computer Mediated Communication.
- **CDN**: Content Delivery Network.
- **UI**: User Interface.
- **UX**: User Experience.

- **API:** Application Programming Interface
- **IDE:** Integrated Development Environment
- **CPU:** Central Processing Unit.
- **NoSQL:** No Structured Query Language.

General Introduction

*“Make sure you understand your audience before planning a social media strategy.
audience well!”*

Liz Azyan.

Background and Motivations

With the support of information technology, which plays an essential part in the growth of many firms and organizations, the world is currently seeing significant technical advancement in all industries.

We painstakingly logged all information on paper medium before the development of the computer and mobile phones. This resulted in a number of issues, including the waste of a significant amount of time in the search for this information, as well as the degradation of the latter. In order to be more efficient, the new logic of work organization needs educational and learning institutions to fundamentally employ information as raw material. Insofar as they shape the entry, storage, organization, and exchange of information, they must incorporate the growth of the information system into their strategic investments.

Primary schools, to which we will also connect our research, are now an intrinsic element of schools that may benefit from mobile devices. Indeed, the increase of the student population necessitates the construction of a sensible and quick management system yet, manual management remains dominant, necessitating the introduction of mobile phones into these training centers [18].

Problematic and Contributions

During our visit to our primary school, we were able to see that a large portion of the processing is done manually, which causes a lot of issues, such as:

- Large amounts of data are manually processed, which might lead to mistakes in document production.
- Difficult register research, resulting in a waste of time.
- Information insecurity.
- There's a chance you'll make a mistake when filling out the numerous forms and registers.
- Possibility of error in the calculation of statistics.

As a result, the automated management system is the greatest answer for resolving the issues since it provides instant access to data while also securing it, making administrative work easier. As a result, we advised school authorities to create an application to help them run their school .

Dissertation Organization

The objective of our project presented in this work is the creation and implementation of a basic mobile application for the administration of students and instructors in a school, and in order to do this goal, we chose UML (Unified Modeling Language) as the modeling language and Android Studio as the development platform.

The following is a breakdown of the dissertation's structure:

Chapter 1: in this chapter we provide a conceptual, historical, and scholarly context for the articles in this collection. We begin by defining what constitutes a social network applications and then present one perspective on the historical development of social network applications, and highlight key works.

Chapter 2: this chapter comprises our contribution, which includes a system architecture, tool descriptions, and UML diagrams of all transaction registrations.

Chapter 3: the third chapter will be the part of the implementation and the realization of our application, where we will present the environment of development, the structure of our application and some interfaces of the one if.

Finally, we close this dissertation with a general conclusion and our future work.

Publications reached

- Fatima Zahra Aoubid and Telli Abdelmoutia. *Toward to develop a Specific Academic Social Network Application*. In 3rd International Conference on Applied Engineering and Natural Sciences, ICAENS 2022. Will be on July 20-23, 2022 Konya, Turkey.

Chapter 1

Social Network Application

Development

“If art interprets our dreams, the computer, disguised as programming, puts them into action!” Alan J. Perlis.

1.1 Introduction

Social networks like Myspace and Facebook have drawn millions of users since its launch, with many of them including them into their daily routines. However, there are hundreds of social network applications available, each with its own set of technological features, that cater to a diverse set of interests and behaviors. The cultures that evolve around social network applications are diverse, despite the fact that their basic technological elements are quite consistent. Some applications cater to a wide range of users, while others draw individuals together based on a shared language, sexuality, or nationality. The amount to which new information and communication capabilities, such as mobile connectivity and photo/video sharing, are included into applications varies as well [4].

This chapter provides a conceptual, historical, and scholarly context for the social network applications. Also, it highlights related works.

1.2 History of social network applications

Only with a few clicks of a button, we can connect with individuals from all over the world, making it easier than ever to stay in touch with our friends and family. As a result, social network has become the largest industry of our day, but it wasn't always thus.

- The early years: the Bulletin Board System, which was introduced in 1978, was the first example of a social network (or BBS). The BBS was hosted on personal computers, and users had to dial in through the host computer's modem to exchange information with other users over phone lines. This was the first system to allow users to log in and interact with one another, however it was rather slow due to the fact that only one person could be signed in at a time.
- Later in the year: the bulletin board Usenet was a method of disseminating the first versions of web browsers. Users may upload news items or posts, which were referred to as "news," to Usenet, which was founded by Jim Ellis and Tom Truscott. Usenet differed from other BBSes and forums in that it lacked a committed administrator or central server. Yahoo! groups and Google groups are two examples of modern forums that use the same concept as usenet.

The first version of instant messaging, Internet Relay Chat, was released in 1988 (IRC). IRC was Unix-based, which meant that most people couldn't use it. It was used to share links and files, as well as to keep in touch with one another.

- The birth of social network applications as we know it: Velocities was one of the first social network platforms on the internet. Its goal was to let users build their own websites and divide them into "cities" based on the content. The Globe.com was launched in 1995, allowing users to interact with others who shared their interests and publish their own content.

- Two years later: in 1997, SixDegrees.com and AOL Instant Messenger were introduced. This was the first year that internet users were able to create profiles and friend each other, and it was also the first year that instant messaging became widespread.
- In the following years: other social network applications, such as Classmates.com, LinkedIn, and Tribe.net, began to emerge, including what would become the most popular social network application in internet history, Facebook.

Facebook.com was founded in 2004 with the goal of connecting American college students, beginning with Harvard University. Over half of the 19,500 pupils joined up in the first month. After increasing popularity, Facebook allowed non-college students to register, and in 2008, Facebook eclipsed Myspace as the most popular social network application.

Since 1978, the social network has come a long way, and we will all continue to see its progress for years to come, constantly changing the way people connect [5]. Currently, the majority of public relations businesses use social media to keep in touch with the general public. Because people can now get information on the move, virtually quickly, thanks to social network programs, the way information is distributed has changed (see Figure 1.1) [5].

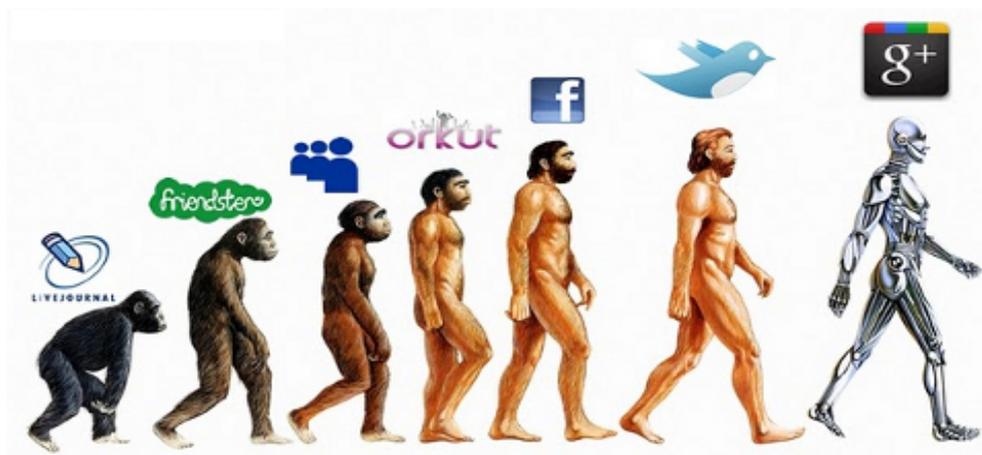


Figure 1.1: The history of social network

1.3 Definitions of social network applications

We define social network applications as web-based services that allow users to create a public or semipublic profile within a bounded system, articulate a list of other users with whom they share a connection, and view and navigate their list of connections as well as those made by others. The nature and terminology of these linkages may differ from one location to the next (see Figure 1.2).



Figure 1.2: Social network application definition

While we refer to this phenomenon as a “social network application,” the word “social networking applications” is also used in public discourse, and the two terms are frequently interchanged. For two reasons: emphasis and scope, we elected not to use the phrase “networking.” “Networking” stresses the establishment of new relationships, frequently between strangers. While networking is conceivable in these applications, it is not the norm, nor is it what distinguishes them from other types of computer-mediated communication (CMC).

What makes social network applications distinctive is that they allow users to verbalize and make accessible their social networks, rather than allowing them to meet strangers. This can lead to relationships between people who might not have met otherwise, although that isn’t always the intention, and these encounters are commonly between “latent ties” who have an offline connection.

Participants on many of the huge social network applications are largely communicating with people who are already a part of their extended social network, rather than “networking” or wanting to meet new people. We call these apps “social network applications” to stress the articulated social network as a crucial structuring component.

While social network applications have a wide range of technological features, its backbone comprises visible profiles that present an articulated list of Friends who are also system users. An individual is required to fill out forms comprising a series of questions after joining a social network program. The answers to these questions are used to build the profile, which often contains identifiers such as age, location, and hobbies, as well as a "about me" section. Users are also encouraged to provide a profile photo in most applications. Users can enhance their profiles by adding multimedia content or changing the style and feel of their profiles in some applications. Others, such as Facebook, allow users to customize their profiles by adding modules (“Applications”).

Users are prompted to identify persons in the system with whom they have a relationship after joining a social network application. Depending on the program, these connections are referred to as “friends,” “contacts,” or “fans,” among other words. The term “friends” might be misleading because a relationship does not always imply friendship in the ordinary sense, and people connect for a variety of reasons. Apart from profiles, Friends, comments, and private messaging, the functionality and user base of social network applications differ widely. Some include built-in blogging and instant messaging functionality, while others feature photo or video sharing capabilities.

While many social network applications are designed to be widely accessible, many of them initially attract homogeneous populations, so it is not uncommon to find groups using applications to segregate themselves by nationality, age, educational level, or other factors that typically segment society, even if this was not the designers’ intention [4].

1.4 Concept and realization of social network applications

The system must also make sense of context data in order to perform intelligent reasoning and understand user demands. Context data can include information about people, objects, and the environment [6], and it can be collected from a variety of sources. For example:

- Infrastructure-based context data: network Bandwidth, reliability, device configuration (display resolution)
- Application-based context data: service availability, access protocols, environmental constraints.
- Personalized context data: user, location, time, presence, device, agenda, contacts.
- Social context data: user interaction, ties between users and location, media capture, media share (audio, video, picture, text).

The system must also make sense of context data in order to perform intelligent reasoning and understand user demands. Context data can include information about people, objects, and the environment [6], and it can be collected from a variety of sources.

There are a variety of issues to consider, including usability, privacy and security, and data mining. Usability, privacy and security, and data mining are only a few examples.

One of the issues we discuss in this paper is how to use real-time contextual data in these applications. This improves the efficacy and usability of social network applications and allows them to respond in a more automatic manner.

Below there are some examples for such applications:

- Recommender service: assist users and clients with their requests. The accuracy of recommendations is shaky, but it improves as more background information becomes accessible. Applications for mobile devices are heavily affected. Users may desire different types of services from the recommender system depending on their context, such as finding hotels, choosing a route based on traffic, or choosing a service based on time.
- Podcasting service: As a network application, podcasting is a relatively recent aspect of social services. Blurry.com is a social networking site that allows users to podcast music and video while also tracking the amount of visits.
- Microblogging's service: microblogging is a popular service for social network.

This service's main goal is to allow users to submit short messages on a blog and have them delivered to various user groups dependent on the communication media [6].

1.5 Characteristics of social network applications

Unlike content-based platforms, social network applications are built around individuals who are connected online by their shared interests, activities, and viewpoints. Issues such as religion, similar language, nationality, or other interests may draw audiences together online. Users, according to Boyd, are the backbone of social network programs, as there would be no forums, chatroom, or applications without them.

Facebook and other social media platforms have evolved into online gathering places where users can communicate and express themselves.

They provide a mechanism for users to stay connected to virtual communities they are a part of, such as social and professional groups.

Users are the ones who make a network dynamic, in the sense that the more relationships in a network, the deeper the network becomes and the more active it becomes. In fact, social network applications come with a wide range of features that attract billions of users every day, among which we select the followings :

1. **Presentation of oneself** : most social network applications require users to create a personal profile, which is a customized page on which the user presents himself or herself to other users. Texts, images, music, and videos can all be found under the personal profile, among other things. Users can use this software to keep track of their social relationships and profiles.
2. **The formation of virtual communities** : Although virtual communities have been around for a long time, social network programs promote new ways for users to connect in diverse online communities. Users can join a community based on a shared interest, such as a learning community or a book reader group.
3. **Ease of access** : the ease of use is one of the reasons why Facebook is the most popular application among students. A personal account can be created and managed by anyone with even the most basic digital skills. The use of social network applications is completely free, and they represent an open environment for anybody to use.
4. **Interactivity** : social network programs are more interactive than other websites since they include chat rooms, discussion forums, and online game applications. As a result, they provide users with a variety of ways to engage with other people and have fun.

One of the factors that persuades people to participate in such a kind of media is the opportunity for social and professional connection [3].

1.6 Types of social network applications

We come across a variety of social media sites, some of which are designed for professionals, some for family and pleasure, others for news updates, and yet others for delivering rapid information (see Figure 1.3).



Figure 1.3: Types of social media applications

- **Social network applications:** Facebook, Twitter, and LinkedIn are examples of social network programs that can help you connect with friends, family, coworkers, and businesses.
- **Media sharing networks:** users of image-sharing applications such as Instagram and Snapchat allow their users to share and curate their material.
- **Networks for consumer reviews:** the main goal of social review applications is to assist you in planning ahead of time so that you don't have to continually guessing which option to choose.
- **Discussion forums:** the best thing about forum applications is that, unlike Facebook and Instagram, other users can't see as much information about you.

