Implementation of IT in Systems Simulation for the Registration Process

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Abstract

The percentage of errors made during the re-enrollment processes, either because of the students of new entry or by the system itself, generate each new period of chaos between the teaching and student community, as well as an unnecessary expenditure of resources in the existing re-enrollment systems. This paper discusses the creation of a system for tutors, coordinators and students capable of carrying out a periodic simulation of subject enrollment, and that, according to the selections made, allows to evaluate whether the prerequisites are met and percentage of progress required for the next period, they are also provided with a list of suggested subjects with the aim of streamlining this process; on the other hand, it will allow tutors to keep track of their assigned group allowing them to know when one of their students is faced with some problems when simulating their enrollment.

1. Introduction

Re-enrollment processes, especially from the first to the second period, have been a problem for most students of new entry, which is why some kind of system is needed in which a simulation can be performed before the actual process re-enrollment so that students know in advance how it should be made and the possible mistakes in which it may fall due to lack of prior knowledge, this with the aim of decreasing the rate of errors made during the re-enrollment of subjects. In addition, it is necessary that this system allows tutors assigned to students to visualize if any of their tutors had problems and how to solve them, this also leads to better monitoring and control of tutors. The system shall be error-proof as far as possible, by internally restricting the requirements of previous subjects and percentage of progress. That is why SSPR (Simulation system for the re-enrollment process) must be simple, concise and intuitive, it is developed under web standards with the appropriate languages for this purpose.

2. State of the art

EDISON is a well-known online computing scientific simulation platform designed to educate students and assist researchers with e-learning and e-research by providing a large-scale variety of software tools. In the last 6 years, the platform has matured enough to support 50,000 users and more than 300 software simulation tools. Allows users to access various simulation tools from different specialized disciplines. However, performance degrades when multiple users make use of computer time or by continuous simulations. To address the problem, a scientific simulation storage and processing system is proposed that can respond quickly by referencing existing results; this system is called SUPERMAN, which significantly improves the efficiency of computer-time simulations and limited storage resources, and adds interoperability for future processes. Additionally, avoid duplication of simulations for better performance. (Lee, 2019).

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With the increase in the number of international students, the quality of management of international students needs to be improved. That's why the management system for international students was developed. Using information technologies to improve management efforts. According to the business process, the student management system can be divided into the following 5 modules: student management, educational management, day management, exchange interaction and system management. The first module contains student registration, login, editing of information, and other functions. The educational management module can perform resume entry, information review, student course choice, and other information related to academic matters. The third module mainly conducts study management and student life, including mainly questions about exits, participation in events, management of various advertisements, management of rewards and punishments. The following module is used to send and receive short messages, questionnaires, provide file upload and other functions. Finally, administrator rights include adding, deleting users, modifying user privileges, monitoring user revenue on the system, etc. (Nwana, 1990).

3. Theoretical framework

During the development of this work various languages and tools were used, on the client side HTML was used, which is the Hypertext Markup Language, the force that makes everything stay in the place it should and that the page does not look something chaotic It also contains special instructions that make the text able to link to other Internet content. (Prescott, 2015). Also, CSS, cascading style sheets, was made a language that allows us to grant attributes to the elements of documents made in HTML; allows you to separate the design (format and styles) of the contents of web pages. Also, it implemented JavaScript which is an interpreted programming language, it is mainly used in its client-side form, implemented as part of a web browser allowing improvements in the user interface and web pages Dynamic. (Morgan, 2014). Server-side PHP was used, a recursive acronym for Hypertext Preprocessor, is a very popular open source language especially suitable for web development and that can be embedded in HTML. (The PHP Group, 2001-2019). Finally, a relational database was implemented using phpMyAdmin, a tool written in PHP with the intention of managing MySQL administration through web pages, using a web browser. You can currently create and delete Databases, create, delete and alter tables, delete, edit and add fields, execute any SQL statement, manage keys in fields, manage privileges, export data in various formats, and it is available in 72 Languages. It is available under the GPL Version 2 license. (Ratschiller, 1998).

4. Subjects and Methods

Every year in the Faculty of Computer Sciences of the Benemérita Universidad Autónoma de Puebla, new students enter, who are not familiar with the processes of registration and follow-up of their career. This creates uncertainty for the following reasons: little or no knowledge of the subjects to be recorded, lack of confirmation by the system on the actions taken, little advice from the designated mentors and tutors. Similarly, the tutor-guardian relationship is not enriched unless the teacher in charge gives subjects to his assigned group, generating little confidence in the student, which in the most cases, prevents him from attending for advice. That is why it was proposed to create a web system that contemplates the above scenarios in order to provide tutors and students with a tool that serves first as a guide for students where they can perform a simulation of the process of re-enrollment, which consists of the following steps:

- System entry.
- Visualization of the subjects by blocks and the graphic map of the race (support resource). See figure 1.
- Selection of subjects.

