

Mobile application for sending and receiving academic messages

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Iván Azamar Palma

Master in Interinstitutional Relations

Institution: TECNM: Tecnológico de Estudios Superiores de Chalco

Address: La Candelaria Tlapala, 56641, Chalco, México

E-mail: ivan_azamar@tesch.edu.mx

Marco Antonio Acosta Mendizabal

PhD in Systems Engineering

Institution: TECNM: Tecnológico de Estudios Superiores de Chalco

Address: La Candelaria Tlapala, 56641, Chalco, México

E-mail: domila163l@mail.com

Claudia Guzman Barrera

Master of Information Technology Management

Institution: TECNM: Tecnológico de Estudios Superiores de Chalco

Address: La Candelaria Tlapala, 56641, Chalco, México

E-mail: claudia_gb@tesch.edu.nLx

Virginia Aguilar Guerrero

Master's Degree in Website Management and Engineering

Institution: TECNM: Tecnológico de Estudios Superiores de Chalco

Address: La Candelaria Tlapala, 56641, Chalco, México

E-mail: virginia_ag@tesch.edu.nLx

Consuelo Ceron Rodriguez

Degree in Administration

Institution: TECNM: Tecnológico de Estudios Superiores de Chalco

Address: La Candelaria Tlapala, 56641, Chalco, México

E-mail: consuelo_cr@tesch.edu.rnx

Martha Guadalupe Morales Huerta

Master in Computation

Institution: TECNM: Tecnológico de Estudios Superiores de Chalco

Address: La Candelaria Tlapala, 56641, Chalco, México

E-mail: martha_mh@tesch.edu.nLx

Cristóbal Estrada Acosta

Master of Business Administration

Institution: TECNM: Tecnológico de Estudios Superiores de Chalco

Address: La Candelaria Tlapala, 56641, Chalco, México

E-mail: cristobal_ea@tesch.edu.rnx

ABSTRACT

We live in a competitive and globalized world in which innovation is essential for the development of new services and products that favor the generation of value in society. This is the case of education where the integration of information and communications technologies has made possible the innovation of teaching-learning processes, as is the case of the use of mobile devices inside and outside the classroom. However, inevitably, there are still barriers to being able to provide real-time interconnectivity in the educational context. Hence arises the importance of the implementation of mobile devices to revolutionize educational practices that provide optimal education of excellence. This project aims to develop a new modality through the application of mobile devices for smartphones, which allows receiving relevant messages of academic interest for students from teachers and coordinators of a higher education institution, at the same time, allowing that academic coordinators and students have excellent communication in real time in locations far from metropolitan areas. It was developed with a qualitative, transversal methodology and as a research technique, software development using the agile scrum methodology. The evidence found proposes a broad field for research on the use of applications in the educational context and the pedagogical potential of mobile devices in higher education and allows us to propose a broad field for future studies.

Keywords: Android, Services, Web, Systems, Software.

1 INTRODUCTION

Currently, mobile devices, smartphones, and the Internet have transformed the quality and habits of the population, forming an essential part of people's lives in terms of communication. This is the case of the educational context where the use of mobile devices within the classroom allows students to discover new teaching-learning processes, with different intensity, penetration and use in formal and non-formal training. The mobile device is called to revolutionize educational practices by providing degrees of freedom that other previous technologies did not offer.

Different authors have carried out research on this topic, where they analyze the teaching-learning processes, such as the case of e-learning. When referring to mobile devices as digital teaching media, we speak of "mobile learning", "learning on the move" or Mobile Learning (Anderson, 2014). Mobile Learning consists of the use of mobile technologies in the teaching-learning process. Its main characteristic is ubiquity, that is, it allows teaching-learning anywhere and at any time.

These have defined it as a set of teaching and learning practices and methodologies through mobile technology, that is, through mobile devices with wireless connectivity. Pacheco and Bueno (2016); cantillo (2008); Padron (2013); Rodriguez, (2020), define Mobile Learning

It would be the combination of e-learning with mobile devices, thus producing educational experiences in any situation, place and time, being able to cover urgent learning needs, in mobility and with great interactivity. Camacho (2012) highlights the main characteristics of Mobile Learning as its portability, ubiquity, immediacy, connectivity and adaptability to the user. Brazuelo and Cantillo (2012)

add the aspect of learning autonomy as a fundamental characteristic of Mobile Learning, an element that is crucial in all forms of e-learning and distance learning methods.

