

Virtual Enrollment Platform to Fulfill Social Distancing: COVID-19

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Abstract: *Worldwide, there are long queues outside educational institutions, causing them to become infected with COVID-19 due to the agglomeration of people, which generates great consternation and misunderstanding among parents during the enrollment process. Therefore, the objective of this research is to implement a web platform to optimize the enrollment process in educational institutions, taking into consideration the availability, integrity and confidentiality of the information. The system development methodology was divided into 3 phases. Start; The problem, the functional and non-functional requirements were defined, the technologies to be used for development were evaluated and the system prototypes were designed. Development; The Frontend was designed by programming the functional requirements and the architecture of the database was developed in the Backend. Transition; A feedback was made correcting errors by users through a usability test. In this sense, it was possible to carry out the registration process in a virtual way, complying with social distancing, preventing citizen insecurity, optimizing processes in a fast and efficient way, preserving information security. The web platform made it possible to reduce the digital gap for the use of information technologies (IT) between the institution and parents, reducing educational inequality with an inclusive education, taking a step towards digital transformation in an equitable and transparent way.*

Keywords: *implementation, web enrollment system, enrollment process, virtual enrollment platform.*

1. INTRODUCTION

Currently, the online enrollment system represents a technological path for educational institutions in order to improve the enrollment process and offer a better educational service to students. In America, technologies were implemented to deal with the state of emergency, the most implemented were: digital platforms, downloadable study guides, online sending of documents and updates, thus eliminating the long queues that parents made to reserve a school vacancy in institutions (UNESCO, 2020). A web platform is one that is accessed through the internet offering dynamism and functionalities that respond to particular cases, it is also estimated that its application reduces the registration time by 80.5% (Amasifuen, 2020), thus generating greater competitiveness among educational institutions (Delgado et al., 2020). The enrollment process does not have to be frustrating, on the contrary, it should be as simple as possible for parents, thus generating a good impact as an institution. The enrollment process is located within the administration services, it maintains: academic activities, course registration and delivery of certificates (Araya, 2016). On the other hand (Moreno et al., 2016) defines the enrollment process as the set of procedures and activities that guarantee the continuity of students in an educational institution. Some of the most

common technologies for the development of a web platform are: HTML, CSS, JavaScript and PHP. (Coronado et al., 2014) defines HTML as a markup language. (Felisberto et al., 2015) defines CSS as the technology in charge of granting a better visual presentation to an HTML document, on the other hand, it defines JavaScript as a language to be executed on the client side. (Delgado & Rebeca, 2020) defines PHP as a server-side language used for the execution and creation of dynamic websites.

In Jordan, (Ali et al., 2019) investigated web accessibility at the University of Jordan, stating that an online system helps university students by reducing the time in the enrollment process by 87%, which corroborates the importance of using digital enrollment platforms to eliminate queues in educational institutions. Likewise, in the Philippines, (Custodio & Castro, 2016) in their research on the pre-registration procedure through the online registration and qualification evaluation system, they state that the registration process is optimized by creating user profiles, which indicates that one of the ways to develop the solution is by creating user profiles: students, teachers and administrator. In Nigeria, (Obasi et al., 2013) in their article on a novel web-based student academic record, they affirm that to optimize the academic record, processes must be accelerated and untimely delays eliminated. In Peru, (Delgado et al., 2020), indicate that the best way to accelerate and optimize the school enrollment process is through a mobile application with 3 processes: registration, monitoring and control. With which these functionalities will solve future problems, such as the monitoring of notes and the control of attendance.

In Spain, parents make long queues at the Santa Bernadette Children's Center, this generates consternation and misunderstanding in parents who wait hours enduring the cold and insomnia. This problem is experienced in 95% of public institutions (Barnés, 2020). In Chile, the Ministry of Education implemented the digital platform "help MINEDUC citizen care", where parents request a vacancy, enroll and update their children's data online (Ministerio de Educación del Gobierno de Chile, 2020). In Peru, at the end of the third quarter of 2018, the "Identicole" digital platform was implemented, its mission is to provide relevant data from educational institutions nationwide, such as: geographic location, list of teachers, infrastructure, curriculum and tools technological teaching - learning. Documents cannot be uploaded on the web platform, so parents have to go to the institution in person, risking public health (IPAE, 2020). It is important to mention that not all educational institutions comply with an efficient enrollment process, so they resort to extemporaneous processes. In the province of Chincha, parents queue for a vacancy in the institutions. An approximate wait of 5 hours was reported in inhumane conditions (Chincha en la Noticia, 2020).

