

## Development of the Lobo Connect mobile application

### Desarrollo de la aplicación móvil Lobo Connect

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#### Abstract

Cross-platform mobile applications have become essential to society. Most people have a mobile device, and the apps help users stay connected, informed, and even entertained. In the context of an educational institution and considering the characteristics of the so-called Generation Z or Centennials, who are naturally linked to the virtual world and consider it part of their community, it is essential to have communication tools according to their needs and motivations. The objective is to develop a mobile application that helps the student community of the Technological University of San Juan del Río to stay informed and can access in real time to news of important events and know their status of the evaluations in the subjects they take. As a result, the application called "Lobo Connect" was obtained.

#### Resumen

Las aplicaciones móviles multiplataforma se han vuelto indispensables para la sociedad. La mayoría de las personas cuentan con un dispositivo móvil y las apps ayudan a los usuarios a mantenerse comunicados, informados e incluso para distraerse. En el contexto de una institución educativa, y considerando las características de la llamada Generación Z o Centennials, quienes se vinculan de forma natural con el mundo virtual y lo consideran parte de su comunidad, es indispensable contar con un medio de comunicación acorde a sus necesidades y motivaciones. El objetivo es desarrollar una aplicación móvil que ayude a la comunidad estudiantil de la Universidad Tecnológica de San Juan del Río a mantenerse informados y puedan acceder en tiempo real a noticias de los eventos importantes y conocer su estatus de las evaluaciones en las materias que cursan. Como resultado se obtuvo la aplicación que lleva por nombre "Lobo Connect".

#### Mobile app, Scrum Android

#### Aplicación móvil, Scrum, Android

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**Introduction**

The future of mobile applications, their formats, their functionalities and possibly their success, depends to a large extent on the hardware that supports them. So it seems unthinkable to venture to guess what apps will be like without knowing what the mobile devices on which they will operate will be like. What now seems as natural to us as touch screens, screens with curved edges, the disappearance of physical buttons, submersible devices, fingerprint sensors, etc., were once true revolutions in the future of mobile devices (Tokyo School, 2020).

*What is a mobile application?*

A mobile application, or app, is a computer application designed to be executed on smartphones, tablets and other mobile devices and which allows the user to carry out a specific task of any type, whether professional, leisure, educational, access to services, etc., facilitating the management or activities to be carried out. (XpertoSolutions, 2020)

Multiplatform applications are apps that are characterised by being created under a single programming language that facilitates their export and therefore their display on any type of device regardless of its operating system.

The creation of cross-platform mobile applications can also be done with native rendering tools. In this case, tools such as Flutter or React Native are frameworks that generate native code for each operating system (ABAMobile, 2022).

Flutter is an open-source framework, i.e., a tool that facilitates a schema when developing an app. (Abamovile, 2022)

Main advantages it offers (Aures, 2022):

- The creation of graphical interfaces is very flexible.
- Development is very fast, allowing you to see the result instantly while writing the code.
- Compiles natively on both Android and iOS.

Android and iOS are the operating systems that dominate the mobile phone world (GROSSO, 2021).

This paper shows the process and stages through which the app "Lobo Connect" was developed, through 7 stages, which are briefly mentioned.

It is a sequential methodology for project management that is divided into phases. Each phase only starts when the previous one is finished (Laoyan, 2021).

**Problem**

The students of the university do not have a mobile application that allows them to consult news, grades, timetables and check the school calendar immediately.

**Justification**

The university is an ISO 9001:2015 certified institution, which refers to the continuous improvement of its processes, in this way it is identified that an improvement in communication with students is to create an app that keeps students informed, showing them the various notices such as: news, timetables, grades and the school calendar.

ISO 9001 is the most widely recognised quality management standard in the world, helping organisations to meet the expectations and needs of their customers, among other benefits (bsi, 2022).

*What ISO 9001 is for*

The importance of implementing ISO 9001 lies mainly in three points: customer confidence and brand differentiation, increasing stability in development and fostering the participation and leadership of the organisation's staff (Geoinnova, 2021).