Figure 1 Subjects per block

From this point two periods will be established, within the first the students will have the opportunity to mark the subjects they approved, while in the second they will mark the subjects that they plan to take the next semester taking into account the following points:

a) The student will be able to select a maximum of 6 subjects to enroll.
b) It will be considered an error if the student selects a number equal to or less than 2 subjects.
c) Within the system you will have a section of help that will be considered as the academic projection which will allow you to know the subjects with the highest priority that you must enroll.

Once both periods have ended and in case of an error within the testing process the system will notify the designated tutor and in turn the student will see the error message and the instruction to go with his tutor. It should be clarified at this point that errors that may be generated within the system are limited, however, strict metrics are still available, where, the student after a year inside the school must have completed and approved 50% of their subjects plus one, in that period, in addition to respecting the rules of the maximum and minimum limit of subjects to be registered. The system will allow the student to save the progress that generates each semester and when entering the platform again their data will be loaded automatically, see figure 2.Another support given to the student is to be able to visualize the amount of credits and the percentage of progress that he has accumulated according to the subjects he has marked, this information is presented in the form of a personalized profile for each student which will contain his or her name, email and your photo, through this data will establish a link between the tutor and tutorthat that will allow a more timely follow-up for your academic development.

Figure 2 Student profile

5. Results

The simulation software was tested with 150 students from the first semester of Engineering during two enrollment periods (spring 2019 and fall 2019). 127 students performed the registration simulation in the established period, 15 students subsequently performed the simulation and 8 students did not perform the simulation, see figure 3.
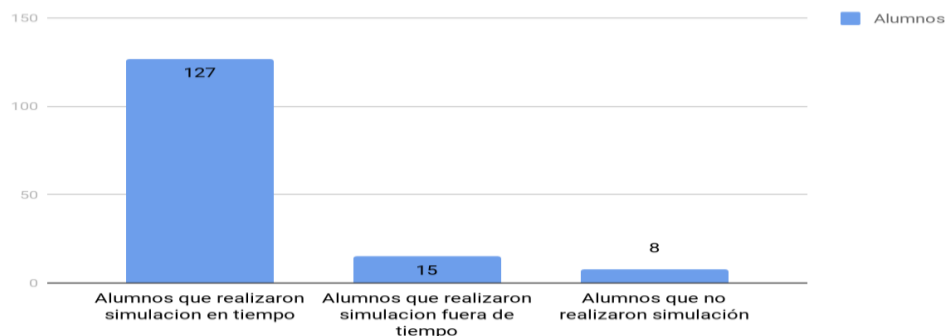

Figure 3 Students who performed the enrollment simulation

142 students completed the enrollment simulation in either of the two periods, representing 94.7% of the total new entry students, see figure 4.
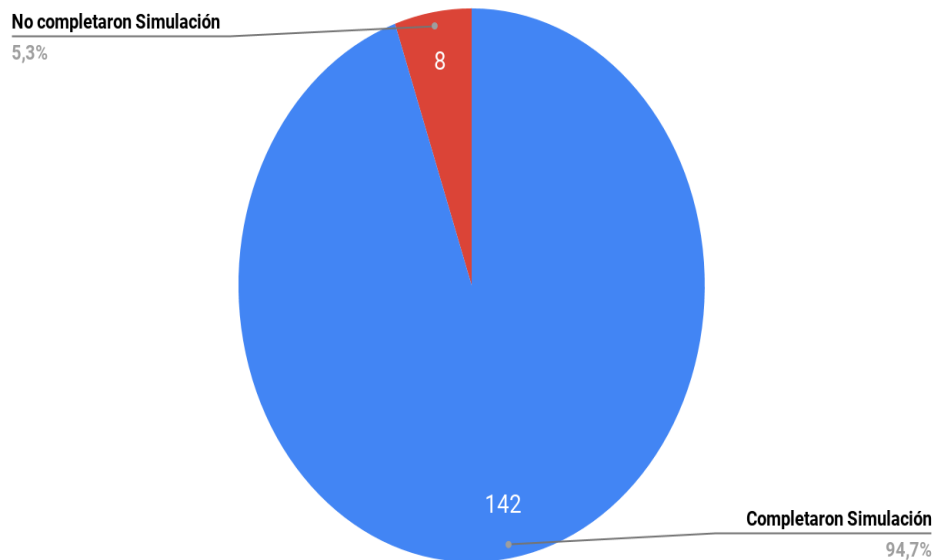