- **Bookmarking and content curation networks:** today's most popular image bookmarking applications is Pinterest. It's a fantastic resource for getting ideas for your next DIY project.
- **Community blogs:** when a photo or brief post isn't enough, you might just want to offer a long caption. Self-hosted website apps, however, aren't always the best option. Because it's typically a lot of labor, shared or community blogs are the way to go! Tumblr and Medium are fantastic examples of platforms that provide people their own room to be as creative and opinionated as they want.
- **Dating applications:** online dating is the newest trend in the dating world. You can simply meet individuals in your area and go on dates. Tinder and Bumble are the two most popular dating applications. These applications allow you to "sell" yourself to the dating pool by selecting your finest images and sharing some unique facts about yourself.
- **Short-Form video:** Vine and Dubsmash were popular a few years ago. Those two apps were once the most widely used short-form video apps. You can do a witty comedy, perform a magic trick, or give an impression [7].

1.7 Features in social network applications

WhatsApp, Instagram, YouTube, and other social network applications are just a few examples. Each of these apps has its own set of characteristics. We've outlined some basic yet effective features that may be included into a variety of social media programs to help you succeed.

- **User profile:** having a user profile that can retrieve user data from LinkedIn, Google+, Twitter, and Facebook using REST API calls.
- **Connections:** content-based connections, Explorer, Talker, Admirer, Groups, and Events.

- **Feed:** users can exchange posts, user-generated stories, audio, video, presentations, and images via the social media stream.
- **GPS settings:** allow users to share their current location with family and friends. This can be done using a location API that gets the location of a device from GPS and mobile network providers.
- **Managing the self-esteem:** People enjoy maintaining a positive image and receiving immediate gratification for their social media actions in the form of likes, comments, shares, and subscriptions.
- **Social media platforms are often linked with one another:** users are able to share their WhatsApp stories on Facebook that remain active for 24 hours.
- **Personalization:** there must be a method to personalize. Photo effects, background colors, and other features should be included in a social network application.
- **Post creation:** text, audio, video content.
- **Content management system (CMS) :** admin authorization, admin management, user management [2].

1.8 Academic usages of social network applications

The increased usage of social network applications by academics and their impact on instruction and learning outcomes has piqued academic and research attention. Online social networks can be successfully employed in the educational sphere, just as they redefine communication and provide a range of paths for more individual socialization.

This may be seen in the growing popularity of so-called collaborative and interactive learning, in which students' self-directed and problem-solving activities are touted as the focal point of the learning process.

Social network applications, according to Mazman and Ulsuel, are an essential gain for the educational profession.

They also claim that the nature and various functions of Facebook, a popular network application, such as providing members with spontaneous or intentional learning opportunities by bridging distances between people who share common interests, exchanging information, sharing ideas, and collaborating, have made it an adequate learning space.

Similarly, Selwyn, N,LJ2009 stated that the significance of social network applications in the lives of learners of all ages has sparked a lot of excitement among educators.

It has been claimed, for example, that social network can help people re-engage with learning and education through improving critical thinking skills, which is one of the traditional educational aims.

Indeed, several educators have praised the potential of these places to provide instructors with a venue for simple network and pleasant student network.

Lemeul Some of the most effective faculty members, according to Pascarella and Pascarella, E. T., and Terenzini, P. T. (1991), are those that develop an informal relationship with their students. And Facebook is certainly a place that encourages this kind of behavior.

Students can use social network programs to effectively express their ideas, conduct online debates, and collaborate, according to Philip et al., IJPSR, 2011.

They also indicate that these platforms can be useful tools for educators to share instructional content and improve student-teacher collaboration [3].

1.9 Architecture of social network applications

An online social network application is that:

- Acts as a hub for individuals to establish relationships with other persons. Each user articulates a list of other users with whom a connection is shared.
- Includes a variety of tools for people to use to create a sense of community in a non-formal and volunteer manner. Users connect with one another online, contribute information to a shared information space, and engage in a variety of interactive activities (e.g., photo uploading, tagging, etc.).
- Contains specific components that allow people to: define an online profile, list their connections (e.g., friends, colleagues), receive notifications on the activities of those connections, participate in group or community activities, and control permission, preference and privacy settings.

A reference architecture of social network application is depicted in Figure 1.4
The entire system is formed by the following layers:

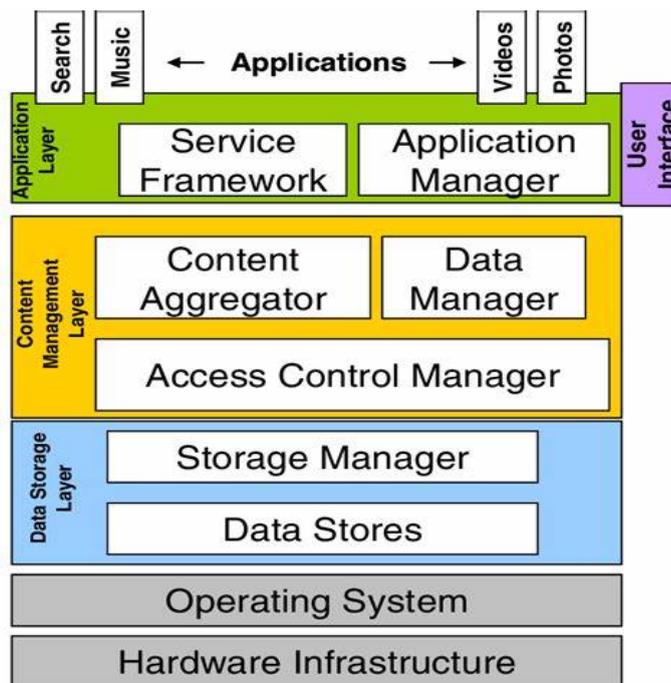


Figure 1.4: Reference architecture of an online social network platform

- **Data storage layer:** this layer is made up of two parts: the storage manager and the database load manager. The storage manager is in charge of efficiently storing information from social graphs and handling increased database loads. This is commonly accomplished through the use of distributed memory caching. The data store component, on the other hand, contains the storage pieces for a social network service's information items. Multimedia databases, user profile databases, and other data stores are examples of data stores.
- **Content management layer:** this layer is in charge of three major tasks. To begin with, it enables the integration of social data from remote online social network apps via a Material Aggregator, which collects and organizes content from social media while also distributing it to other social network platforms. The data manager, on the other hand, makes it easier to maintain and retrieve the social content graph. Finally, it establishes and maintains an access control strategy to manage user access.
- **Application layer:** search, news feeds, mobile access, and other features are available in every online social network program. In order to evaluate and manage the social content graph, the services connect with the data manager and the access control manager. An application manager distributes the programs to users.

The application manager uses a set of APIs to make user interaction easier. A service framework for scalable cross-language service development is also included in this component.

HTTP requests are used by users to communicate with an online social network application. Each user can choose to be an authorized user or remain anonymous. Anonymous users generally have fewer rights than registered users.

The access control module is in charge of dealing with online social network users' privacy and security settings.

A user forwards a request to the OSN platform, which forwards it to the appropriate application server.

A load balancer is in charge of monitoring an OSN platform's application servers, balancing request loads, handling failover, and sending requests to the application servers.

The graph servers keep track of and manage user connection relationships. In terms of content delivery, cache servers reduce the demand on application servers, allowing dynamic Web applications to run faster. OSNa, in particular, have a very distinct set of needs than standard Web apps. One of the most significant differences across OSNa platforms is the changing nature of user relationships and trust.

The design of data insertion, replication, and distribution algorithms in OSNa is dictated by this behavior. Another key distinction is that OSNa involves a large number of little files that must be read and updated regularly by a large number of users, (CDNs) or Cloud Infrastructures.

User requests are automatically routed to the nearest edge location in a CDN arrangement, ensuring that content is provided at the highest feasible speed.

The system in a Cloud environment is made up of massive clusters of processors.

Finally, OSN platforms can have their data stores centralized or distributed across multiple administrative domains.

Concerns about privacy and scalability arise as a result of centralized OSNa. Data can be stored in a peer-to-peer system to bypass these restrictions.

A layer for managing overlays Node identity management, topology design and maintenance, message routing, node search services, and interfacing with local resources and the underlying fabric would all be handled by the overlay network layer.

The overlay management layer will include methods for peer-to-peer resource authentication and authorization, as well as decentralized monitoring, administration, and adaptive control [8].

1.10 Disadvantages / advantages of social network

The most popular internet trend in recent years has been social networking. It may be beneficial to your job, but there are also drawbacks to consider. Let's look at the benefits and drawbacks of social network to see if we should be focusing more of our attention on this online activity [9].

1.10.1 Disadvantages of social network

- Social network can take a lot of your time and can hold you back from engaging in other important activities such as family bonding.
- Many people use social network as their only form of communication.
- Can cause a great barrier between those people who have access to the internet and to those people who don't.
- Your privacy is in big jeopardy because of social media and can affect your dignity and pride as a person.
- Can also become a way to destabilize the government and a means for advancing a form of terrorism.
- Can be used to promote crime.
- It is a perfect venue for the act of bullying, which is very evident these days.
- Can become a vector to ruin the structure of a particular language.
- Can hold back a person from moving on freely if they encounter a bad experience through social network.

So there, you got some of its disadvantages. Now, keep reading and get ready to grab the list of its advantages [9].

1.10.2 Advantages of social network

- Helps people to keep in touch with their relatives and friends from a distance in a very convenient manner.
- Social network is a perfect way to promote products and services.
- Can be a perfect medium to for someone who expresses themselves on the internet.
- Social Network can be a good way to help charitable works or charities to deliver their needs to help other people.
- Social networks are a powerful search engines for those who want to seek jobs locally and abroad.
- Can be a means to counteract organized crime or perhaps terrorism.
- Social networks can be a perfect way to look for partners, dates, or people can even utilize it in looking for lost pets and relatives.
- Can leverage political will for bodies that want to become more exposed publicly.
- People who are searching for thoughts and ideas about a certain topic can use social networks as well to solicit possible answers.
- Social networks can help students perform better at school.

The scope of advantages and disadvantages of social network is actually vast. Its importance and negative impact on the society will deeply depend on the person who utilizes it and the person who deals with it.

Social network is just a medium. It shouldn't shoulder the entire fault [9].

1.11 Related works

Connecting with one another is easier now that we can just tap away on a keyboard and communicate with someone who lives over 3000 miles (about 4,828 kilometers) away. With Google on every computer on the planet, finding information knows no bounds. As educators, this means having access to more information at a quicker pace, which is both exciting and mind-boggling. However, with so many options, it may be annoying and perplexing. The greatest educational social network programs are listed below [10].

1. **Edmodo:**¹ (See Figure 1.5) is a well-known free K-12 network that enables instructors to both inspire and be inspired by their students and colleagues. This is a platform for sharing and discussing educational issues, resources, and papers in both public and private groups (classes).



Figure 1.5: Official logo of Edmodo application

You may assign homework and specify due dates for it using Edmodo. The platform features built-in quiz and survey-building capabilities, however they are quite rudimentary. Because Edmodo supports digital resources, you may create more complicated exams and attach ready-to-use quizzes. This will also help you to keep track of more specific outcomes and provide pupils individualized feedback based on their responses [11].

Students may then take exams, “hand in” assignments, track their progress, comment to messages, and make their own posts.

¹<https://info.edmodo.com/about>

2. **TedEd:** ²(See Figure 1.6) education and the young project strives to ignite and celebrate the exchange of ideas and information between teachers and students all around the world. TED-global Ed’s network of over 250,000 teachers celebrates innovative leadership by producing a growing video library of original animated lessons, providing an international platform for teachers to create their own interactive lesson plans, assisting curious students around the world in bringing TED to their schools and gaining presentation literacy skills, and more.

TED-Ed has evolved from a worthwhile concept to an award-winning education platform that serves millions of instructors and students worldwide [13].



Figure 1.6: Official logo of TED-ED application

Users may easily create a class plan with customized questions and conversation using the TED-Ed platform, they can use any TED Talk, TED-Ed Lesson, or educational video they like.

Users may then share these lessons with the rest of the globe, a class, or a single student, while also keeping track of their progress.

3. **TeacherTube:** ³(See Figure 1.7) it’s dubbed “YouTube for Teachers” since it features instructive videos for pupils of all ages. Each of the 1 million videos on TeacherTube is appropriate for use in the classroom, since the application continuously evaluates new content for suitability. TeacherTube also archives audios, photographs, and pre-made material bundles in addition to videos.

²<https://ed.ted.com>

³<https://www.teachertube.com/>

Teachers and students can also post their own media, which they can make public or private. You may also build and share playlists, collections, and channels with your pupils.

While TeacherTube is designed to help you locate and save content, TeacherTube classrooms is an add-on tool that will help you coordinate interactions with colleagues, students, and parents. You may create an application for your school, fill it with posts, and even change the look to suit your preferences. It's also feasible to use TeacherTube's resources in this regard. You can quickly enroll new members and track their actions once your classroom page is complete [11].



Figure 1.7: Official logo of TeacherTube application

4. **TweenTribune:** somewhat similar to the TED-Ed platform, TweenTribune ⁴ (see figure 1.8) allows teachers to construct classes based on existing information, this time in the form of articles rather than video. Tween Tribune lets children keep up with the latest news while also improving their reading and critical thinking abilities.



Figure 1.8: Official logo of TweenTribune application

⁴<https://www.tweentribune.com/>

Begin by choosing an article that is related to your topic. You may use keywords to search, or you can limit results by grades (K-4 through K-12), themes, and even exile level.

When teaching foreign languages, i find the latter incredibly beneficial because pupils' vocabulary sizes might vary dramatically.