In its technical part, this project proposes the use of different platforms in the Client – Server model through the data exchange format in the JSON format (JavaScript Object Notation).

The essence of the prototype is to have an app (mobile application) for the Android operating system that allows you to view and manage the messages generated by administrative and academic staff to teachers and students so that they are informed with information that is relevant to each user profile. The above is achieved by managing and sending messages from a computer that acts as a server through an intranet to the users' smartphones. This process is known as web services, since in essence it is communicating different platforms under XML (Extensible Markup Language) messages Quan-Haase (2008).

The project consists of two development platforms; one for mobile devices with Android operating system and another for the administration of institutional messages through a web system with free software tools such as the PHP programming language (Hypertext Preprocessor), a MariaDB database management system and the use of Framework and JavaScript tools for a more dynamic user interface on the Web.

The app uses the SQLite database for mobile devices as a management system that allows storing the record of sent messages and user profiles.

The idea is to provide computer tools that allow users and their mobile devices to communicate more efficiently with the use of new technologies that are independent of development platforms. The practical case is the achievement of having a project in a university where you want to immediately communicate institutional messages from academics and administrators that are of interest to the student and teaching community using smartphones.

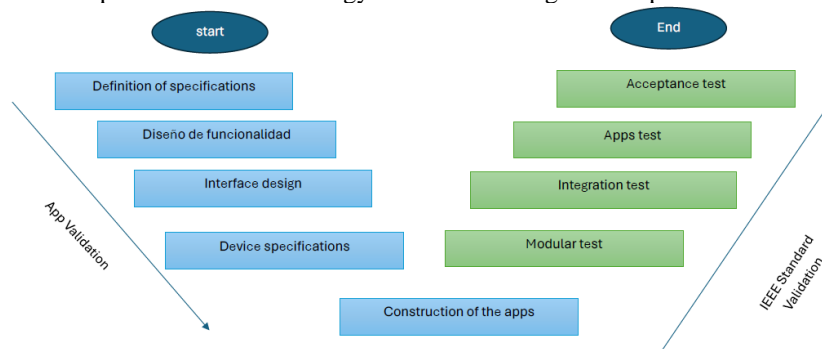
2 METHOD DESCRIPTION

For the development of the applications, work has been established in the case study, from a qualitative perspective. This qualitative approach facilitates the approach to the reality studied and its description in its context. For this development it has been necessary to carry out qualitative analysis of apps, in such a way that their characteristics, performance and educational potential are well known, not only at an individual level but also as a whole. In this sense, observation and experimentation has been chosen, aiming to show the validity of the communication of mobile applications in the teaching-learning process. The case study can be used as an exploration tool, but also for testing and building theories.

The methodology, which appears as outstanding is its transversality of the process using the agile Scrum methodology for software development, properly carrying out the activities established in it: Daily meeting of the work team, sprint planning, review of sprints for the product feedback.

The main assumption was made in XP with the possibility of decreasing the mythical exponential curve of the cost of change throughout the project, enough for the evolutionary design to work. This is achieved thanks to the technologies available to assist in software development and the disciplined application of the following practices: the planning game, small deliveries, metaphor, simple design, testing, refactoring, pair programming, collective code ownership, continuous integration, forty hours per week, on-site client, and programming standards according to (Canós; Penadés, 2012).

Figure 1. Description of the methodology for the technological component used in the project.



Source: The authors

3 DEVELOPMENT

To develop the mobile application, the need was first established to raise the level of communication and interaction between the actors of an educational institution so that they are increasingly closer and thus able to interact in the best way for their own benefit and that of the institution in which they are located. that are found.

To propose a solution to the problem, surveys were carried out with students, parents and teachers of educational institutions. The results derived from the responses revealed the aspects that must be improved, from the communication of tasks, through personalized attention to doubts, to a record of attendance and notes, which can be consulted at any time; Likewise, it was determined that many times parents are not notified when there is an assignment or a note has been received, usually because the students do not give it to their parents, which generates a gap between students, parents and teachers.

