

UniSegura – AI-Powered Web–Mobile Application for Enhancing University Safety and Counseling Support

Juliana Cavadia¹  Laura Ramirez²  Sofia Pantoja³  Katty Alzamora⁴  Mauricio Pardo⁵ 

Nancy Gómez⁶  and Juan Pablo Tello⁷ 

^{1,7}Universidad del Norte, Barranquilla - Colombia

¹jmcavadia@uninorte.edu.co, ²mlcuentas@uninorte.edu.co, ³sofiapantoja@uninorte.edu.co,

⁴kalmazora@uninorte.edu.co, ⁵mpardo@uninorte.edu.co, ⁶ngomez@uninorte.edu.co, ⁷telloj@uninorte.edu.co

Abstract—Violence, harassment, and discrimination continue to affect universities worldwide, undermining students' well-being, academic performance, and trust in institutional protection mechanisms. In Colombia, despite the implementation of awareness programs and reporting protocols, recent studies reveal that more than 71% of students remain unaware of these resources. This critical gap highlights the need for innovative tools that not only facilitate reporting but also ensure timely support and effective case management. This paper introduces UniSegura, a web–mobile platform designed to empower the university community by providing secure, accessible, and user-centered channels for prevention and intervention. The solution integrates a mobile application for students and a web portal for counseling professionals, enabling a continuous flow of information. Among its most innovative features is Alma, a chatbot powered by GPT-4, which guides users through text or voice, identifies potential risk patterns, and directs them to appropriate institutional resources. Pilot testing with 60 students from Universidad del Norte demonstrated high acceptance: 85% considered Alma useful, over 80% expressed satisfaction with the platform, and 85% rated usability, navigation, and functionality between 4 and 5 on a five-point scale. Statistical validation confirmed acceptance levels above 83%. These results position UniSegura not only as a technological innovation but also as a model of social impact engineering, contributing to safer, more inclusive, and empathetic university environments.

Index Terms—Web-mobile, prevention, usability, chatbot, social impact.

I. INTRODUCTION

Violence, harassment, and discrimination within university environments remain persistent challenges that, despite institutional efforts, continue to undermine student's emotional well-being, academic continuity, and trust in protection mechanisms. Victims often encounter barriers when attempting to report incidents, whether due to a lack of knowledge about available support services, fear of retaliation, or skepticism regarding the effectiveness of existing protocols [1].

In Colombia, according to the Colombian Association of Universities (ASCUN), awareness programs and response protocols have been implemented across several institutions [2]. However, recent studies conducted in 2022 revealed that more than 71% of students are unaware of the existence of such protocols [3]. Therefore, there is a pressing need for innovative

tools that facilitate reporting and the management of violence in academic settings.

In this context, technology emerges as a key instrument to bridge gaps, streamline reporting processes, and provide timely support for individuals in vulnerable situations. Web and mobile applications, in particular, enable the creation of secure, anonymous, and accessible channels that foster prevention and comprehensive care, as demonstrated in various developments presented by multiple authors [4], [5], [6], [7], [8], [9], [10].

Building on this premise, we propose the design and implementation of UniSegura, a technological solution consisting of a mobile application for the university population and a web platform for psychological counseling professionals. Its primary goal is to provide a support system capable of identifying situations of violence, facilitating case reporting, and enabling the scheduling of appointments with trained professionals. The application incorporates an artificial intelligence module designed to assist users in recognizing patterns of violence they may be experiencing and, more importantly, to guide them toward the appropriate university departments and resources available. The tool was developed with careful consideration of usability, accessibility, scalability, and security, leveraging technologies such as Node.js, AWS, MySQL, Android studio and the GPT-4 model.

To assess its operation, functionality, and effectiveness, pilot tests were conducted with students from Universidad del Norte using structured surveys and satisfaction scales. The resulting statistical analyses confirmed the tool's usefulness and broad acceptance.

This paper presents the development process of the platform, the theoretical foundations that support it, the technological decisions adopted, as well as the outcomes of the pilot tests and their analysis. UniSegura represents a commitment to social innovation through engineering, aimed at strengthening existing institutional mechanisms and contributing to the construction of a safer, better-informed, and more empathetic university environment.

II. DESCRIPTION OF THE PROPOSED SOLUTION

The design of the UniSegura web–mobile platform, which aims to prevent, report, and manage cases of violence in university settings, consists of two main components, as illustrated in Figure 1 a mobile application and a web platform.