In this situation, you may divide people into exile levels and assign articles based on their exile levels.

Each story comes with a pre-made reading comprehension assessment, so when you offer an article to a student, he or she must first read it before answering the questions.

The results of a test are automatically transmitted to the classroom Gradebook once it has been passed.

Because these exams are so brief, you might wish to include more open-ended questions.

5. **The Educator's PLN:** ⁵ (see figure 1.9) is an online platform for developing your own social network that makes it easier for educators to connect.

It includes a variety of materials, including downloadable podcasts featuring education luminaries as guests, discussion groups focused on certain topics, such as iPad use in the classroom, and links to pertinent blogs, videos, resource lists, and events [12].



Figure 1.9: Official logo of The Educator's PLN

⁵<http://edupln.ning.com/>

6. **edWeb.net:** ⁶ (see figure 1.10) is a free online social network for educators that allows them to interact with one another, cooperate on objectives and projects, create their own professional learning communities, mentor one another, and experiment utilizing a variety of new technologies. One of the network's specific projects is a game-based learning forum, which will bring together instructors and game developers to debate best practices and advance the industry [12].



Figure 1.10: Official logo of The edWeb

7. **My Big Campus:** ⁷ (see figure 1.11) Tamarind Tree's virtual learning environment, a school without walls. This site is utilized and produced by a group of young learners and facilitators from all around the world. My Big Campus is an experiment in elementary school digitalization and one of the only places where kids as young as six years old can begin their learning experience online. Students in a blended classroom can access a variety of courses based on the National Council for Educational Research and Training (NCERT).

It also offers basic English, math, and digital literacy training for students of all ages. Unless otherwise stated, all work on this site is licensed under Creative Commons 4.0.

This implies you've already been granted permission to use it in any way you choose [13].

⁶<https://home.edweb.net/>

⁷<https://mybigcampus.in/>



Figure 1.11: Official logo of My Big Campus application

We have discussed some social media applications and their roles, for our project we are developing a social network application that has all the same characteristics shown before but will be more fluent and easy to use.

1.12 Conclusion

For the education industry, social network applications are an excellent platform. It is concluded that social applications are a useful tool for educationalists such as students, instructors, and researchers to share and communicate knowledge without boundaries [14].

The next chapter focuses on our contribution, which includes a system architecture, tool descriptions, and UML diagrams of all transaction registrations.

Chapter 2

Proposed Academic Social Network Application

*“If art interprets our dreams, the computer executes them in the guise of
programs!”*

Alan J. Perlis.

2.1 Introduction

Before starting the development of our application, we must specify the objective of this application by determining the functional and non-functional needs that our application must meet. In this chapter, we will first present the overall notion of our system, which includes the many interactions between the actors and the other system components. Next, we employ the UML language, which enables the representation of pictorial concepts and the modeling of applications. The system’s many players and the roles they can perform are depicted in this UML modeling [23]. To construct the various UML diagrams, we utilized the yEd.

2.2 General conception

The course management system is a web-based application with server-side processing of intensive requests. The environment provides the three principal users (teacher, learner, and administrator) a device, which has for primary functionality the availability and the remote access to pedagogical contents for language teaching, personalized learning and distance tutoring [16]. The figure 2.1 shows the general conception of proposed system.

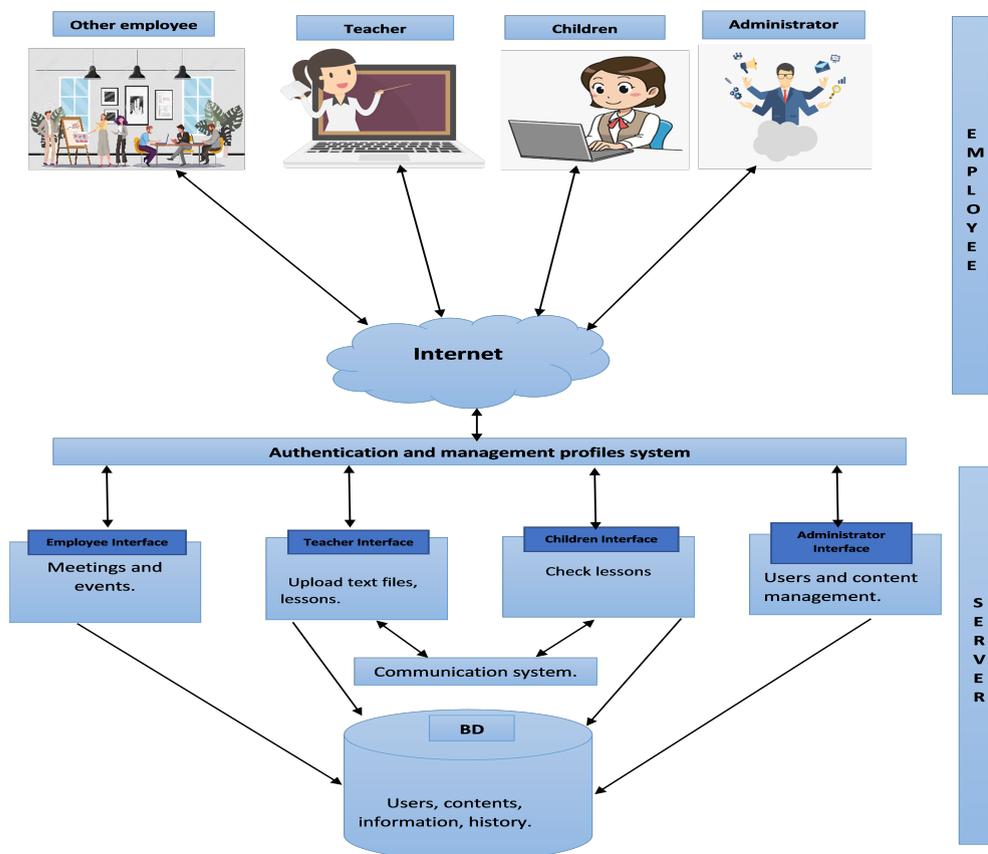


Figure 2.1: General conception of proposed system

2.2.1 Teacher's role

The environment necessitates the employment of suitable content organization and delivery techniques. Different learners' demands necessitate different techniques.

Then, we suggest a content structure paradigm that allows for varied user representations as well as material presentation at various degrees of detail based on pedagogic principles such as case study, definition, example, interaction, motivator, and directive.

The environment enables the teacher to make available to the students, via a specialized interface, a vast number of high-quality textual texts to read. These materials were either developed by teachers or found on the internet. The interface also allows the teacher to explain the files in the most detailed manner feasible. The following information is relevant to each file: name, language, target audience, anticipated pedagogic aims, accessibility period, source, copyright, and so on. As a result, the teacher's materials are imported into the platform server's database.

If the student can build and enrich his or her own procedures and strategies to grasp reading comprehension, the instructor's responsibility is to assist him or her in developing and enriching such strategies [16].

2.2.2 Learner's role

Learners using laptops may use their browser to access the learning area, see published courses, and participate in them. Discussion forums and chat spaces allow users to collaborate with other students or lecturers.

- The course access interface allows learners and teachers to update lessons, homework, and other tasks, as well as share documents [16].

2.2.3 Other employee role

Another part of the employee could be secretaries or agents and even parents who are part of this study.

- The employee access interface allows learners and teachers to be informed about meetings, events, and record attendance etc. . .

2.2.4 Interactive logbook

The purpose of the logbook is to create an automated record of the learner's behavior while he or she is performing a scenario on a teaching item (date and duration of each connection, exercises for self evaluation, etc. . .).

This necessitates an effort in information organization and platform deployment. Learners can use this information to assist them through their training program.

The interactive logbook metaphor was derived from the very traditional personal learning environment of a logbook, which was used by students to record lectures, laboratories, project notes, and other activities.

Although logbooks are still required in many areas, particularly in science fields, they are not commonly used by students.

Because many learning activities take happen digitally, such as writing essays, analyzing data, surfing the web, and participating in online debates, printing or copying the output for a paper-based logbook makes little sense.

Despite the fact that the interactive logbook has network capabilities and digital search, the word 'logbook' conveys the tool's flexibility and purpose. The interactive logbook aims to provide a secure, confidential, and long-term storage solution for personal information.

Physical time and effort barriers can be minimized by integrating with the environment in which much of the learner's activity takes place, which can be further decreased by automatic tracking of fundamental documents and occurrences (emails, documents, diary entries, etc.) [16].

2.2.5 Communication system

Learners must discover the same classical setting in the environment as they do in real life. Learners can ask whatever questions they want in this setting, and they can debate a wide range of topics, both fascinating and irrelevant, together.

The system also facilitates group collaboration by providing forums, conversations, and shared workspaces where students can share papers via podcasts. Asynchronous and synchronous communication facilities are distinguished. In learning contexts, social relationships are critical. Learners should be able to display themselves on a personal homepage that includes a photo, a list of activities, and other personal information.

It provides a strong framework for the creation of new educational technologies to improve various kinds of teaching and learning. It is well-suited to mobile learning and can incorporate tools designed specifically for mobile environments.

A variety of learning activities in formal educational settings (such as teacher-led classroom situations) are well-suited to mobile learning technologies.

For pedagogically rich learning, synchronous learning activities such as polling/voting and question and answer (where the system quickly collates all replies and shows an aggregate view of votes or answers to all learners) are excellent.

The following are features that are unique to the system and would improve learning:

- The ability to easily sequence activities into re-usable lesson plans
- Learner replies can be recorded for subsequent review by learners and teachers, and teachers can build “question answer” exercises with anonymous or identifiable answers from students.

Mobile devices can provide flexible, “on the go” learning possibilities in informal learning contexts (such as student conversation in a cafeteria).

Again, the environment supports these activities by providing an environment to manage and provide these tools in the context of asynchronous (and synchronous) informal learning, including the recording of activities for later learner/teacher evaluation, and the building of re-usable lesson plans [16].

2.3 Analysis model

We need to build an analytical model that focuses on organizing and formalizing the system requirements in order to provide a model of the system that is correct, complete, and consistent.

There are three types of models in the analysis model: functional, object, and dynamic models. Use case diagrams may be used to describe the functional model.

The object model is represented using class diagrams. Sequence, state chart, and activity diagrams can all be used to depict a dynamic model [17]. We have presented the analytical model in terms of the functional model and dynamic models using case and sequence diagrams for the purposes of this project.

2.3.1 Use case diagram

Perform a sequence of operations to provide an output in this use case. A use case is a standardized means of describing how a business system interacts with its surroundings.

A use case assists in the development of a project's knowledge and the services that the system must deliver for its stakeholders (users).

It also assists the user in understanding the system's operation. Wherever a use case exists, actors are always stated. Actors are the people, things, and computers who interact with the system directly or indirectly.

Actors are pulled from the outside. Actors are identified by their names and a brief description.

- **The global use case diagram**

The use case diagram in the next page represents how our application works.

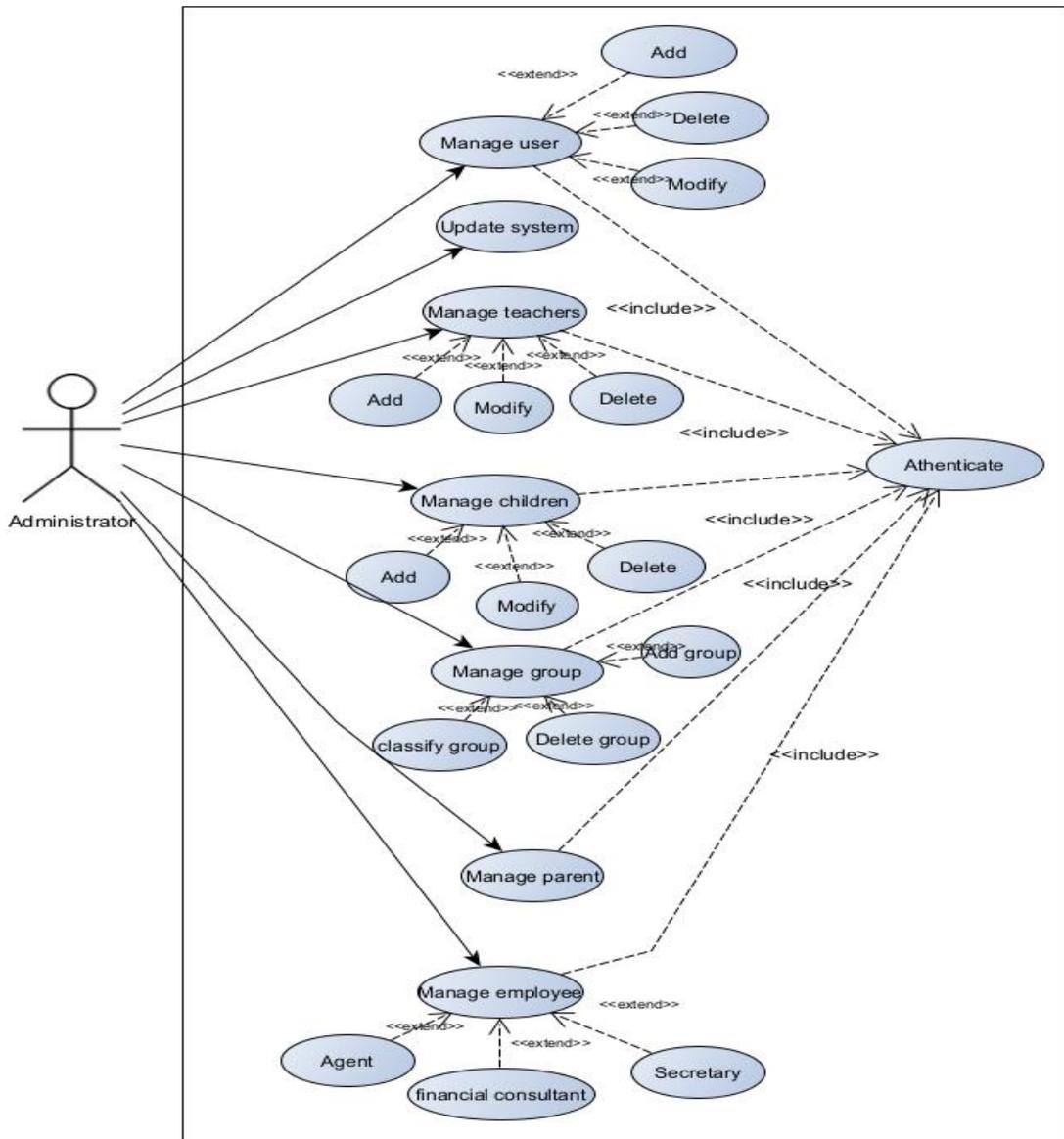


Figure 2.2: Overall use case diagram

Based on figure 2.2, we have distinguished the following use cases:

1. User management: for the site administrator.
2. Authentication: in order to grant access to the application, the application must verify that the user is who he or she claims to be.
3. Data update which includes: creating, modifying and deleting a user.
4. Data update for the system.

