Implementation of Google App script for automatic generation of pre-registration form

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Abstract
The present study aims to implement Google App Script to optimize the automatic generation of the pre-registration form at FIIS-UNFV. The methodology used is based on applied descriptive research, focused on improving the registration process through automated tools. The results highlight an improvement in the control of quotas, avoiding excesses in courses, as well as the elimination of waiting times for students when completing the process online. Student satisfaction resulting from these changes is 50%, reflecting a positive impact, although there are still strategies to improve to increase satisfaction to 100%.

Keywords: automation; enrollment; time; App Script.

Implementación de Google app script para la generación automática de la ficha de pre-matrícula

Resumen
El presente estudio tiene como objetivo implementar Google App Script para optimizar la generación automática de la ficha de pre-matrícula en la FIIS-UNFV. La metodología empleada se basa en una investigación descriptiva aplicada, enfocada en mejorar el proceso de matrícula mediante herramientas automatizadas. Los resultados destacan una mejora en el control de cupos, evitando excedentes en los cursos, así como la eliminación de tiempos de espera para los estudiantes al realizar el proceso en línea. La satisfacción estudiantil resultante de estos cambios se sitúa en un 50%, reflejando un impacto positivo, aunque aún existe estrategias para mejorar para incrementar la satisfacción al 100%.

Palabras-clave: automatización; matrícula; tiempo; App Script.

1 Introduction

In recent years, the automation of administrative processes in education has experienced significant growth, driven by the development of new technologies that facilitate the optimisation of routine tasks. In particular, the automatic generation of enrolment forms and quota management have emerged as key solutions to improve efficiency and student satisfaction in higher education institutions [1]. These solutions not only reduce the time needed to complete enrolment processes, but also eliminate problems such as long queues and human error, providing a smoother experience for students [2].

The use of tools such as Google App Script has enabled educational institutions to automate various functions, significantly improving administrative efficiency (Miller and Zhang, 2020). This approach has not only been applied in the context of enrolment, but also in areas such as inventory management and management information systems [3]. On the other hand, the implementation of automated systems not only streamline processes, but also improves the user experience, which is crucial for maintaining high levels of student satisfaction [4]. Integrating technologies such as Google App Script into educational administration not only streamlines enrolment processes, but also facilitates the customisation of systems to the specific needs of each

Figure 1. Phases of implementation
Source: Own

institution [5]. This approach has been widely adopted in several institutions, which have reported significant improvements in operational efficiency and accuracy of automatically generated data [6]. By enabling the automation of routine tasks, institutions can focus their resources on more strategic aspects, such as academic development and technological innovation [1].

On the other hand, recent studies have shown that automated enrolment systems not only benefit educational institutions in terms of operational efficiency, but also offer advantages in data management and strategic decision-making based on real-time information [7]. Optimising these processes also allows administrators to adapt platforms to the changing needs of users, ensuring greater flexibility and customisation [8].

This paper focuses on the implementation of Google App Script as a tool for the automatic generation of the pre-enrolment form at the Faculty of Industrial and Systems Engineering (FIIS) of the Federico Villarreal National University (UNFV). The research aims to explore how this technology can optimise the enrolment process, improve quota control, eliminate queues for counselling and increase student satisfaction.

2   Method

Three phases are developed for the implementation of Google App Script for the automatic generation of the FIIS-UNFV pre-enrolment form. See Fig. 1.

Spatial scope: The present project is focused on the Faculty of Industrial Engineering and Systems at the Universidad Nacional Federico Villarreal.

Temporal scope: This project has a timeframe of 2024.

Universe: Students from the first to the fifth year of Professional School and Systems Engineering.

Sample: 141 students from the first to the fifth year of Professional School and Systems Engineering.

Instrument: Pre-enrolment form, quota visualisation tool and questionnaire.

Technique: Data analysis, surveys.