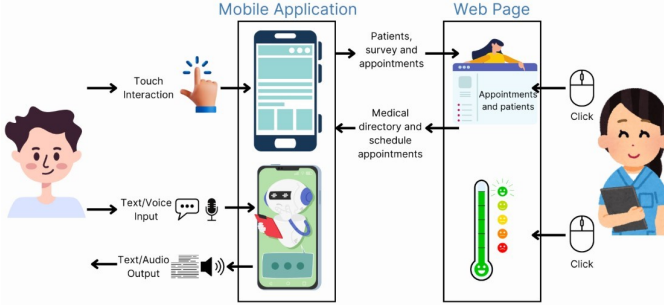


Fig. 1. General architecture of the UniSegura solution.

The mobile application is developed in the Android Studio environment, which provides a native graphical interface, compatibility with Android devices, high performance, and seamless integration with external technologies. It also incorporates functionalities such as voice recognition, text-to-speech synthesis, and real-time notifications. The application logic is implemented in Java, enabling efficient execution, maintaining well-structured code, and facilitating integration with external libraries.

On the other hand, the web platform features a graphical user interface that is connected to a server and a database. The server, implemented in Node.js, leverages its non-blocking, event-driven architecture to efficiently handle multiple simultaneous requests. This technology is particularly well-suited for real-time applications and integrates smoothly with cloud services, ensuring both performance and scalability.

For database management, MySQL was selected due to its speed, compliance with ACID properties, and ease of administration. As a relational database, it supports the execution of complex queries involving relationships among various tables (e.g., users, counselors, surveys, appointments, clinical history, and emotional risk levels). This structure ensures that information remains well-organized and enables efficient queries across the implemented functionalities.

The entire system infrastructure is deployed on Amazon Web Services (AWS), utilizing services such as EC2 (for hosting the web platform), RDS (for the database), Lambda (for serverless functions), and S3 (for storing multimedia files). This setup guarantees high availability, automatic scalability, and secure management of sensitive data.

The mobile application also integrates a chatbot powered by OpenAI GPT-4, chosen for its advanced natural language understanding, ease of integration, and extensive support in reference applications. This chatbot, named Alma, provides user support via both text and voice, offering guidance according to the user's emotional state. Importantly, Alma is strictly designed as a tool to direct users toward the most appropriate institutional psycho-emotional resources, and not as a substitute for psychological therapy.

The resources provided by Universidad del Norte as part of its response process—which begins with the filing of a complaint, an analysis of the case, and the implementation of measures for follow-up—include the encryption and protection of personal data, in accordance with Law 1581 of 2012 and Decree 1074 of 2015 - Colombia.

During the design process, alternative technologies were evaluated using comparative matrices that considered criteria such as compatibility, performance, prior experience, scalability, cost, and ease of use. This evaluation informed the development of a modular, secure, and scalable architecture that allows for future integration with other institutional systems.

In this context, the integration of these technologies is realized through an architecture illustrated in Figure 2. In the case of the web platform, the server is deployed on an EC2 instance connected to a database hosted on Amazon RDS. The EC2 instance is linked to a REST API, which enables communication with both the mobile application and the web interface. This API is associated with several AWS Lambda functions developed in Python, which manage user responses, counselor profiles, and the scheduling and acceptance of appointments, all of which are ultimately displayed within the mobile application.

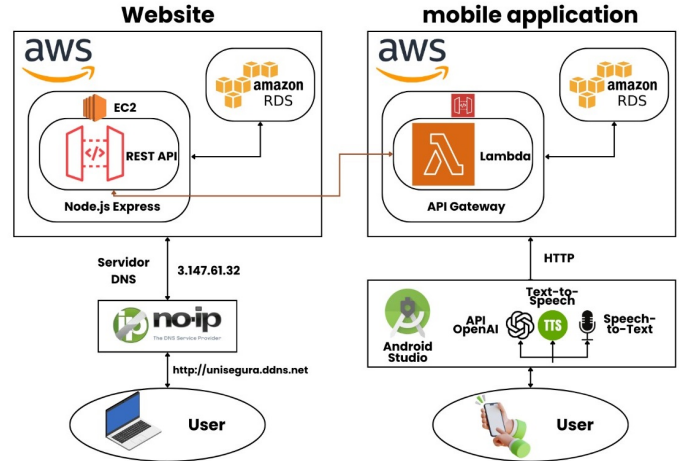


Fig. 2. Technological infrastructure of the Unisegura system.