Having based on the previous premise, the application began to be carried out, making the decision to use a free-use platform tool, which has a well-defined structure in terms of its algorithm and programming, handles code pagination and blocks are used to divide the programming. Within each object found in it, this platform has proven to be an excellent and praiseworthy tool for building educational software, for this reason the developments carried out through it have a consolidated robustness in terms of its architecture.

3.1 WEBSERVICES

In the first instance, the following lines of code are added to the build.gradle (Module:app) of the Android Studio (development IDE), which is selected in blue as shown in Figure 1 to install the Volley library. (Mollahoseini, 2018)



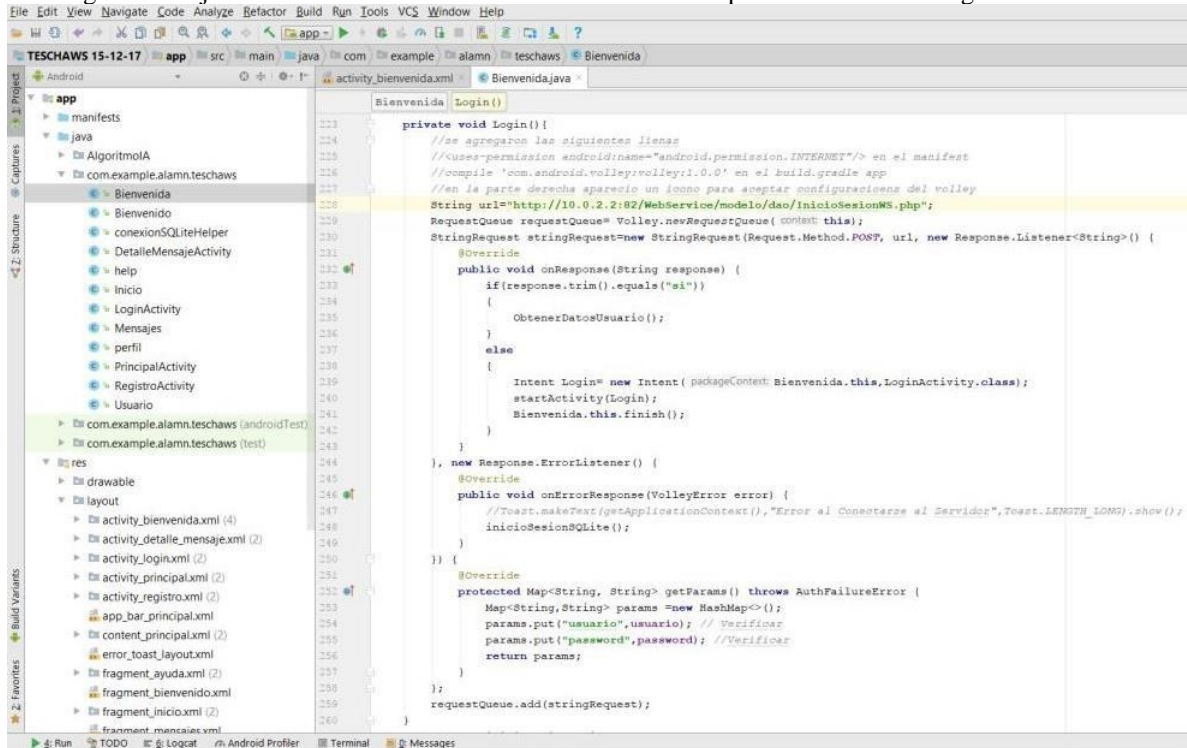
Source: The authors

Figure 2 shows part of the code that was used to build the first activity of the app, which highlights the connectivity through a webservices, which allows us to send the username and password to the web server. sends an access or denial response using the JSON format, which is received and processed by the Android app. Note that the source code in Figure 1 defines the path of the web server: “http://10.0.2.0:82/Webservice/model/dao/inicioSesionWS.php”

The previous url belongs to the domain of the web server and through which it receives a request through the POST method and through which the user name and password that will be consulted to validate access are sent. The onResponse(String response) method is responsible for receiving the response from the server to the app to continue accessing the different activities.