3   Results

3.1   Control of course quotas through automatic generation of the Enrolment Form

A Script has been implemented that allows the automation of the quota control in real time, avoiding the over-allocation of enrolled students in the courses, see Fig..2 An event has been created that allows to control every minute the availability of courses, for example, the course "100375-INGLES I -A-M-1" is available in the Pre-Enrolment form when the number of enrolled students is less or equal to the available limit (25), the Google Apps Script event controls the maximum limit, hiding the available course so that the following students cannot be enrolled.
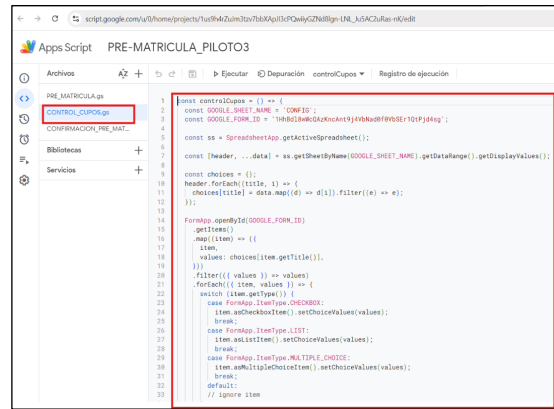

Figure 2 - Quota control
Source: Own

Figure 3 - Configuration of the event quota control every one minute
Source: Own

In Google, the process for scheduling events is called triggers. In the case of quota control, it was configured so that the process is executed every minute. See Fig. 3.

3.2   Elimination of queues through automatic generation of the Enrolment Form

The automated system with Google App Script has eliminated the need for physical queuing for Pre-Enrolment, see Table 1 for the time taken from the flow of regular enrolment. Students can complete the entire process online, saving time and avoiding crowds. Table 2 shows the time reduction in relation to the waiting time.

Table 1.
AS-IS Flow (part 1)

Registration of the Registration Form	Request a review of compliance with the requirements	Waiting time to be attended by the counsellor (teacher)	The counsellor gives attention to the student and reviews the student's file.
20 MIN	3 MIN	[1h - 2h]	5 MIN

Source: Own

Table 1.
AS-IS Flow (part 2)

Sign and record teacher's code on the registration form.	Receives the signed Registration Form	Request attention at SUM OCRAC	Waiting time at the SIEF OCRAC SUM
1 MIN	1 MIN	3 MIN	[1h - 2h]

Source: Own

Table 2.
TO-BE

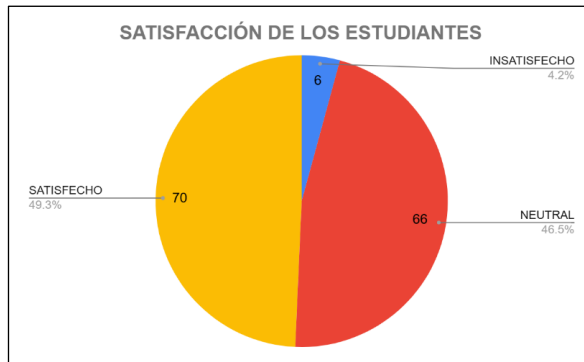| To register the registration form using the following form	The counsellor gives attention to the student and reviews the student's file	Submits approval and/or comments on observations to be raised.	SUM OCRAC's technical office registers the Cards that were approved by the advisor in its system.
10 and 15 MIN	5 MIN	1 MIN	3 MIN

Source: Own

Figure 4 - Level of satisfaction
Source: Own

Upon registration of the Pre-Enrolment form the status changes to "Pending Review", the next step is the review by the counsellor. The online enrolment flow eliminates the waiting time to be seen by the counsellor.

3.3 Student satisfaction

Students have expressed greater satisfaction with the tool's contribution to eliminating the queue and controlling quotas. To evaluate the level of satisfaction we will use the graded table or scales, for this we will evaluate the questions How easy was it to use the automatic generation tool of the Enrolment Form? and How satisfied are you with the accuracy of the information generated in the Enrolment Form? In the following Fig. 4, you can see the results obtained from the student surveys.

On the result, 50% were satisfied with the use of the Google App Script tool, 46% indicated that they have a neutral opinion, that it can be improved with training and coaching and 4% indicated that they had problems when generating their Pre-Enrolment Form. In addition, evaluating other questions, it is mentioned that the ease of generating the Pre-Enrolment Form is 73.6% and 95% consider that the use of the tool reduces the time of the enrolment process.