**Methodology**

The proposed methodology is in 7 stages:

Stage 1, We started with the planning of the development of the app.

Stage 2, an analysis of the functioning on iOS and Android operating systems was carried out, as these operating systems are the most used by the students.

Stage 3, At the design stage the consultant presented the developers with a set of templates for the app interface as a guide, logos and typography were provided to the developers by the university's communication department.

Stage 4, the developers started with a course and started with the programming of the app.

Stage 5, The corresponding tests were carried out, the tests were given according to the programming of each of the components of the screens; these tests only refer to design details, arrangement of icons, colour correction, widget positioning and other general aspects of the app.

Stage 6, The corresponding tests were carried out, the tests were given according to the programming of each of the components of the screens; these tests only refer to design details, icon arrangement, colour correction, widget positioning and other general aspects of the app.

Stage 7, the use of the application is left to the students of the Universidad Tecnológica de San Juan del Río, only for the consultation of institutional information (partial grades, class schedule, school calendar and news).

## Development

### *Planning*

Months before the start of the project, the purpose of the project was determined, and an analysis was made of how many people would be part of the development team. Deadlines and other deadlines were also agreed upon.

### *Analysis*

Generally speaking, what is sought with the development of this project is the creation of a multiplatform mobile application, by this we mean that it is functional on iOS and Android operating systems, these operating systems are the most used by the students of the Universidad Tecnológica de San Juan del Río, who play the role of being the end users of the app.

The use of the web browser on the mobile device to access the integral information system of the university and consult partial grades, timetables, school calendar, etc., is one of the factors that influence the development of the application, since, by means of this, it will be easier to consult this information, a mobile application designed for this, but with characteristics that distinguish it as part of the university.

Based on this, the following are defined as software requirements:

- That it contains a login to access the app with the same data used to access the university system.
- The main screen after the login should include a section called "News", which should be the same as those on the university's website.
- That the student's partial grades are visible through a screen called "Current Partial".
- Students should be able to view their class timetable for the term in a table containing only the time, subject name and teacher's name in the "Timetable" section.
- The current calendar for the current school year should be visible on the "Calendar" screen.
- That the "Notifications" section is incorporated, where the corresponding notifications are displayed by means of floating windows and the app sends the respective notifications.
- That the app itself contains the corresponding button so that the student can unlogin from the app.
- That the official colours of the university are respected throughout the design of the app.
- That "Lobo Connect" is incorporated as the official name of the app, as well as the logo that will be provided by the project stakeholders.
- That the application is multi-platform, available in the online shops "App Store" and "Play Store".

It is proposed to work with a classic waterfall model, as the project merits it. On the other hand, it is important to emphasise that samples of the project's progress will be given to the project's stakeholders (there are no definite dates, they will be given as the project develops) so that the corresponding modifications can be carried out in due time and form.

Due to the COVID-19 health contingency, all project tasks, without exception, will be carried out in 'Home Office' mode, in order to avoid health complications for the developers and thus comply with the University's requirements.

*Design*

A series of screens are proposed for the application, which are designed by the project advisor, presented to the developers, making it clear that these are only proposed guidelines, that the official colours, typography, logos and other design aspects will be provided by the university's communication department.



Figure 1 Proposed design

Final design of the app "Lobo Connect", the app shows 6 screens: (Rivera Uribe & Avila Mejia, 2021)

- Login
- News
- Timetable
- Current P.
- Calendar
- Other options



Figure 2 Final design login and news



Figure 3 Final design other options and current page

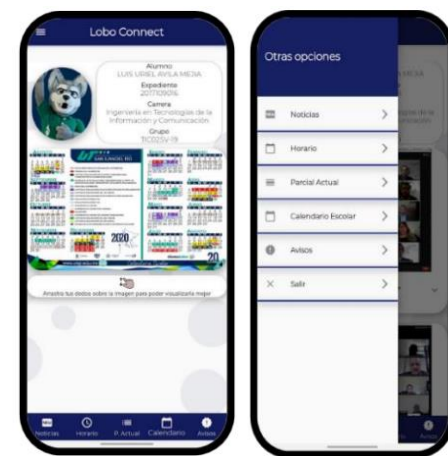


Figure 4 Final design news

Once we have the necessary tools for the design, as well as a detailed analysis of what the application requires, we proceed to the implementation stage, which is carried out by the project developers.