The example shown in Figure 2 represents all the source code of the project that involves the sending and receiving of information between the web server and the Android app, especially the institutional messages where the app periodically requests the user for the institutional messages by the web server, which are received by the onResponse(String response) method and are displayed according to the user's profile and interest in the graphical interface.

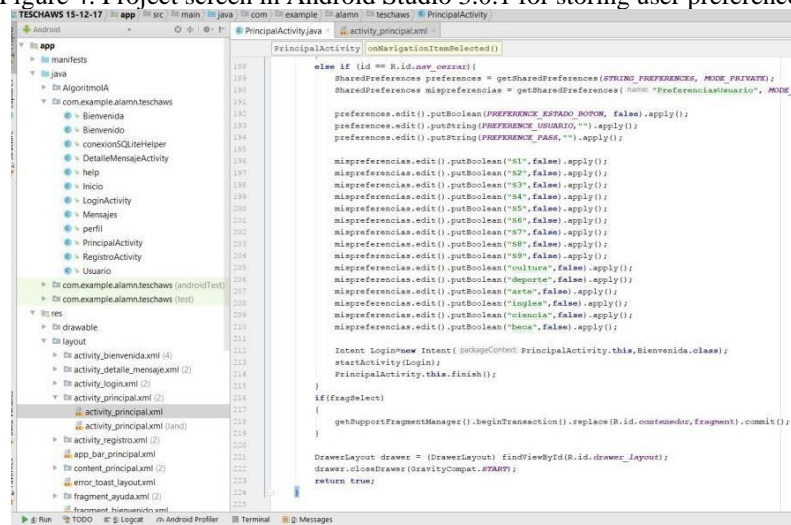
Figure 3. Project screen in Android Studio 3.0.1 for the development of access through web services.



Source: The authors

The app has the ability to register the user's profile, this information is saved in the application folder of the mobile device, which is used to analyze whether the message received by the academic or administrative staff is pertinent to their profile, If so, the message is placed in a list of relevant messages, otherwise, the message will be sent to a general list, the code that serves as an example to save preferences as shown in Figure 3. The source code has the following process: the preference is instantiated indicating the name of the file, the access mode and with the put method to save the data in an xml file.

Figure 4. Project screen in Android Studio 3.0.1 for storing user preference.



Source: The authors

Figure 4 shows an example of the queries that are made of the messages stored in the database, these are received by the web server app and are stored to ensure the efficiency of the application's performance, that is, the user will have a small updated backup of institutional messages in case the server or connectivity fails.

Figure 5. Code examples of the query to the SQLite database.

```
//Llenar el ListView desde SQLite
ArrayList<String> lista = new ArrayList<>();
ConexionSQLiteHelper SQLite= new ConexionSQLiteHelper(getActivity(), name: "webservice", factory: null, version: 1);
SQLiteDatabase bd = SQLite.getWritableDatabase();
Cursor fila = bd.rawQuery( sql: "SELECT * FROM mensajes ORDER BY puntaje desc;", selectionArgs: null);

while(fila.moveToNext()){
    lista.add(fila.getString( columnIndex: 1));
    ListAdapter listAdapter = new ArrayAdapter<>(getActivity(),R.layout.textvw, lista);
    //ArrayAdapter<String> listAdapter = new ArrayAdapter<String>(getActivity(),android.R.layout.simple_list_item_1, lista);
    listMensajes.setAdapter( listAdapter);
}

final SQLiteDatabase bd = SQLite.getWritableDatabase();
Cursor fila = bd.rawQuery( sql: "SELECT id_m, titulo, mensaje, inicio, puntaje FROM mensajes WHERE titulo = '"+idmensaje+"'", selectionArgs: null);
while(fila.moveToNext()){
    id = fila.getString( columnIndex: 0);
    t=fila.getString( columnIndex: 1);
    c= fila.getString( columnIndex: 2);
    f = fila.getString( columnIndex: 3);
    p = fila.getInt( columnIndex: 4);

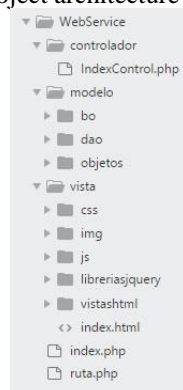
    titulo.setText(t);
    cuerpo.setText(c);
    fecha.setText(F);
    fin = p + 1;

    //Funcionalidad del boton No gusta
    update.setOnClickListener((v) -> {
        ContentValues registro = new ContentValues();
        registro.put ("puntaje", fin);
        bd.update( table: "mensajes",registro, whereClause: "id_m="+id, whereArgs: null);
        showToastInfo( mensaje: "Este mensaje formará parte de tus futuros intereses");
        //Toast.makeText( getApplicationContext(), "Este mensaje formará parte de tus futuros intereses", Toast.LENGTH_SHORT).show();
    });
}
```