The mobile application communicates with the system by making API calls to the corresponding Lambda functions. Some of these functions interact with the database to store user responses, while others handle login processes. Additional functions manage the Amazon S3 service, where profile photos and other media are stored. Furthermore, the application environment also integrates services such as Text-to-Speech, Speech-to-Text, and the OpenAI API.

III. PLATFORM OPERATION AND FUNCTIONALITY

As noted, the UniSegura system was designed to prevent, report, and manage cases of violence in university environments. The technological tool incorporates two user profiles: university students and professionals in counseling and well-being. The former has access exclusively through the mobile application, while the latter operate through a web platform.

Both environments are interconnected, enabling a continuous flow of information.

Within the mobile application, users log in through an authentication system based on encrypted email and password credentials. Upon access, they are welcomed with a personalized screen displaying their name, a motivational phrase, a summary of upcoming appointments, and alerts associated with their profile. From this point, users can navigate a menu that allows them to edit their profile, complete an assessment instrument, and visualize their results in a dedicated section.

The assessment instrument estimates the level of violence experienced and classifies it within a risk scale, which is stored and displayed in the results section. Additionally, users can consult the medical directory, request an appointment, accept or reject appointments, review their calendar, contact emergency hotlines (Figure 3), access the university's official violence-reporting protocol, and interact with the assistance chatbot named Alma.

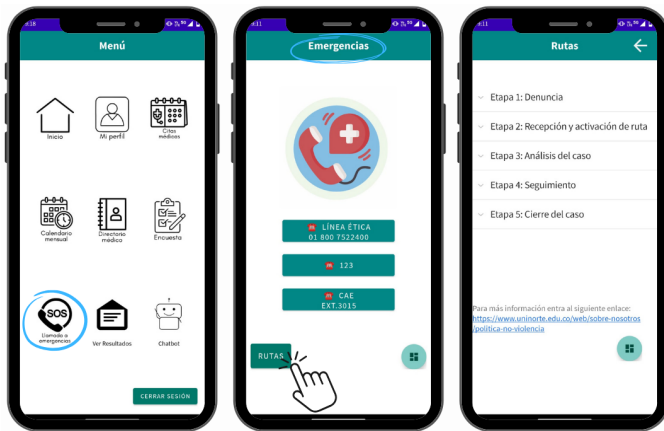


Fig. 3. Emergency call and routes.

A team of psychologists designed the risk classification instrument based on the model proposed by psychologist Leonore Walker, known as the Cycle of Violence. Indicators of violence, discrimination, and harassment are automatically evaluated by the system, which classifies the risk level using a color-coded scale (green, yellow, orange, or red), as illustrated in Figure 4. In cases where a moderate or high risk is detected, an alert is immediately sent to the assigned professional's control panel, ensuring timely intervention.

The web platform provides counselors with a portal where they can review active alerts, manage appointments, access users' clinical histories, and administer a waiting list. Each user profile stores clinical notes, previous assessment results, and records of past sessions (Figure 5). The system also incorporates an interactive calendar that allows counselors to visualize all scheduled appointments in a structured manner and reorganize them according to availability.

One of the system's most innovative components is the Alma chatbot (Figure 6), integrated into the mobile application. This virtual assistant, powered by the GPT-4 model, enables students to engage in guided conversations through either text or voice input. Alma interprets user concerns, identifies potential risk patterns, and provides recommendations