Figure 4 Percentage of students who completed the simulation

After using the software and performing the simulation for the first time, 98 students completed the successful enrollment simulation (no mistakes), 44 students completed the registration simulation with errors so they had to go with their academic tutor to be advised on the process of registering subjects and thus complete the simulation successfully, see figure 5.
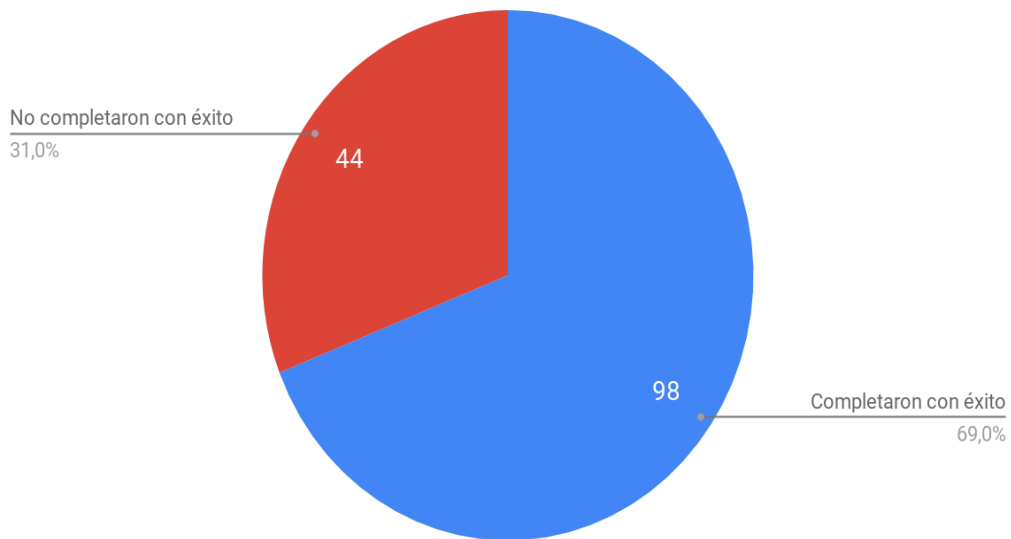
Figure 5 Percentage of students who successfully completed the enrollment simulation (Spring 2019)

This represented that 31% of the students had conflicts at the time of the simulation, leading to the fact that in the actual registration period they could not be enrolled for the next period. For the fall 2019 period, 145 students completed the simulation, increasing by 2% the number of students who completed the application. Of which 135 students successfully performed the enrollment simulation (no errors) and only 10 students performed the failed enrollment simulation, see figure 6.
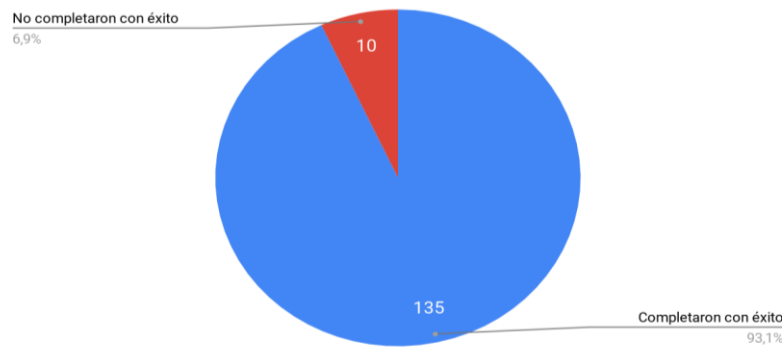
Figure 6 Percentage of students who successfully completed the enrollment simulation (Autumn 2019)

This means that the number of students who had conflicts at the time of enrollment of subjects decreased by 77.2%, see figure 7.
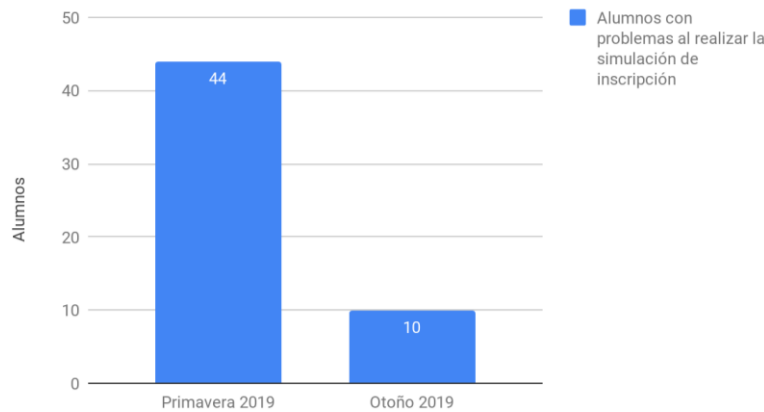