Source: The authors

Figure 5 and 6 shows the architecture of the project and server-side web program built with free software PHP, Java script, HTML, CSS and a Maria DB database manager. The php files receive requests from the web services volley through the POST method and send information to it through data encoded in JSON format with the encode_json() method.

Figure 6. Project architecture on the server.



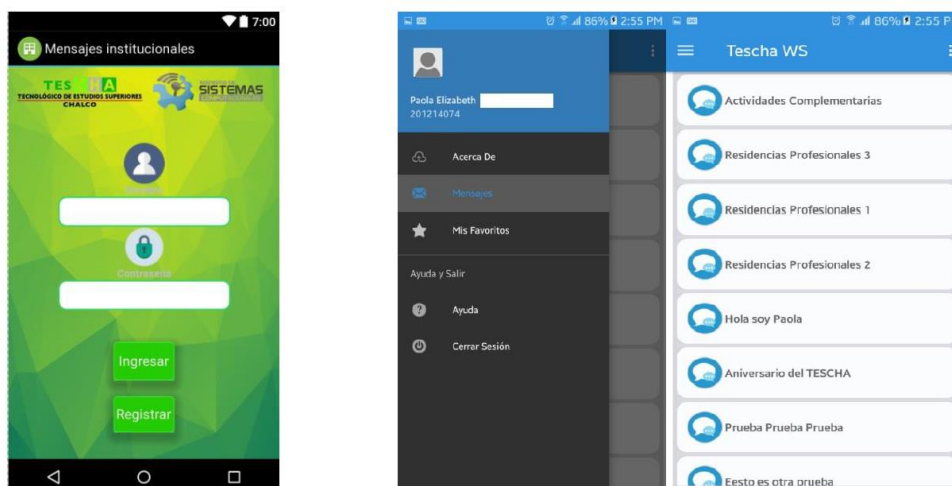
Source: The authors

4 DISCUSSION RESULTS

Figures 7 and 8 show the essentials of how the app works. Figure 6 shows the login access of students, teachers and administrators who must be registered on the web server. Figure 7 shows all institutional messages in the form of a list that can be saved on the smartphone in case of loss of connectivity with the server. Also, in Figure 7, the user's favorite messages section shows a subgroup of special messages. In Figure 8 there is the screen that shows the reading of the messages for viewing on the smartphone and finally in Figure 9 the categories of the messages.