At the end of the expression of the needs using the diagram of the global use cases, in what follows, we detail each of the use cases presented in figure 2.2 giving its textual description [18].

- **The authenticated use case**

This use case diagram represents how the authentication works.

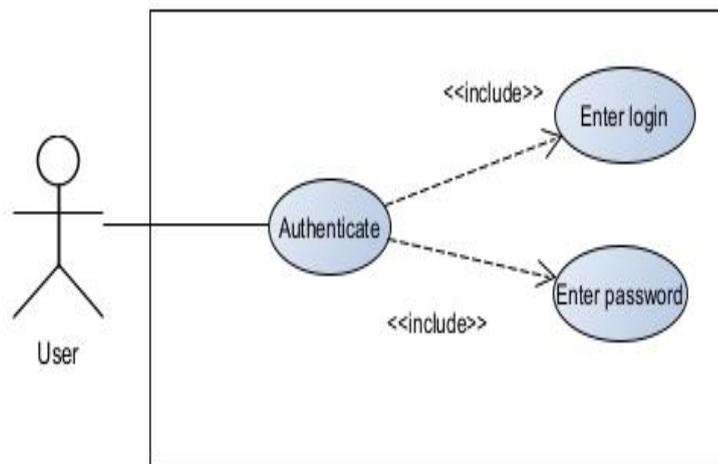


Figure 2.3: Authenticate use case diagram

Based on figure 2.3, we have distinguished this following information:

- Main player: users (Administrator,Teacher/Children, employee).
 - The purpose of this section is: to ensure that the user is the one claiming to be.
1. Normal scenario:
 - The user enters his username and password.
 - The system checks the username and password.
 - The system displays the appropriate space for each user.
 2. Alternative scenario:
 - Login and password are incorrect, a return to the authentication page will be performed with an error message [18].

- **The manage users use case**

This use case diagram represents how the administrator manage users.

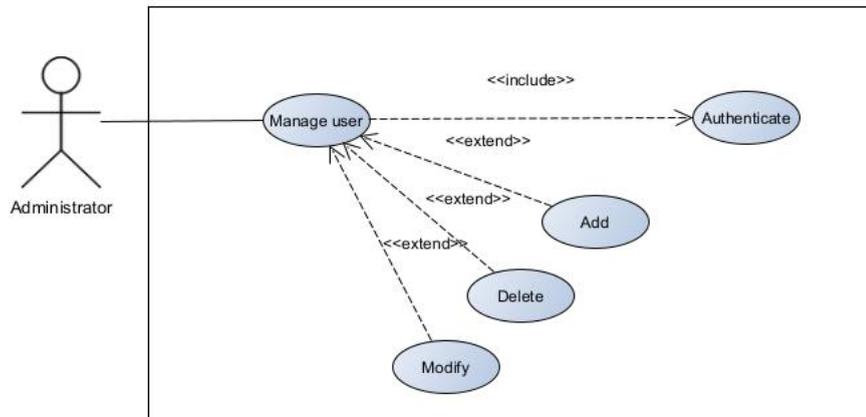


Figure 2.4: The manage users use case diagram

Based on figure 2.4, we have distinguished this following information:

- Main actor: administrator.
- The objective of the administrator is: to be able to add, modify, delete a user folder.

1. Nominal scenario:

case 1: create a user

- The administrator chooses to add a user folder.
- The administrator completes and validates the form.
- The system adds the information to the database
- System, refreshes the list of users and displays it.

case 2: modify a user folder

- The administrator chooses the user to modify.
- He modifies the desired fields.
- The system updates the information in the database.
- The system refreshes the list of users and displays it.

case 3: delete a user folder

- The administrator chooses the user to delete.
- The system asks for confirmation.
- The administrator confirms or cancels the deletion.
- The system deletes the user from the database.
- The system refreshes the list of users and displays it.

2. Alternative scenario:

- case 1:
 - User already exists or fields not conforming to types, empty form: an error message will be displayed.
- case 2:
 - Modification with empty fields, fields not conforming to types: a message of error will be displayed.
- case 3:
 - non-existent user: an error message will be displayed [18].

- **The communications use case**

A mobile application considerably facilitates communication between the instructor and the students, the teacher and the parents, or the students themselves. This conversation can be made between two contacts in private or in a group in our framework. In the first situation, the user has the option of selecting the person with whom he wishes to converse.

The communication in a group chat can be handled by a kid or a teacher. The latter has the ability to create and remove groups.

Both methods of communication can be done synchronously or asynchronously [15].

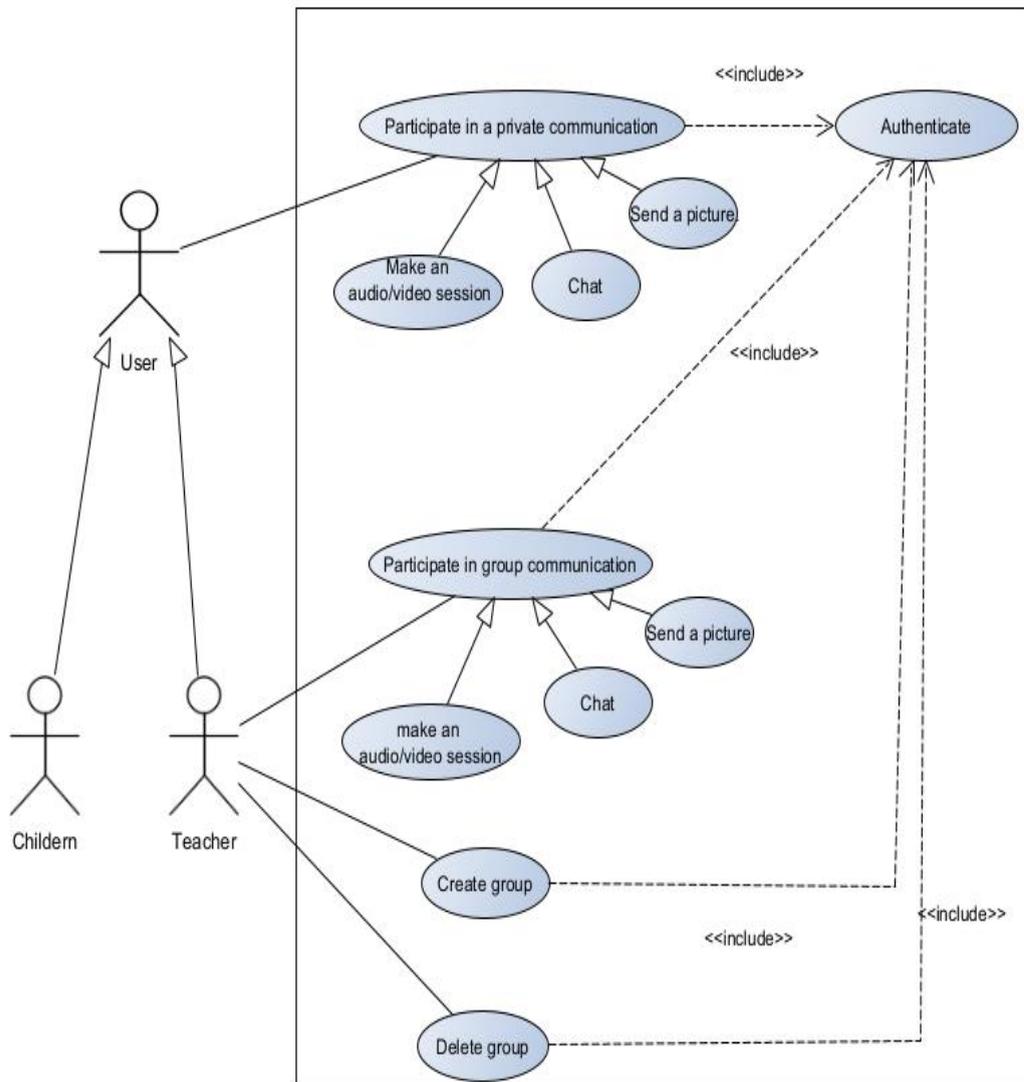


Figure 2.5: The communications use case diagram

Figure 2.5 provides the use case that specifies the functionality of communication between the teacher and the students, or between the students themselves. Authentication is always the first step in communication for every sort of user. And this is true for both private and group conversation, the user has the possibility to:

- make an audio/video session.
- Discussion between users.
- send a picture [15].

- **Course content management**

The teacher must first authenticate before submitting educational content. This might be text, a photograph, video, audio, or another sort of media. The learner can access this content after being approved. He can also pose questions to the teacher, to which the teacher can answer [15].

Figure 2.6 corresponds to the use case specifying the content management functionality of a course.

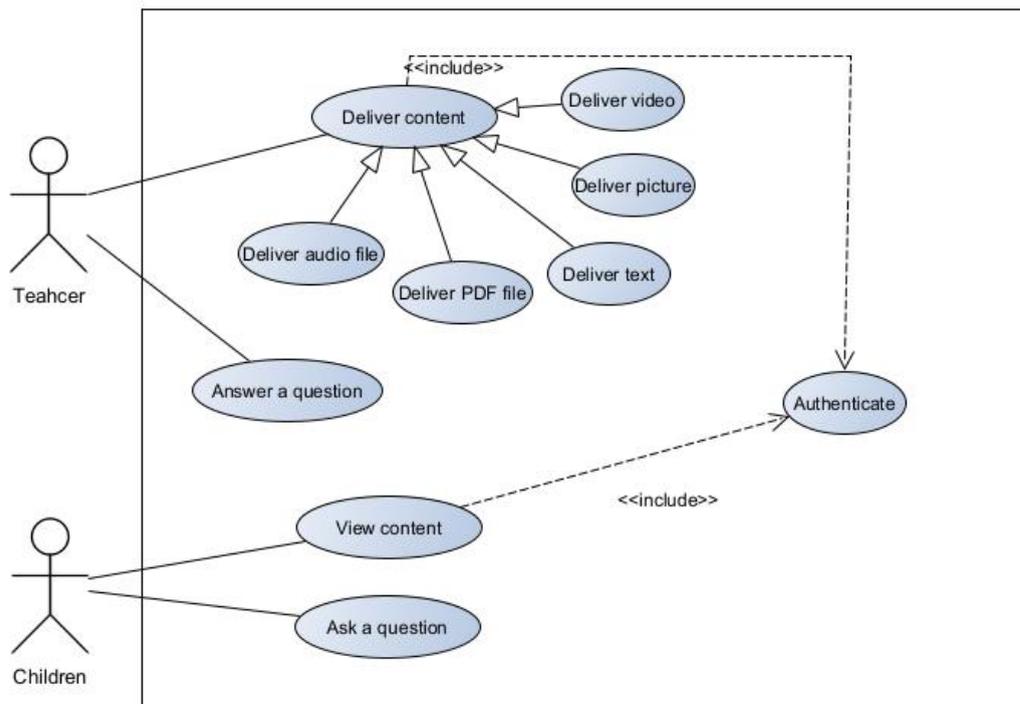


Figure 2.6: The course content management use case diagram

- **Evaluation**

A teacher can build an assessment and maintain its content by adding, deleting, or amending specific questions once it has been confirmed. He can then make it public, allowing his students to reply.

Assessments may be adjusted concurrently or asynchronously, and each student must be allowed to examine his or her findings afterward [15].