At the "Simón Bolívar" Public Educational Institution, parents make long lines from 8:00 p.m. the day before until 9:00 a.m. the next day to look for an enrollment vacancy for their children, suffering from the immense heat of the province, in some cases victims of crime and prone to catching COVID-19 due to the agglomeration of people. Virtual platforms are a support resource for academic management, having permanent access to the internal processes of the institution. Therefore, the objective of this research is to develop and implement a web platform to optimize the enrollment process in educational institutions, taking into consideration the availability, integrity and confidentiality of the information. The web platform breaks the digital divide for the use of information technologies between the institution and the parents, reducing educational inequality with an inclusive education. This research describes the importance of optimizing the enrollment process through a web platform, using a classic methodology for development, accepted by students and parents through a usability test. Establishing 4 steps to simplify and accelerate this process that help maintain social distancing during the COVID-19 pandemic.

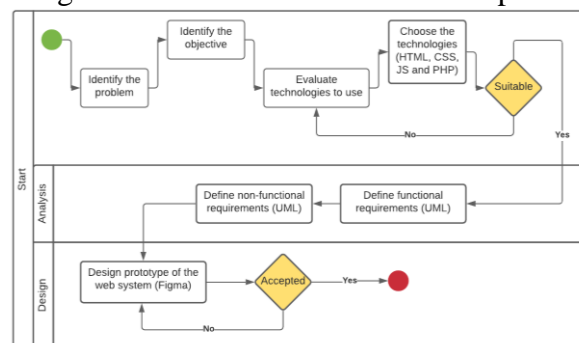
2. METHODOLOGY

The RUP methodology comprised of 3 phases was used, these are: start, development and transition (Díaz, 2016).

Start

In figure 1, in the flow diagram of the initiation phase, the research problem was identified: the queues that parents made in front of the Simón Bolívar Educational Institution, then the objective of optimizing and speeding up the enrollment process at the Institution, then the technologies to be used were evaluated: HTML, CSS, JS, PHP, phpMyAdmin, Figma and CorelDraw. Later in the hardware part a CORE i5 laptop, tenth generation i5-10Y75, 8GB of DDR4 RAM and 1Tb of SSD disk storage was used. This phase had 2 sub phases: Analysis; functional and non-functional requirements were defined; they were outlined through the Unified Modeling Language (UML) and Design; Figma software was used to design the prototypes of the web platform.

Figure 1. Flowchart of the initiation phase

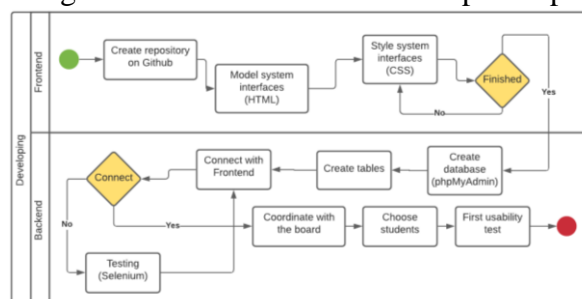


Source: Own elaboration

Development

Figure 2 shows the flow chart of the development phase. a) Frontend: all functional requirements were coded using HTML, CSS and JavaScript. b) Backend: the architecture of the database was developed in phpMyAdmin, connecting later with the Frontend. At the end of this phase, 100 students with different personalities were chosen from a total of the 4 classrooms of the 5th grade, to carry out the first usability test.

Figure 2. Flowchart of the development phase

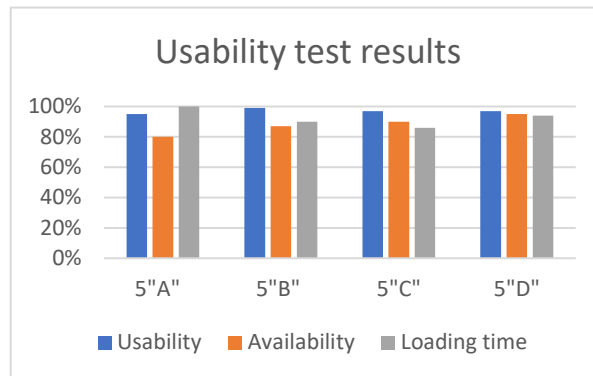


Source: Own elaboration

Transition

In this phase, a feedback was made correcting errors at the Frontend level. The web system was delivered with a usability of 97% according to the results of the test carried out to the students as shown in Figure 3.