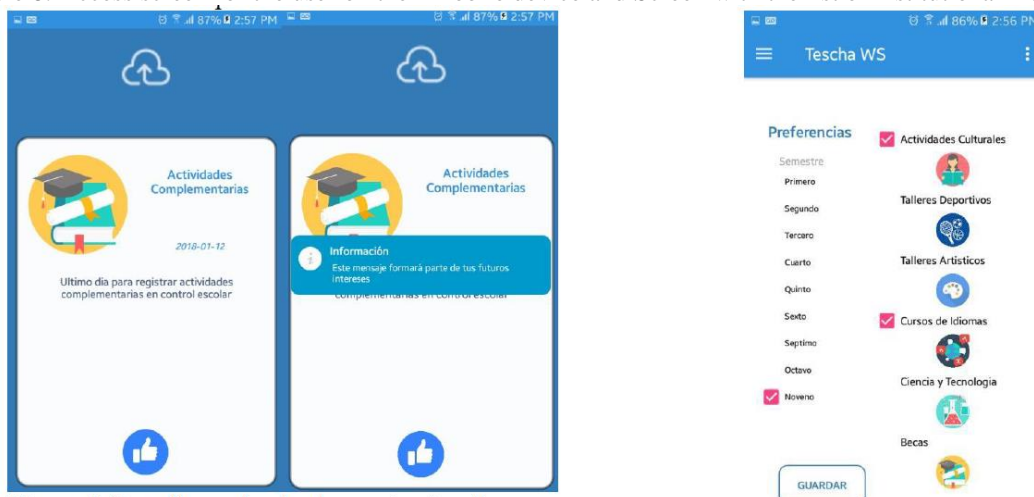
On the other hand, Figures 9 to 10 show the graphic interface with which administrators who wish to send institutional messages through the web server as notifications to smartphones interact. This web system has the following functionalities: access, user management, message management and sending.

Figure 7. Access screen for the user on their mobile device and Screen with the list of institutional messages.



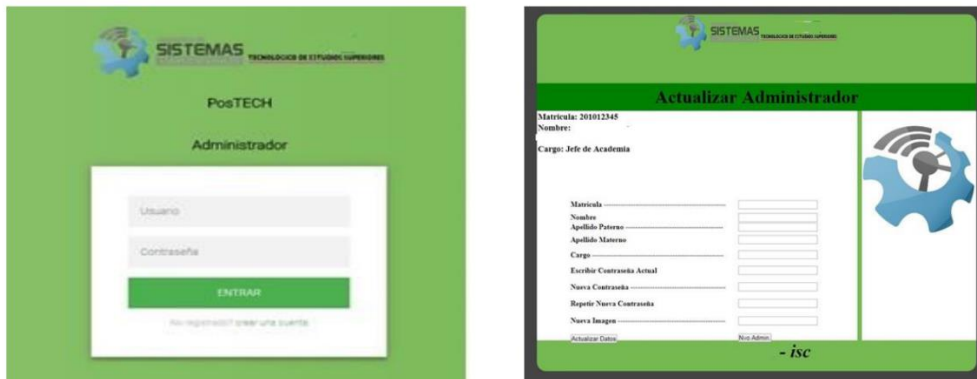
Source: The authors

Figure 8. Access screen for the user on their mobile device and Screen with the list of institutional messages.



Source: The authors

Figure 9. Administrator access and registration screen



Source: The authors

Figure 10. Administration and message registration screen.



Source: The authors

5 CONCLUSIONS

The final result achieved by creating a mobile application appropriate to the needs of the educational institution which met the objective of reducing the communication and interaction gap between teachers and students to a minimum.

On the other hand, it was found that the students achieved greater concentration when carrying out the activities through the use of mobile applications, additionally the fact is highlighted that for the installation of the applications on mobile devices, a efficient of its memory resources and processing capacity, which means that its use does not require high-end smartphones, thus expanding the population that can make use of these tools.

The predominant purpose was to promote academic performance through the best of basic student-teacher communication processes, and the interaction between its members. By achieving this objective, the people involved in student academic development will be brought closer to such a point that they can advance towards academic objectives, the possibility for academic development to be as expected and the most optimal since the interaction would be personalized and increasingly closer.

As you can see, the project was developed for a Higher Studies Technological Institute of the State of Mexico as a pilot test, where the importance of the media and its technologies in keeping the academic community informed will be demonstrated. The System has the advantage of being multiplatform thanks to web services and economic sustainability due to using free software.

It is important to mention that there is a proposal that the application will also be intended for parents and teachers who, for the most part, are alien to new technologies, which is why a mobile application with a friendly interface and easy use is proposed.

The idea is to promote the use of emerging technologies in order to cover specific needs with the minimum cost. The above will allow more people to provide computer solutions to real needs in the environment and take full advantage of the advantages they offer to improve the conditions of developing countries that need to create their own applications, trying to promote their own engineering instead. of importing technological patents disproportionately and at high costs.

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