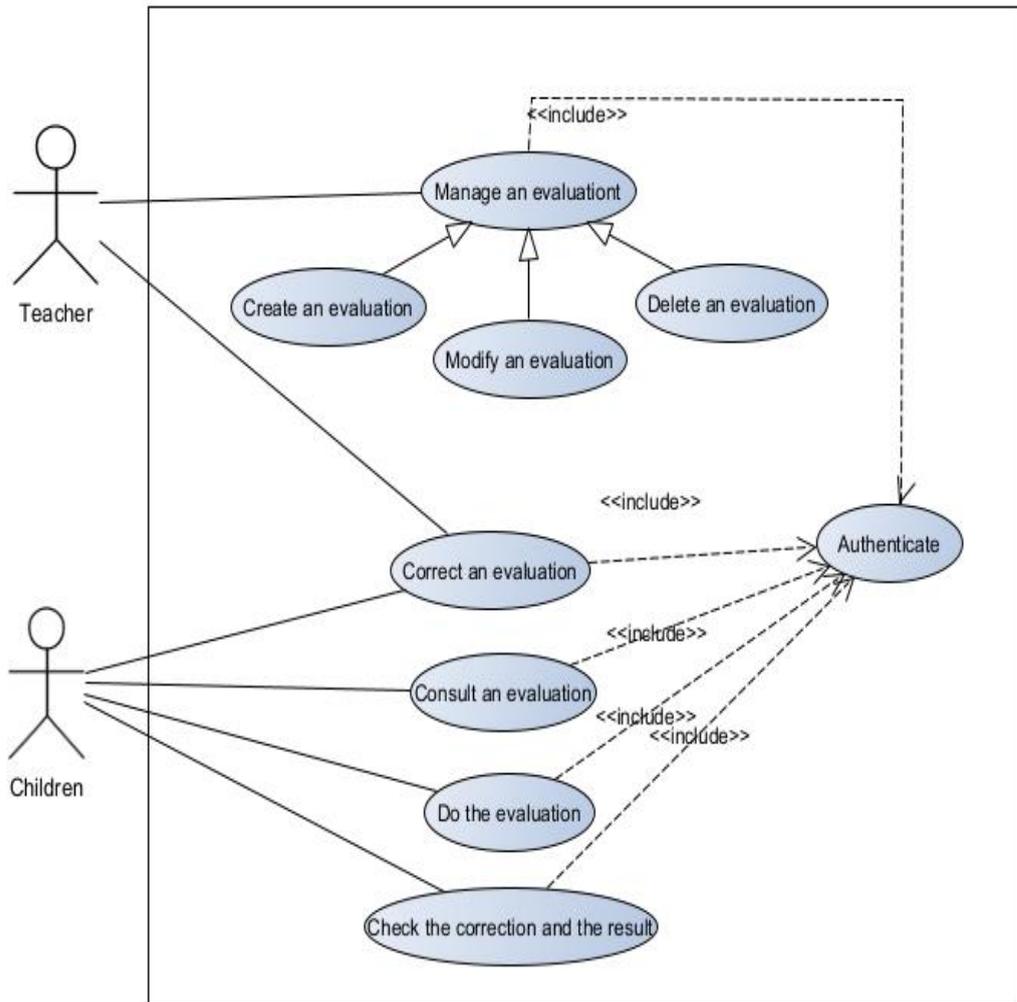


Figure 2.7: The evaluation use case diagram

Figure 2.7 represents the scenario corresponding to the different tasks carried out by the teacher and by the student after the creation of an assessment.

- **Communications with parents**

A parent may become a member of the system and check the student’s class attendance for each topic, as well as the grades earned, and produce the student’s academic report. However, the system will send a warning message to the parent before allowing them to login if the student’s grades fall below the school’s standards. Figure 2.8 below shows a parent dashboard for generating a student’s academic report.

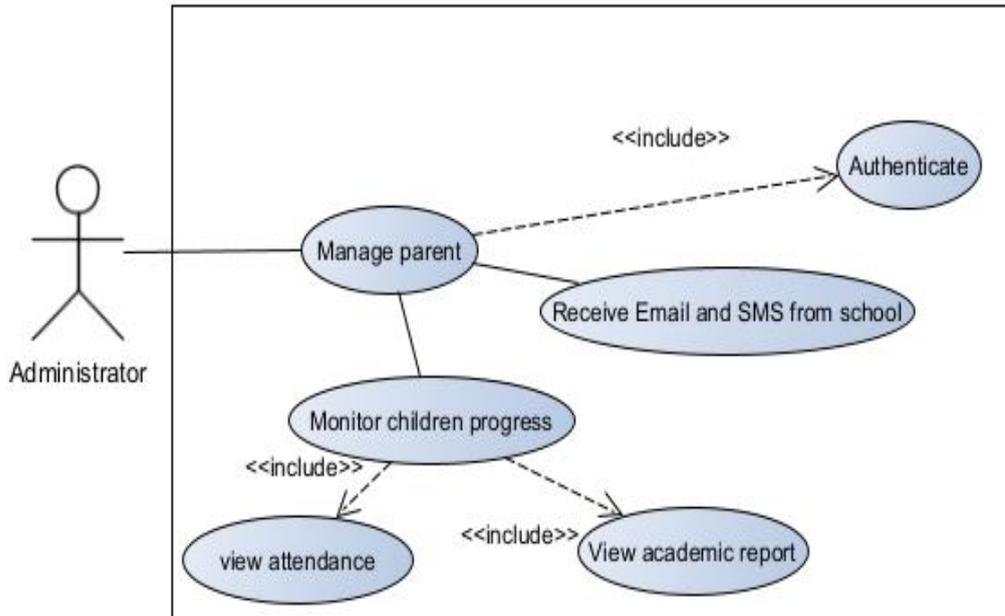


Figure 2.8: Communications with parents use case diagram

- **The employee**

This use case diagram represents how the administrator manage the employee.

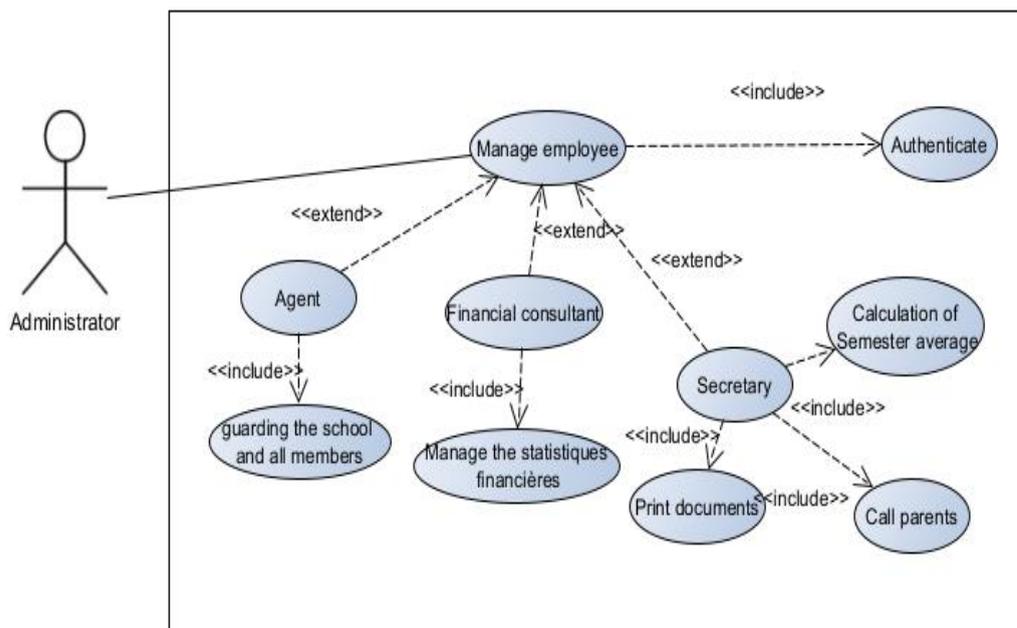


Figure 2.9: The employee use case diagram

Based on figure 2.9, we have distinguished this following information:

The objective of the administrator is: contributes to the internal management of the school.

1. The services that the secretary performs are :
 - Print documents.
 - Calculation of semester average.
 - Call parents.
2. The services that the financial consultant performs are :
 - Calculate the statistics for school.
3. The services that the agent performs are :
 - Make the school and its people safe.

2.3.2 The sequence diagram

In the UML formulation, sequence diagrams are a graphical depiction of the interactions between sequence actors and the system in a chronological order.

Messages are the name given to these inter-class communications. Objects are listed horizontally, and time is shown vertically in the sequence diagram. It simulates the delivery of various messages as a function of time. To realize the diagrams of the sequences, we used interaction operators. An interaction operator defines the type of compound fragment. The interaction operators that we used before in sequence diagrams are:

1. Reference (ref): this operator designates that the fragment refers to has a case seen previously.
2. Alternative (Alt): this operator designates that the composite fragment represents a choice of behavior. At most, one interaction operand will be chosen. The chosen operand must have an implicit or explicit guard expression that evaluates to “true” at this point in the interaction.

3. Loop: this operator designates that the compound fragment represents a loop. The "loop" operand will be repeated several times [18].

- **Authenticate sequence diagram**

The authentication use case scenario is depicted in this figure. The user inputs his email and password, then clicks the connection button to confirm his information. The system then determines whether it is a member. This scenario is depicted in full in the diagram below (figure 2.10).

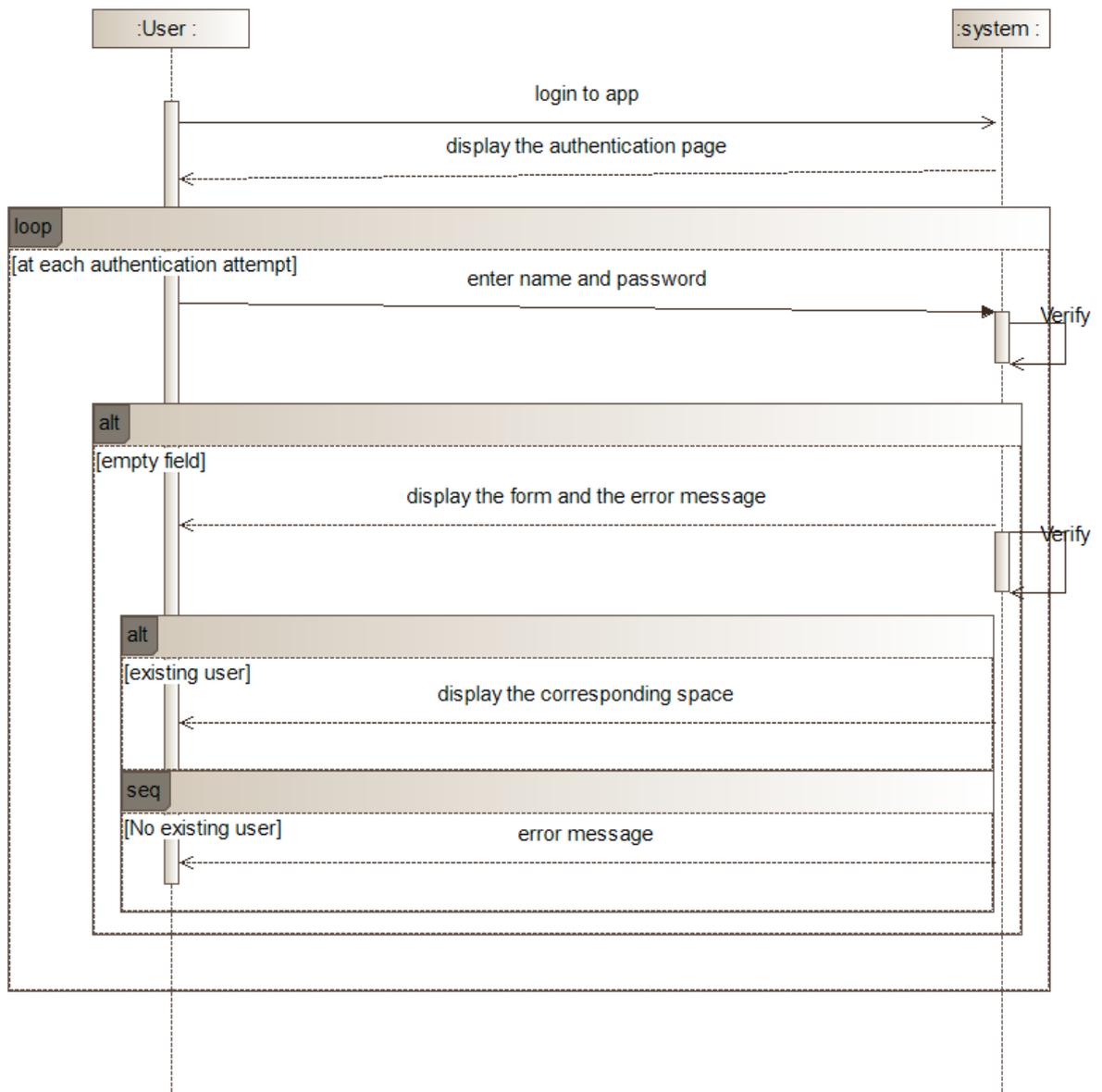


Figure 2.10: System sequence diagram related to the “authenticate” use case

• The global sequence diagram

This diagram figure 2.11, is describing the global use case scenario.