Figure 3. Results of the usability test



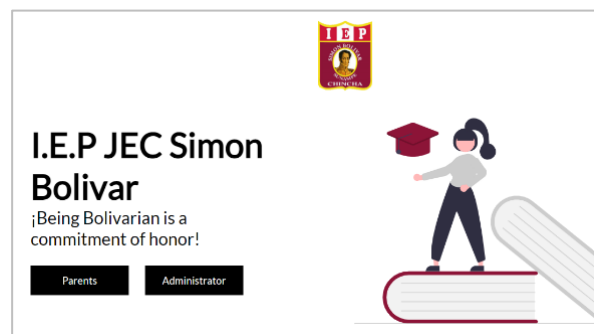
Source: Own elaboration

Results

In figure 4, a) the main view for the user "parent" and "administrator" is presented; b) the categories for the types of incoming students are shown.

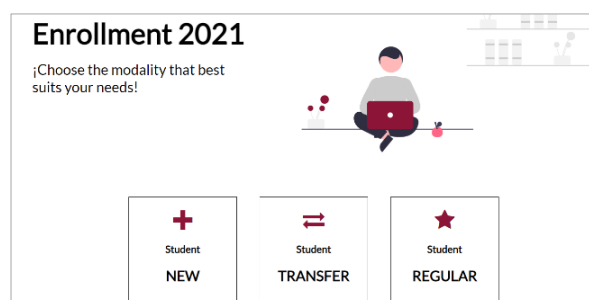
Figure 4: Election process

(a) *Main View*



Source: Own elaboration

(b) *Student category*



Source: Own elaboration

In Figure 5, the view for the “family parent” user is presented, composed of 4 sections:

c) The first step is presented where the data of the attorney-in-fact were recorded: names, surnames, identification number, home address, cell phone, email and occupation; d) the student's data was recorded: names, surnames, identification number, age, birth certificate, nationality, department, province and district; e) All the documents requested by the school were attached: copy of identification number, proof of primary school studies, and payment of APAFA; f) the internal regulations were accepted and finally the registration form is downloaded.

Figure 5: Enrollment process

(c) First step interface

Step 1
Updating of the personal data of the parent or person responsible for the payment.

In this first step, a form will appear with fields that must be correctly filled. Because these data are important for school-parent communication.

Complete the following information:

Surname
Second surname
Names
DNI
Current address
Landline / Cell Phone
Email
Occupation
Workplace

Next

Source: Own elaboration
(d) Second step interface

Step 2
Updating of the student's personal data.

Then, you must complete the data form and the student's medical file.

Student data:

Surname
Second surname
Names
DNI
Age
Place of birth
Birthdate
Nationality
Departamento
Province
District

Next

Source: Own elaboration
(e) Third step interface

Step 3
Upload documents.

Here you have to upload your child's documents.

Files:

Copy of the student's DNI (a) NI...ado
Birth Certificate Ning...ado
Evidence of primary studies Nin...nado
Primary notebook Ning...nado
APAFA payment NI...ado

Next

(f) Fourth step interface

Step 4
Terms and Regulations.

Read the commitment and check "I agree", be sure to read.

Enrollment commitment 2021

I agree

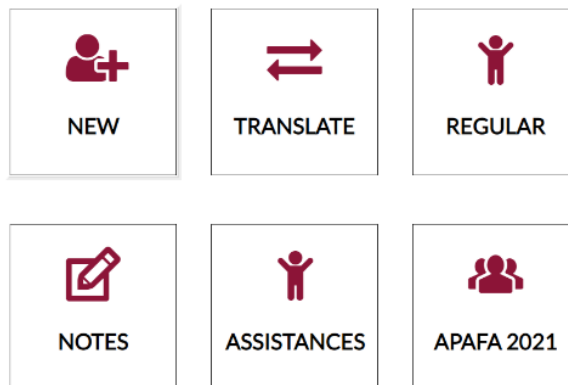
Source: Own elaboration

Figure 6, g) shows the view for the "administrator" user composed of academic activities; h) The record of all enrolled students is presented, the administrator can edit or delete a record;

i) the documents that the parent attached to the platform were downloaded, the administrator validates and sends the information to the Institution's Management.