4 Discussions

4.1 Control of course quotas through automatic generation of the Enrolment Form

Preliminary results show that the implementation of a Google App Script to automate quota control has been effective, allowing real-time updating of course availability and eliminating over-allocation of students (Fig. 2). This

approach is consistent with previous studies highlighting the benefits of automation in educational administration. For example, Miller and Zhang (2020) demonstrated that the integration of Google App Script significantly improves the accuracy and speed of administrative processes, reducing human error and increasing system efficiency.

The ability of the script to automatically hide courses once the quota limit is reached improves management and avoids conflicts that could arise from over-enrolment. This mirrors the findings of Lee and Kim (2022), who found that automating enrolment systems improves resource allocation and reduces the workload of administrative staff. When comparing these results with other implementations, such as the one presented by Ordoñez Valencia et al. (2022), it is evident that automation not only avoids course overload, but also optimises the Pre-Enrolment process, contributing to a smoother experience for students.

However, as Firmansyah and Sari (2021) suggest, one of the challenges of automated systems is the dependence on technology and internet connectivity. During implementation, the need to ensure a stable technological infrastructure was identified to avoid possible delays in updating quotas.

4.2 Elimination of queues through automatic generation of the Enrolment Card

The second key result is the elimination of physical queues during pre-enrolment, which has allowed students to complete the entire process online, saving time and avoiding crowds (Table 1). This finding is consistent with previous research showing that the digitisation of administrative processes significantly reduces waiting times and the need for face-to-face procedures. Calampa Tantachuco (2021) observed similar results in the implementation of a web platform for enrolment, showing that the use of technological tools facilitates organisation and access to administrative services.

Time saving is one of the main benefits, and this result is aligned with the findings of Fandiño Rangel and Álvarez Peniche (2021), who reported an improvement in operational efficiency through digitalisation. Students no longer have to wait for long periods of time to be served by counsellors, which contributes to higher overall satisfaction. In addition, the elimination of physical queues has positive implications for logistics and space management within educational institutions, which Gualoto Garcés (2021) also identified as a key benefit in his study on optimising enrolment processes.

4.3 Improving student satisfaction through automation

Preliminary results indicate that students have responded positively to the new automated enrolment system. In a satisfaction survey, 57.4% of students rated the tool as "easy" or "very easy" to use, reflecting a high level of acceptance. These results are in line with studies showing how the implementation of intuitive and efficient technologies improves the user experience. According to Baxter et al. (2020), simplicity and accessibility of technological tools are key factors in achieving high user satisfaction.

Furthermore, 73.6% of students completed their pre-enrolment in less than 10 minutes, highlighting the speed of the new process compared to the manual system. This finding is consistent with the research of Martinez and Garcia (2023), who found that automated systems significantly reduce enrolment times, improving the efficiency of administrative procedures.

Finally, 50% of the surveyed students are satisfied. This reinforces the idea that automation not only optimises processes, but also improves users' perception of service quality, as suggested by Johnson and Williams (2021).

5   Conclusions

- The implementation of Google App Script to improve the quota control of the courses through the automatic generation of the enrolment form, verifies every minute that it does not exceed the maximum limit of enrolled students, in case of parallel registrations due to student attendance in a certain time, it can be limited to a value lower than the limit to ensure that the maximum quota will not be exceeded.
- By implementing Google App Script to eliminate queues through the automatic generation of the enrolment form, the entire process is completed online, the system time for a student is approximately 24 minutes, while the manual process was 33 minutes, without considering the waiting time generated when the enrolment date is more crowded. For the busiest day for the review of their enrolment forms, the waiting time is reduced with the greatest amount of resource allocation (counsellors),
- The results of the pilot implementation show that 50% are satisfied with the generation of the automatic enrolment form; this indicator can be improved by training students.
- The pilot implementation of Google App Script optimised the automatic generation of the pre-enrolment form at the FIIS-UNFV, eliminating queues and controlling quotas in order to avoid reprocessing.

6   Recommendations

- Use an institutional Google account because it has better functionality than conventional mail.
- Propose an elective course in basic programming with the javascript language for all engineering majors.
- Propose an elective course on automation with the App Script tool to support process improvement in public and private companies.

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