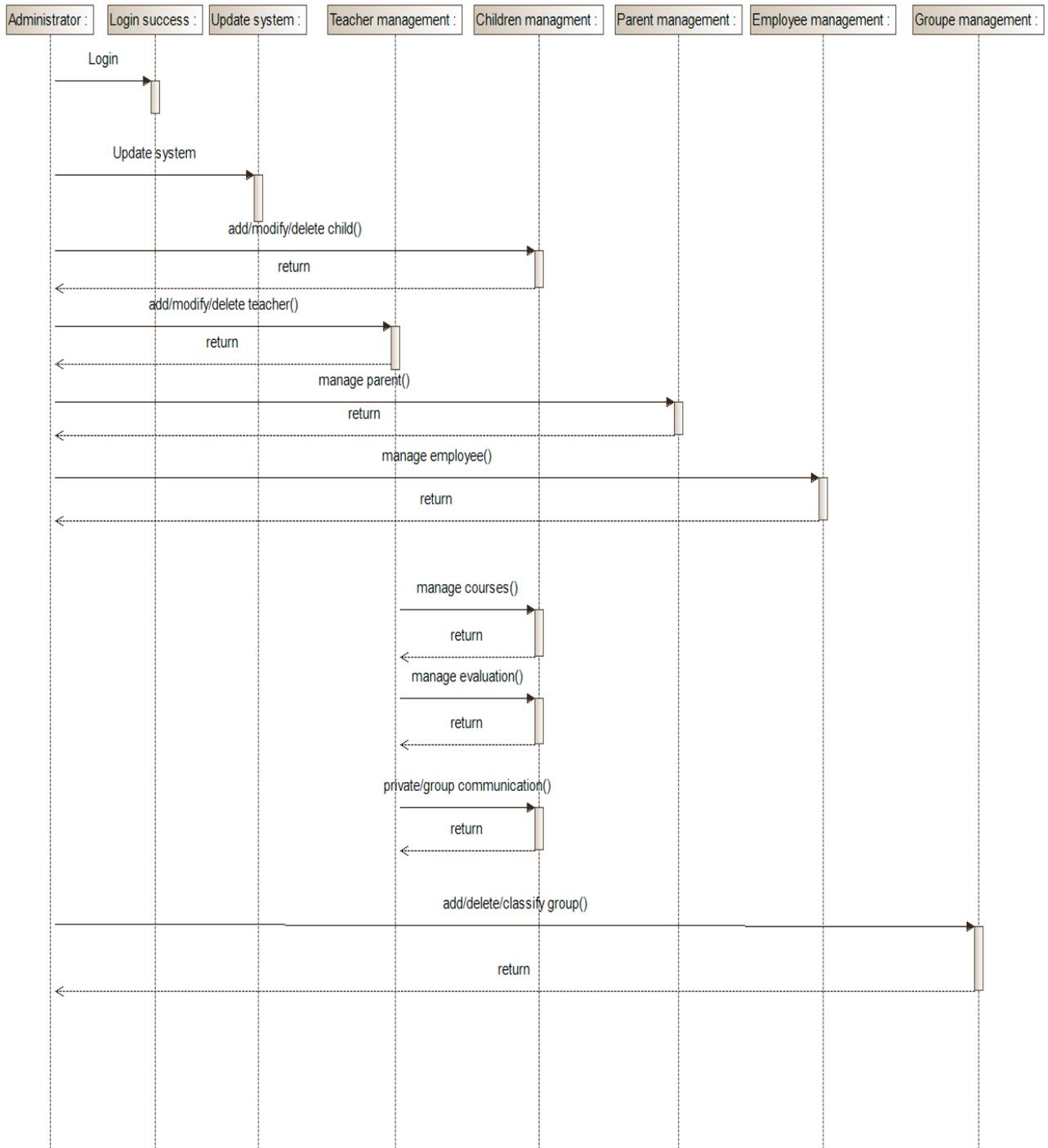


Figure 2.11: The global sequence diagram

2.3.3 The class diagram

A class diagram describes the type of objects or data in the system, as well as the different forms of static relations that link together figure 2.12 [18].

- The global class diagram

The class diagram below represents how our application works.

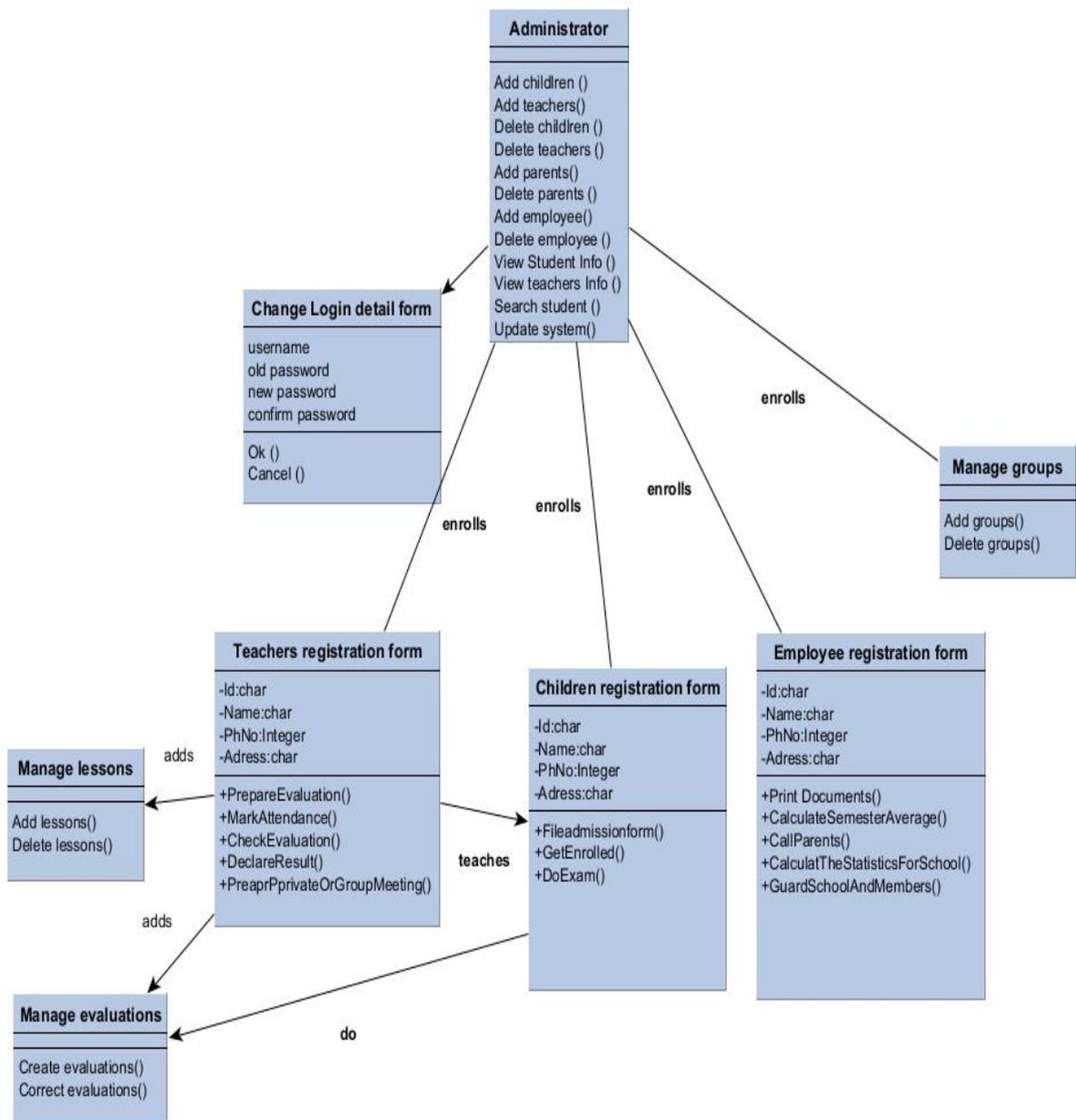


Figure 2.12: The global class diagram

2.4 Conclusion

In this chapter, we have presented the UML diagrams necessary for the realization of our application. We first described the use cases by listing in a textual way all the interactions between the actors and the system, followed by a diagram of the use cases. Subsequently, we completed this textual description with sequence diagrams. And in the end, defining the relationships between the entities, we managed to design the class diagram. This allows us to start the development of the application.

The implementation and testing of our application will be displayed in the last chapter.

Chapter 3

Implementation and Development

A good programmer is someone who always looks both ways before crossing a one-way street.

Doug Linder, computer scientist

A computer is, in my opinion, the most extraordinary instrument we have ever devised. It's the mental equivalent of a bicycle.

Steve Jobs

3.1 Introduction

After detailing the conception and the architecture of our application, this chapter is devoted to the implementation part. We will first present the hardware and software environment and some libraries used in our application.

Then we will talk about the phase implementation of the database, and at the end we will present the different interfaces of our application.

3.2 Hardwares description

All the experiments are performed on a DELL laptop. The minimum hardware requirements to build my application in Android are :

- **Device name:** DESKTOP-2BSOTQT.
- **Processor:** Intel® Core™ i5-6440HQ CPU @ 2.60GHz, 2.59 GHz.
- **Installed RAM:** 8,00 Go.
- **Device ID:** E1DEE581-82BF-460E-B202-5B3CD16BA467.
- **Product ID:** 00330-80000-00000-AA795.
- **System type:** System d'exploitation 64 bits, processer x64.
- **Pen and touch:**No pen or touch input is available for this display.
- 1280 × 800 minimum screen resolution.

Besides a mobile phone with these properties:

- **Name:** Samsung Galaxy M13.
- **Dimensions:**76.9 x 165.4 x 8.4 mm.
- **Weight:** 192 g.
- **CPU:** 4x 2.0 GHz Cortex-A55 cores, 4x Cortex-A55 cores, Cores: 8.
- **GPU:** ARM Mali-G52.
- **RAM:** 4 GB, 6 GB.
- **Storage:** 64 GB, 128 GB.
- **Memory cards:** micros, microSDHC, microSDXC.
- **Display:** 6.6 in, PLS, 720 x 1600 pixels, 24 bits.

- **Battery:** 5000 mAh, Li-Ion.
- **OS:** Android 12.
- **Camera:** 8190 x 6120 pixels, 1920 x 1080 pixels, 30 fps.
- **USB:** 2.0, USB Type-C.
- **Bluetooth:** 5.0.
- **Positioning:** GPS, A-GPS, GLONASS, BeiDou, Galileo.

3.3 Softwares description

We will require two distinct types of software tools to complete our assignment. To begin, we used a variety of free source programming languages. Second, we created various apps using IDE software.

3.3.1 Programming language

1. **Java:**¹ it's the most popular programming language for mobile applications. Even the android operating system was created using java application design, which means that if you know java, you'll be able to construct a wide range of android applications and take control of the platform. It can operate on any platform, including android, which makes it the best language for mobile application development [19].
2. **XML:**² the markup language XML (Extensible Markup Language) is similar to HTML. However, it should be noted that include predefined tags. Instead, you create your own tags that are tailored to your individual requirements. This is an effective method of storing data in a format that can be found, saved, and shared.

¹<https://www.java.com/fr/download/>

²<https://www.w3.org/XML/>

Most importantly, owing to the standardized XML syntax, the recipient may still comprehend the data when you exchange or transmit XML across systems or platforms, whether locally or via the internet, because the essential structure of XML is established [20]. In this work, we use XML to implement UI-related data.

3.3.2 Softwares IDE

1. **Figma:**³ (see figure ??) is a vector graphics editor that allows UX/UI designers to prototype graphical interfaces. In this work, we used it to design our application interfaces [26].
2. **Android Studio:**⁴ (see figure ??) is a Google-created integrated development environment (IDE) for android application development. It was first introduced in the year 2013. Android studio is based on JetBrains' IntelliJ IDEA software, which is offered for free under the Apache 2.0 license [21].

In this project, we use the android studio1.1 to develop this application, to update the configuration files (Gradle and Manifest), the source code files (Java), access libraries, and add auxiliary files (fonts, media...).

3. **Android SDK:** this environment provides all the tools necessary for the development of android applications. These main features are:
 - **An explorer:** allowing to explore the folders of the projects created on this program, in the form of a tree structure displayed on the main interface.
 - **An editor:** facilitating the editing and processing of the code with advanced features, such as coloring of syntaxes relating to the programming languages used to more easily detect errors, and auto-completion.

³<https://www.figma.com/files/recent?fuid=1111284836774706222>

⁴<https://developer.android.com/studio/>

perform logic that should only happen once over the activity's lifetime. Setting the content view, linking the activity with a ViewModel, instantiating various class-scope variables, and so on are examples of this.

- **onStart():** the status of the activity changes to start. As the program prepares for the activity to reach the forefront and become interactive, this call makes the activity visible to the user.
- **onResume():** the state of the action is changed to resumed. The activity can now be interacted with by the user.

Any functionality that needs to execute while the component is visible and in the forefront can be enabled here.

- **onPause():** the activity is put into a paused state. This call indicates that the activity has moved to the background, while it may still be visible if the user is using multi-window mode.

You should suspend or change operations that shouldn't or should be done in moderation at this period. Until either the activity or the activity is resumed, the activity will stay in this status.

- **onStop():** the action has come to a halt. The user can no longer see activity. While the action isn't visible to the user, you should release or change resources that aren't needed.
- **onDestroy():** activity enters the destroyed state. Here, the activity is finishing [25].

4. **JDK (Java Development Kit):** is a requirement for developing android applications. It includes software libraries for the java programming language, as well as various tools for building and running java applications [22]. We used it on our application for developing java based software.

5. **Client/Server architecture**

Our application is designed as a client/server architecture, figure 3.2.

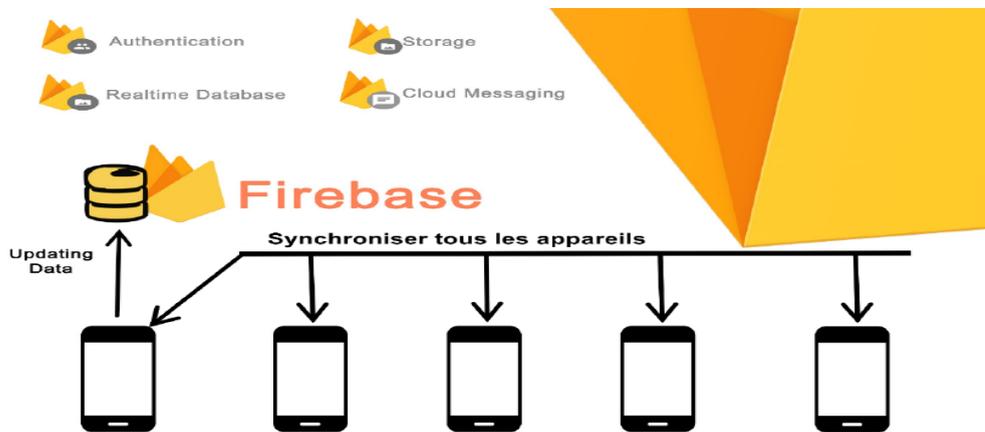


Figure 3.2: Client/Server architecture

- Client: the client in our project is the client application. He has the ability to add, change, or charge his personal data, as well as do other duties.
- Server: all the data in our application is in Google server (Firebase) [21].