Figure 6: Verification process

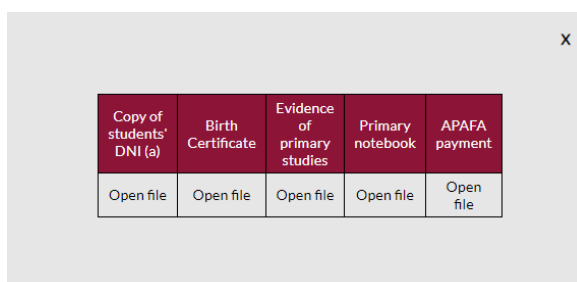
(g) *Academic Activities*



Source: Own elaboration
 (h) *Student registration*

DNI	Names	Last name	Mother's last name	Home	Age	Place of Birth	Birthdate	Nationality	Department	Province	District	Files	Actions
72622771	Kevin Arturo	Sánchez	Magallanes	Los Libertadores Street N° 224	17	Chincha	12-04-2003	Peruvian	Ica	Chincha	Sunampe		
40808556	Alonso Piero	Gutierrez	Medrano	Au. Los Jazmines N° 123	16	Pueblo Nuevo	23-06-2004	Peruvian	Ica	Chincha	Pueblo Nuevo		
72622771	Kevin Arturo	Sánchez	Magallanes	Los Libertadores Street N° 224	17	Chincha	12-04-2003	Peruvian	Ica	Chincha	Sunampe		
40808556	Alonso Piero	Gutierrez	Medrano	Au. Los Jazmines N° 123	16	Pueblo Nuevo	23-06-2004	Peruvian	Ica	Chincha	Pueblo Nuevo		
72622771	Kevin Arturo	Sánchez	Magallanes	Los Libertadores Street N° 224	17	Chincha	12-04-2003	Peruvian	Ica	Chincha	Sunampe		
40808556	Alonso Piero	Gutierrez	Medrano	Au. Los Jazmines N° 123	16	Pueblo Nuevo	23-06-2004	Peruvian	Ica	Chincha	Pueblo Nuevo		
72622771	Kevin Arturo	Sánchez	Magallanes	Los Libertadores Street N° 224	17	Chincha	12-04-2003	Peruvian	Ica	Chincha	Sunampe		

Source: Own elaboration
 (i) *Student documents*



Source: Own elaboration

3. DISCUSSION

In figure 4, through the user selection process, the system allowed to show the appropriate interface, helping the parent in the enrollment process and the administrator in the execution of academic activities. Which agrees with (Custodio& Castro, 2016) where it states that the enrollment process is optimized through the creation of user profiles. On the other hand (Araya, 2016) affirms that the enrollment process supports academic activities and course enrollment. Similarly, in the investigations of (Oré et al., 2020) and (Castilla et al., 2020) stated that, to show an adequate interface, a client-server architecture is needed.

In figure 5, the web platform allowed parents to complete the enrollment process quickly and efficiently from the comfort of their home, thus avoiding citizen insecurity through online payment. In addition to helping social distancing during the COVID-19 pandemic. Which agrees with the investigation of (Amasifuen, 2020) where it states that the use of a web system reduces the registration time by 80.5%. On the other hand (Custodio& Castro, 2016) affirms that to avoid being a victim of citizen insecurity it is advisable to make payments via the web.

In figure 6, the web platform allowed the administrator to manage the academic activities, in addition to editing or deleting the record of all the students, finally downloading the documents and delivering them to the Directorate. This agrees with the (Ministry of Education, 2016), which indicates that the student enrollment process is essential, therefore this process must be executed in the best possible way to avoid corrections in enrollment payrolls.

The registration process allowed parents to register their children in an optimal way, in this way they comply with all the steps that this process requires. Which agrees with (Anrrango, 2020) that maintains that the enrollment process is important because it brings benefits such as: internal control, student identification and personalized follow-ups.

It is recommended to implement new technologies: artificial intelligence, to manage a comprehensive board of enrollment information and recognize which means of payment are used by parents; Big Data, to collect and analyze the information registered by the platform and offer new means of payment using the APIS Application Programming Interface; machine learning, so that the system makes intelligent decisions through patterns and automatically categorizes (new, regular or transfer) the incoming student.

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