*Implementation*

This phase corresponds to the official development period of the mobile application, which is carried out through the following series of steps:

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As a first step, the developers acquired knowledge about the programming language "Dart", with "Flutter" through the course "Flutter: your complete development guide for iOS and Android" which has to be acquired through the platform 'Udemy'.

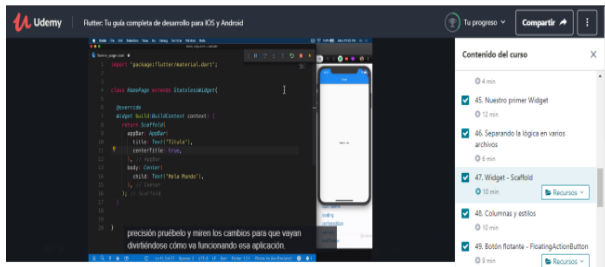


Figure 5 Course

Udemy

Udemy is an online course platform, which was founded in 2010. Udemy's mission is to improve people's lives through learning by offering affordable, on-demand courses.

Currently, its extensive multilingual library includes more than 65,000 courses taught by expert instructors, in addition to the 248 free courses, all of which are of great educational value and many of which are in Spanish. (APRENDER, 2022)

Programming During the programming period of the app, the resources listed in the table below were used:

Resource	Description
Flutter: your complete guide to iOS and Android development	It is the course of Dart and Flutter, framework and programming language, was used throughout the development of the application, as it serves as a fundamental guide in the technical aspects.
Visual Studio Code	It is the code editor, thanks to all the tools it provides and the easy handling for programming in Dart, it is the editor that the course recommends to carry out the programming lines.
Android Studio x Emulator	It only helps in the creation of the emulator on which the tests will be carried out during the development of the app..
Android mobile device	Carry out tests on Android operating system, used simultaneously with the emulator.
MacOS & iPhone	Apple devices, to carry out app testing on iOS operating systems, the Mac is required to generate the application.

Table 1 Resources

Testing

During the development of the mobile application, the tests were carried out according to the programming of each of the components of the screens; these tests only refer to design details, arrangement of icons, colour correction, widget positioning and other general aspects of the app. For the final tests, these will be developed at the end of the app as such and will only consist in the review of the data at the time of access, for example: login data, institutional data at the time of entering, partial grades and class schedule, all this through the control folio with which access to such data is accessed.

Installation or deployment

Once the application development work has been completed, the corresponding apk files are generated for the operating systems (iOS and Android), and these versions are tested on their respective devices. If any faults are found, the relevant corrections will be made. For the publication of version 1.0 of the application in the official shops (App Store and PlayStore), where it will be available to all students of the university, it is up to the developers after the approval of the stakeholders of the project.

APKs are executable files for Android. Each application requires a set of data in order to run on an operating system. In the case of Android, this app data is compressed within the APK (Android Application Package) file. These files can be shared between Android mobiles (just send them by the way you want), and to open them you just need to click on them (xatakandroid, 2020).

The Lobo Connect app is available in the PlayStore and the App Store.

[https://play.google.com/store/apps/detail?id=com.utsjr.loboconnect&hl=es\\_MX&gl=US&showAllReviews=true](https://play.google.com/store/apps/detail?id=com.utsjr.loboconnect&hl=es_MX&gl=US&showAllReviews=true) (PlayStore, 2021)

<https://apps.apple.com/gt/app/lobo-connect/id1571372929> (Store, 2021)

App Store and Play Store

The Google Play Store is the mobile application shop for devices with the Android operating system. Any software that is developed for use on smartphones or tablets running the Google OS must be listed in the catalogue of this shop to ensure its security and approval by the company. (NeoAttack, 2020)

App Store is Apple's app marketplace for users, through which thousands of app developers from around the world offer their products and millions of users can download free or paid apps, known as iPhone/iPad apps and games (QODE, 2022).