6. Database Firebase:

the Firebase Real-time database is a NoSQL database that enables us to store and sync data across our users in real-time. It's a big JSON object that can be worked with in real time by developers. Through a single API, the Firebase database provides the application with the current value of the data as well as revisions to that data.

Our consumers may access their data from any platform, be it web or mobile, thanks to real-time synchronization, figure 3.2. The Real-time database helps our users collaborate with one another.

It ships with mobile and web SDKs, which allow us to build our application without the need for servers. When our users go offline, the Real-time database SDKs use a local cache on the device for serving and storing changes. The local data is automatically synchronized, when the device comes online [23].

3.3.3 Firebase user authentication

In order to recognize users, manage premium content access, and safeguard user data, many applications, and web services must include some type of authentication mechanism.

It would be difficult for the application to determine which user's data and settings belong to them if there was no method to distinguish one user from another.

Authentication choices varying from needing an to allow people to sign in, they must have an email address and a password, with passwords obtained from third-party platforms like Facebook, Google, and Twitter.

Regardless of why an application needs user authentication, developers typically discover that the implementation is far more complicated than it appears on the surface.

Not only does authentication need to be safe and reliable, but it also has to allow users to alter forgotten passwords are supported in their account settings. And interface with a variety of third-party authentication APIs.

Databases must be created and securely maintained, and an administrative interface for manually adding, modifying, and removing users must be created.

Fortunately, there is a less expensive alternative to constructing all of this infrastructure [24].

3.3.3.1 FirebaseUI auth authentication

Firestore takes the least amount of time and programming work to integrate out of the two Firebase authentication alternatives (Firestore SDK and FirestoreUI Auth). In fact, setting an android studio project to accept Firestore authentication generally takes longer than creating the FirestoreUI authentication code itself.

FirestoreUI Auth comes with everything you'll need to get started with user authentication, including all of the user interface pages that guide you through the account creation and sign-in process.

User authentication can be integrated into an application using FirebaseUI Auth by following a few straightforward steps:

1. In the Firebase interface, enable the needed authentication providers.
2. Register the application with any third-party authentication providers that require assistance (Google, Facebook, Twitter and GitHub).
3. In the android studio project, add the FirebaseUI auth libraries.
4. Obtain a reference to the FirebaseAuth object that is shared.
5. To configure and construct the FirebaseUI authentication intent, use the authUI class.
6. To start the FirebaseUI Auth activity, use the intent.
7. Take care of the activity's outcomes [24].

3.3.3.2 Firebase SDK authentication

Although utilizing the Firebase SDK to integrate authentication is more time intensive, it does offer more flexibility. Unlike FirebaseUI Auth, the Firebase SDK gives you complete control over how the authentication process looks, feels, and behaves (except any authentication screens presented by third-party authentication providers).

The following steps are used to build Firebase SDK authentication in its most basic form:

1. In the Firebase console, enable the needed authentication providers.
2. Register the application with the third-party authentication services that require assistance (Google, Facebook, Twitter and GitHub).
3. In the Android Studio project, add the Firebase SDK libraries.
4. Obtain a reference to the FirebaseAuth object that is shared.

5. Write callback methods and add an `AuthStateListener` object to the `FirebaseAuth` instance.
6. Design the sign-in screen's user interface, including alternatives for lost passwords.
7. Implement code for account creation, sign-in, sign-out, and password reset, as well as customizations for each of the authentication providers that will be supported.
8. Firebase credentials may be exchanged for tokens from third-party authentication services.
9. Within the callback of the `AuthStateListener` object, handle authentication results [24].

3.3.4 Email/Password authentication using FirebaseUI Auth

In this work, will show how to use the `FirebaseUI Auth` API to establish email/password based authentication in an android application [24].

3.3.4.1 Creating the project

This activity begins with the creation of a new project. To get started, open android studio and, if required, close any open projects with the file close project menu option so that the Welcome screen displays.

Select the Start a new android studio project quick start option from the welcome screen, and then type `FirebaseAuth` in the application name field and your domain in the company domain setting (or make up a fictitious domain for testing purposes) before clicking the Next button in the new project dialog.

Enable the phone and tablet option on the form factors screen, and set the minimum SDK to API 25.

Continue to the project setup screens, asking the development of an Empty Activity named FirebaseAuthActivity and a layout named activity Firebase auth. [24].

3.3.4.2 Connecting the project to Firebase

The Firebase assistance panel must be used to link an android studio project to a Firebase project before it can access the Firebase capabilities.

Select the tools Firebase menu item to launch the Firebase helper. Locate and pick the authentication section when the Firebase assistance panel displays, as illustrated in figure 3.3.

Select email and password authentication from the drop-down menu.

Refer to the Firebase assistance panel once more, this time tapping the add Firebase authentication to your Application button after the project's Firebase connection is formed.

A dialog will appear, figure 3.4 describing the modifications to the project build setup that will be made to allow Firebase authentication

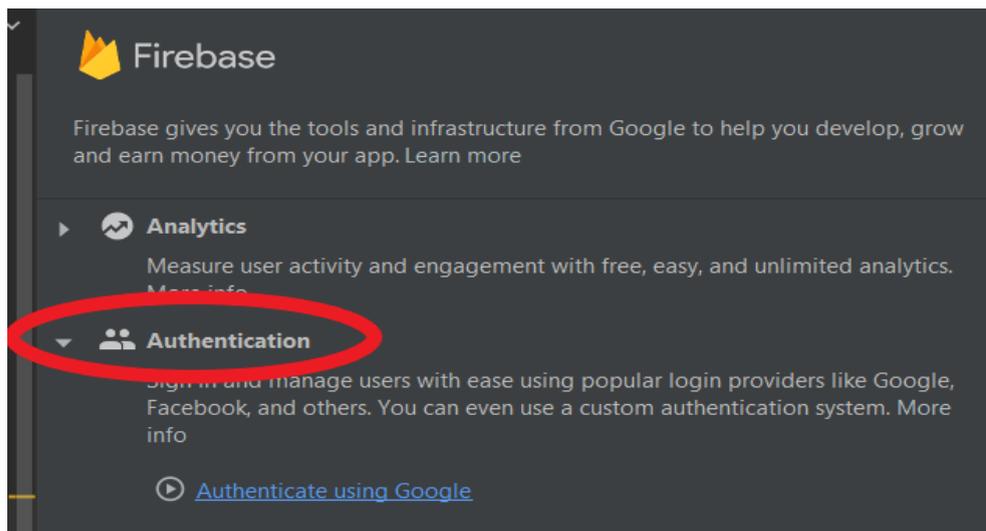


Figure 3.3: Connection with Firebase

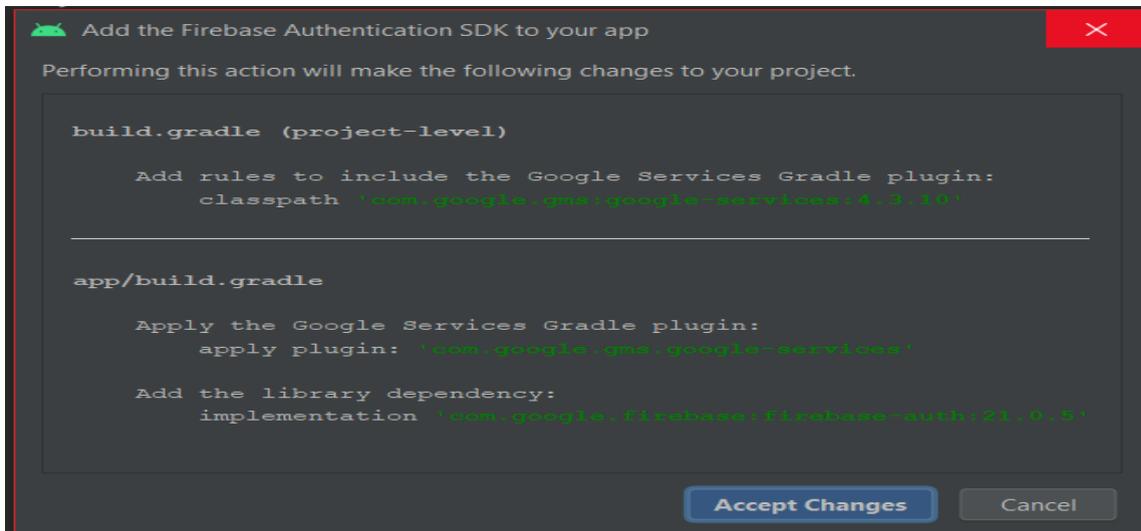


Figure 3.4: The modifications on project

3.3.4.3 Enabling Firebase email/password authentication

After configuring the android studio project to enable Firebase authentication, you'll need to configure certain authentication settings in the Firebase interface. Navigate to your Firebase account in a browser window. Console at:

<https://console.firebase.google.com/>

Select the Firebase examples project from the list of available projects once you've signed in to the Firebase interface, and note that the FirebaseAuth application has been added to it.

In the left-hand navigation panel, select the authentication option and, in the resulting panel, select the Sign-In methods tab as highlighted in (see figure 3.5):

It's worth noting that none of the sign-in providers are enabled by default for applications in the Firebase examples project. Only the email/password provider has to be enabled for this project to operate. When the settings dialog displays, click the enabled switch next to the email/password entry in the providers list (see figure 3.6). To make the change, click the save button after the provider has been enabled (see figure 3.7).

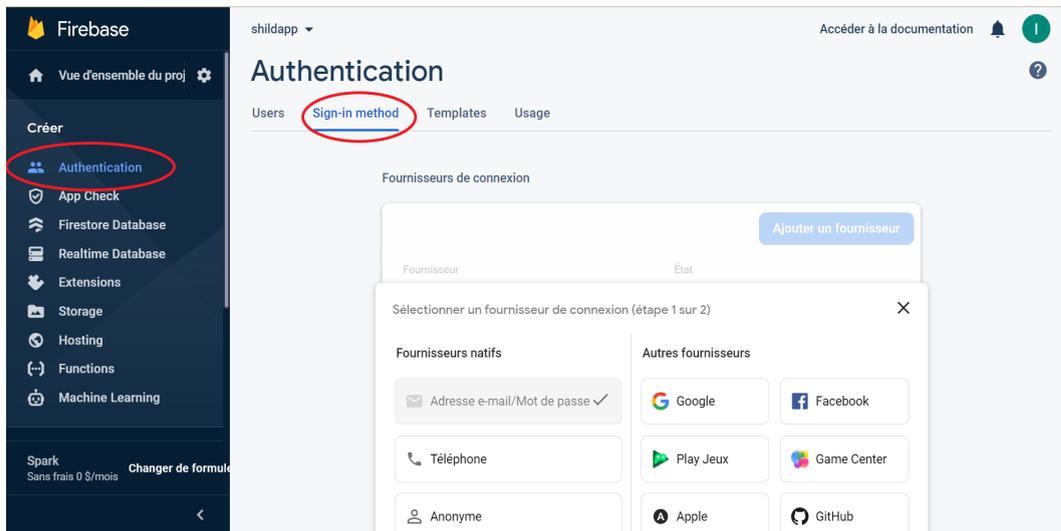


Figure 3.5: The sign-in method

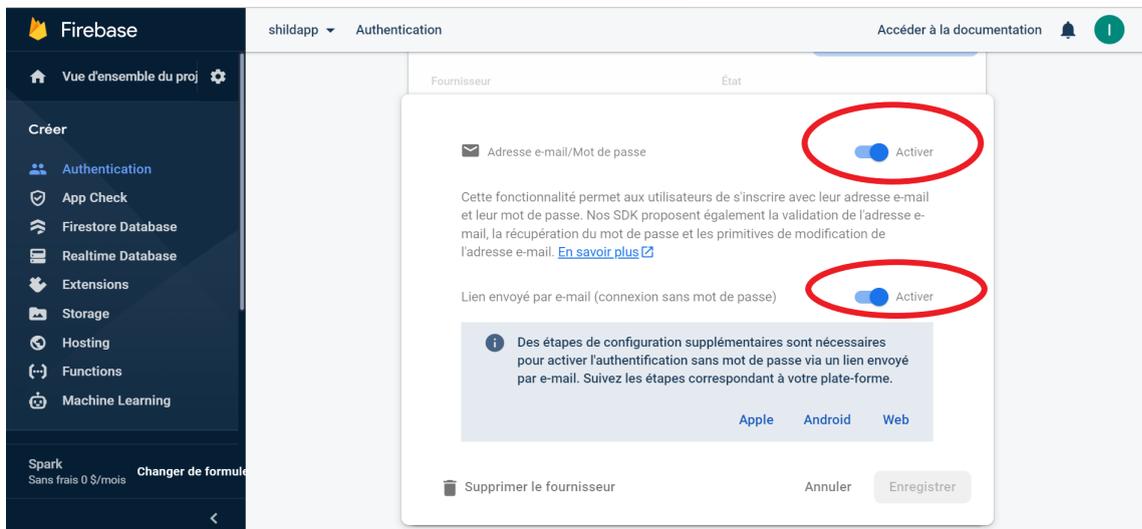


Figure 3.6: Enabling Firebase interface

Adding authentication to your application prevents users from accessing certain features or information until their identity has been confirmed and validated. This implies that the user won't be able to access certain parts of the application until the authentication procedure is complete [24].