Figure 7 Number of students with missense simulation

6. Tests

During the spring 2019 period the simulation yielded different results, among which highlight a greater number of successes than errors. 69% of the simulations did not produce any errors, proceeding to register correctly, see figure 8 and figure 9.
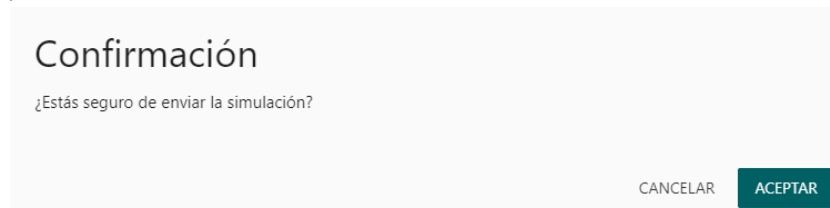

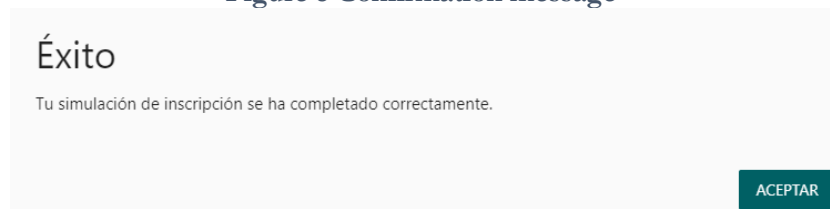**Figure 8 Confirmation message**

Figure 9 Registration Success

However, there were cases where enrollment could not be performed, then 2 error scenarios are individually described. The first happens when a student without the 70% advancement wants to enroll the social service, and that by institutional regulation is not possible, see figures 10, 11 and 12.

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Créditos: 34 /260

Avance Acádemico: 13.1 %

Figure 10 Academic progress less than 70%

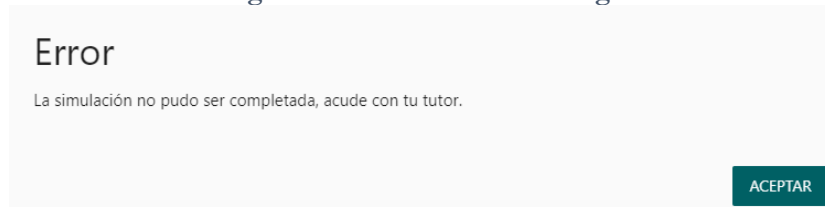**Figure 11 Social Service Dialing**

Figure 12 Registration Error

The second error case happens when you want to select 4 electives in the same period, without taking into account the necessary prerequisites, see figure 13.
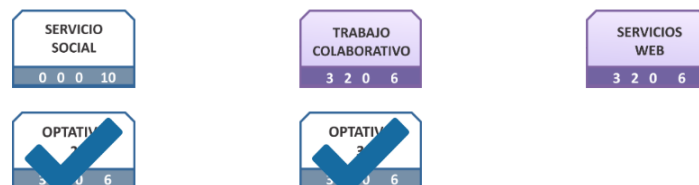

Figure 13 Marking of 4 electives

7. Conclusion

Through the points set out above, it is concluded that from the partial implementation (evidence on a sample of the student population) of the software was achieved to reduce by 82% the number of errors that arise in the registration period. This is the goal of generating a tool that allows students to know the environment they will face each semester to achieve the re-enrollment of their subjects, as well as helping mechanisms for students where they will be able to consult the amount of credits they have, the percentage of progress they have accumulated and the projection with the best subjects they should choose, thus avoiding problems and confusions within the community, and in case a problem arises you will be there will be a means of contact between the student and his/her corresponding tutor giving a timely support for each student.

8. Discussion

Compared to the SUPERMAN system, the SSPR system will provide tools to students that allow them to simulate their enrollment process, aiming to significantly improve the use of self-service platform resources that were used by students from new income that had no prior knowledge of the functioning re-enrollment system, in contrast the SUPERMAN system adds interoperability for future processes and prevents simulations from being duplicated. While existing platforms such as those already mentioned support students in their re-enrollment process have been found to be complex processes so most of them have not given them the constant use, that is why the advantage of our website comparing with the management system for international students is that it is more focused on students and tutors facilitating the use of this tool in its entirety, that is, it was developed more interactive, visual and practical. On the student's part, its privileges are to mark and demarcate its academic progress, restricting the number of subjects per period (a maximum of six and a minimum of three), visualize its projection of subjects (subjects that are recommended to take the next period), submit your enrollment simulation to detect errors the student may have and be reported to their tutor. Finally, tutor's rights include viewing mock dates for their tutors, seeing which students have had problems with their enrollment, and tracking those issues.

9. Future Work

The next step in the investigation will be to increase the scope of the enrollment simulation platform to the entire student community. The tool should allow students from different academic units to use the software. For academic tutors to carry personalized control for each of their students. In addition to strengthening the communication and relationship between tutor-guardian.

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