Use and maintenance

The use of the application is the responsibility of the students of the Universidad Tecnológica de San Juan del Río, only for the consultation of institutional information (partial grades, class timetable, school calendar and news), the notices section is developed by the students of the Information Technology degree in the Multiplatform Software Development Area, who will make the necessary corrections for the following versions.

Results

A survey was conducted to identify the opinion of the end users, students of the university about the Lobo Connect app and most of the students recommend the app.

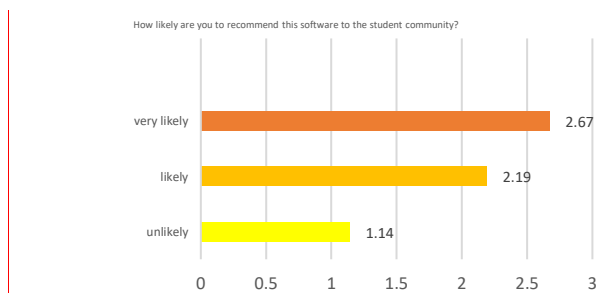


Figure 6 Survey

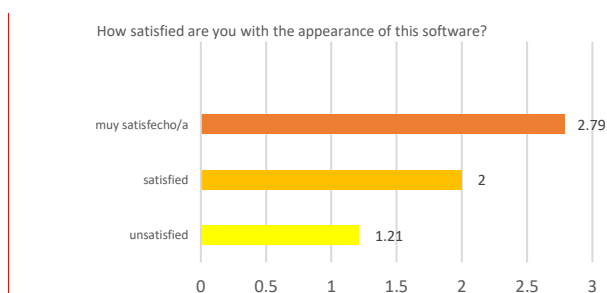


Figure 7 Survey

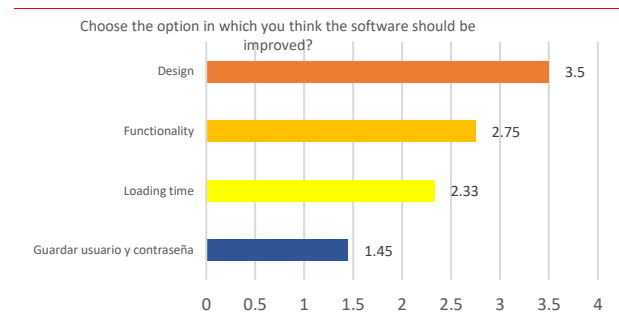


Figure 8 Survey

The result in comparison of the applications like those of Lobo Connect shows the characteristics:

App	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
Lobo connects	✓	✓	✓	✓		✓								✓
UAEM	✓		✓	✓		✓	✓	✓	✓	✓	✓			✓
UCOL	✓		✓				✓	✓					✓	✓
MiUV	✓		✓			✓					✓			✓
Lobo Up	✓		✓	✓	✓	✓						✓		✓

Table 2 Comparative table of university institutions with apps

Characteristics:

- Student information.
- News.
- Timetable.
- Grades.
- Absences.
- Calendar.
- Sports.
- Culture.
- Services.
- Communication (social networks).
- Routes.
- Payments.
- QR code, access control.
- Android – IOS.

The Lobo Connect app shows the news of the UTSJR in comparison to the rest of the applications (Sandoval, 2017) (Freeware, 2022).

The UAEM app is one of the apps with the most functionalities (UAEM, 2015). UCOL, unlike the Lobo Connect app, does not show students' timetables (Colima, 2022).

As a result, the necessary requirements for INDAUTOR were obtained and the registration is in progress.

## Conclusion

The "Lobo Connect" app has been of support to the student community as all students have a mobile device and having this app makes it easier for them to consult their timetables, grades, to consult the school calendar and to keep informed about new news from the university. In addition, the app can be installed on different platforms such as IOS and Android systems, and is available in the official shops (App Store and PlayStore).

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