3.3.5 Presentation of prototype interfaces

Now we can start programming our application with the android studio.

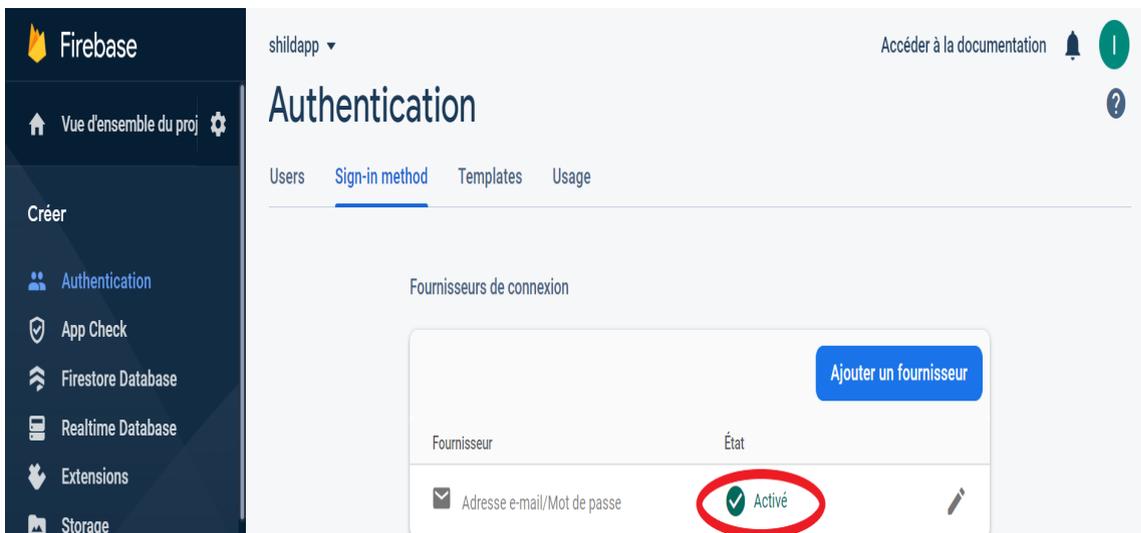


Figure 3.7: Enabling Firebase interface (2)

3.3.5.1 Logo and name of the application



Figure 3.8: Logo application

For the logo figure 3.8, at the same time, the name of the application is “ShilDy” which is a combination of my nickname “imy” and the word “children” from school.

3.3.5.2 Welcome interface

The user must click on Get Started (see figure 3.9) so that he can access the login page.

3.3.5.3 Login interface

In the login interface, there are two scenarios, figure 3.10:

- **Scenario 01:** the user has an account, he must fill in the two authentication fields with the correct coordinates so that he can access the profile page.



Figure 3.9: Welcome interface

- **Scenario 02:** if this is the first time you log in, please create a new account by clicking on Create One and creating your account.

3.3.5.4 Registration interface

If the user is in this case, then you must fill in the registration form figure 3.11.

If there are missing fields to fill in, an error message is displayed on the screen.

3.3.5.5 Email confirmation interface

If the email is real, you will receive a confirmation message in your inbox, figure 3.13 to be able to log in profile page.

This email is contains a link to verify the email address used on the description.

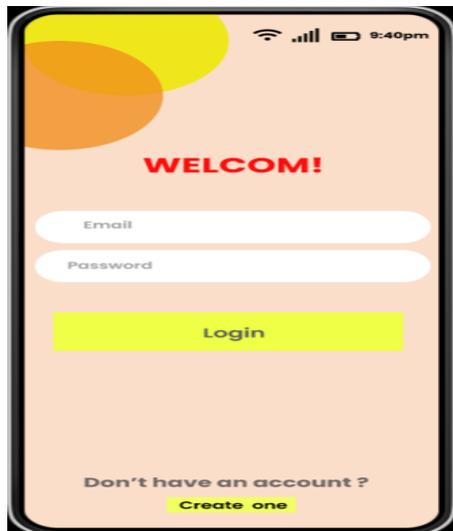


Figure 3.10: Login interface

3.3.5.6 Profile interface

After the user enters their information, they can now access the profile page, figure 3.14, and he can do whatever he wants, he will just have to choose from the list in front of him.

3.3.5.7 Student interface

One click on student layout, so that you can access to the student page, figure 3.15.

3.3.5.8 Add a student interface

One click on +, then you must fill in the registration form. If there are missing fields to fill in, an error message is displayed on the screen. The student will be added automatically on Firestore database, figure 3.16

The same steps apply with teacher and secretary.

3.3.5.9 Discussion interface

One click on discussion signal, so that you can access to the discussion page (figure 3.17).

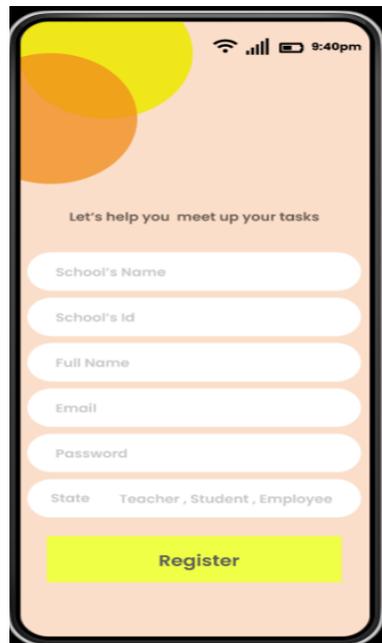


Figure 3.11: Registration interface

3.3.5.10 Module interface

One click on module layout, so that you can access to the module page (figure 3.18).

Each class presents a school year with its modules.

3.3.5.11 Classes interface

One click on class1 layout, so that you can access to the class1 page for all lessons (figure 3.20)

3.3.5.12 Secretary interface

One click on secretary layout, so that you can access to the secretary page for all meetings and events (figure 3.21)

3.3.5.13 Icon of profile page

One click on the profile page icon, so that you can go back to the profile page (figure 3.23).

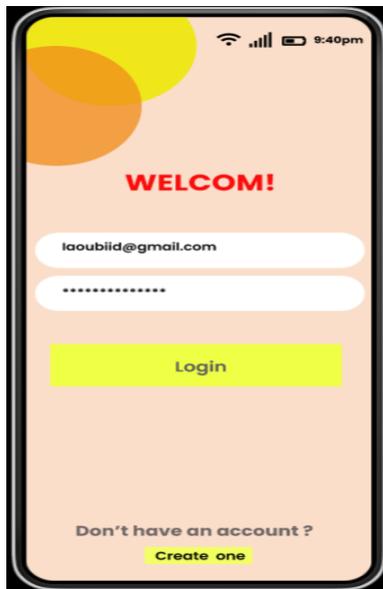


Figure 3.12: Login interface

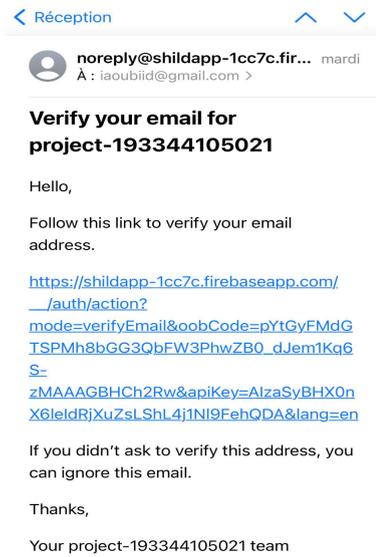


Figure 3.13: Confirmation interface

3.3.5.14 Exit the application

One click on ShliDy door, so that you can exit the application (figure 3.25).



Figure 3.14: Profile interface

3.4 Conclusion

In this chapter, we have presented in detail the realization of our project, starting with the presentation of the hardware and software tools used.

Then in the second part, we illustrated the result of our work by screen prints of the most important interfaces of our application.

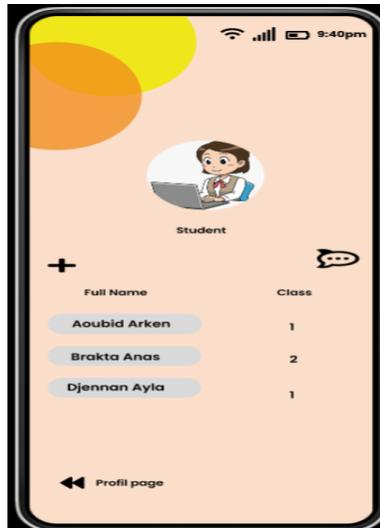


Figure 3.15: Student Interface

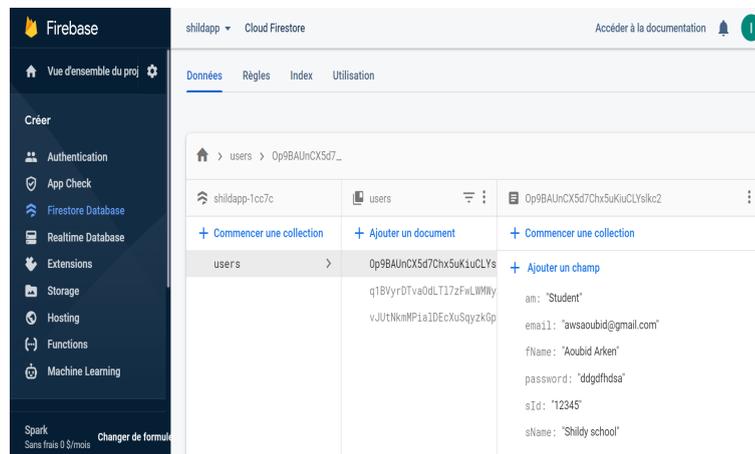


Figure 3.16: Add student firestore database interface

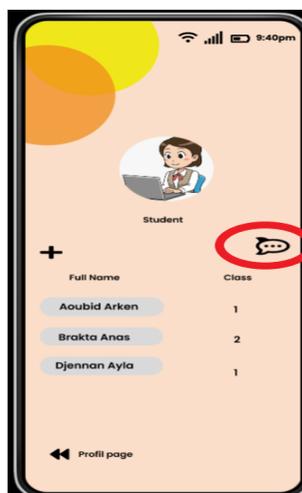


Figure 3.17: Student Interface

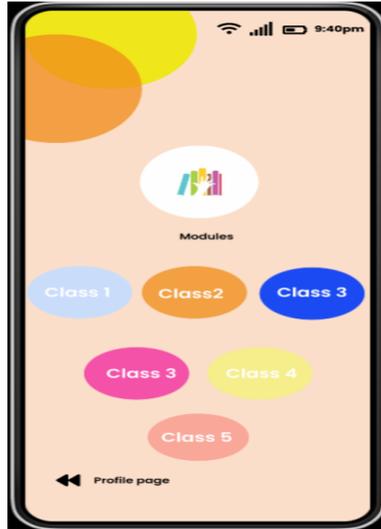


Figure 3.18: Module Interface



Figure 3.19: Module interface



Figure 3.20: Class1 interface

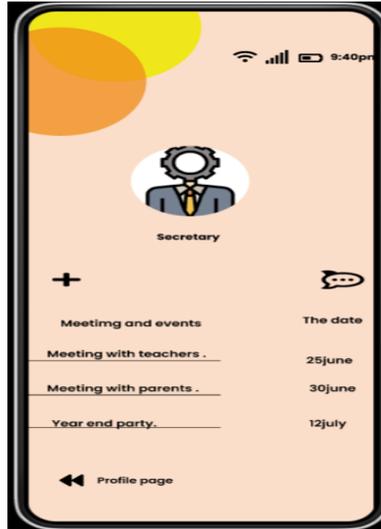


Figure 3.21: Secretary Interface

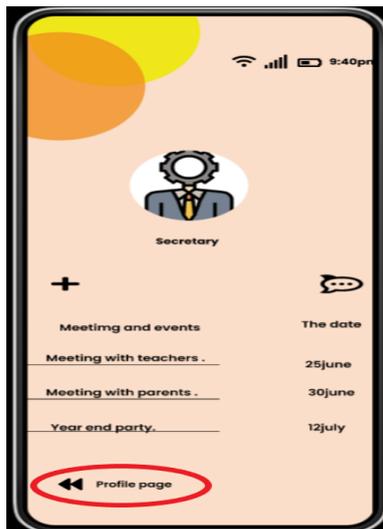


Figure 3.22: Secretary interface



Figure 3.23: Profile interface



Figure 3.24: Profile interface



Figure 3.25: Welcom interface

General Conclusion

“Failure is success if we learn from it”.

Malcolm Forbes.

In this work, we discussed the various phases involved in developing an android based mobile application for a primary school [21]. We began by covering the fundamentals of android smartphone programming. We also spoke about how social network applications are used in academia. Then we showed UML diagrams, which helped us comprehend the system’s static and dynamic structure.

Finally, we discussed the key tools that helped us construct our application effectively, such as the java programming language in android studio.

As well as, the Firebase for database development and event management. These choices enabled us to develop an application that aids in the administration of the school as well as the interaction between the instructor and the student.

We were able to increase and strengthen our theoretical and practical understanding of mobile applications design and development through this project.

We enjoyed the project’s result since we could see the results of our efforts right away, which was really motivating.

Perspectives

At the end of this project, our application is produced in its first version. It will always remain open to prospects for improvement.

We therefore plan to add new features based on user recommendations as:

- We are considering adding another language for very wide use.
- Direct contact by phone (if phone number provided).
- Geolocation.
- Live videos.

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