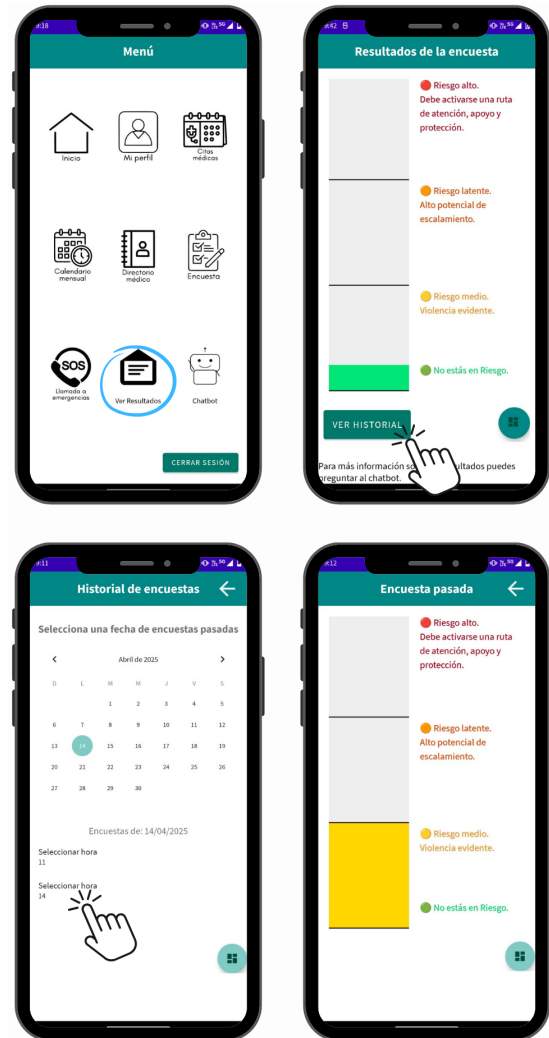


Fig. 4. Risks level classification in the Unisegura App.

that direct users strictly to the appropriate institutional support pathways. In urgent cases, it can also trigger emergency protocols and facilitate contact with available professionals. Figure 6 illustrates an example of user interaction with the chatbot, simulating two distinct scenarios of violence and demonstrating how Alma provides orientation and guidance in selecting the appropriate professional response pathway.

IV. PLATFORM TESTING AND VERIFICATION

A development team comprising three engineers conducted the system testing process in collaboration with professionals from the fields of social communication, psychology, and engineering. This group was responsible for designing the testing procedure and verifying the project's functionality to ensure reliability and operational performance. This multidisciplinary alliance ensured that the platform was tested under realistic scenarios, prioritizing the needs of end users. Their feedback highlighted areas for improvement and confirmed the system's ease of use and effectiveness.

The evaluation utilized measurement instruments based on surveys designed to validate the system functional operation.

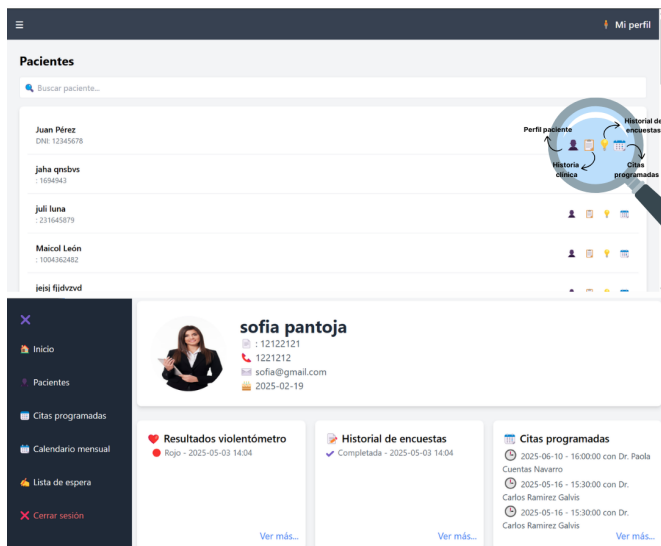


Fig. 5. Patient profile - Web platform.

TABLE I
LIKERT SCALE.

Scale Point	Description
1	Strongly disagree
2	Disagree
3	Neither agree nor disagree
4	Agree
5	Strongly agree

These included tests of the registration and login processes for both the web platform and the mobile application, ensuring that appropriate permissions and access controls were in place.

The database was tested to verify the integrity of stored data, including operations such as insertion, updating, and querying. Additionally, a scalability test was conducted by performing multiple registrations and queries simultaneously, to which the system responded satisfactorily.

The evaluation instruments were structured around two approaches. The first consisted of a 16-question survey addressing issues related to the perception of violence in university environments, the usefulness of technological tools for its prevention, and students' willingness to adopt the proposed application. This survey was completed by 60 students from the Universidad del Norte, representing a diverse range of academic programs. Selected results from the survey questions are presented in Figure 7.

The second instrument consisted of 10 questions. One of these was open-ended, allowing respondents to share their individual opinions about using the platform. At the same time, the remaining nine were evaluated on a five-point Likert scale (Table I) from functional, visual, and navigational perspectives. The survey assessed various aspects, including the ease of logging in, clarity of the user profile, comprehension of results, access to key functionalities, and the overall usefulness of the system.

Eighty-nine percent of respondents rated most items between 4 and 5 (Figure 8.). The collected feedback helped identify areas for improvement, including the need to adjust

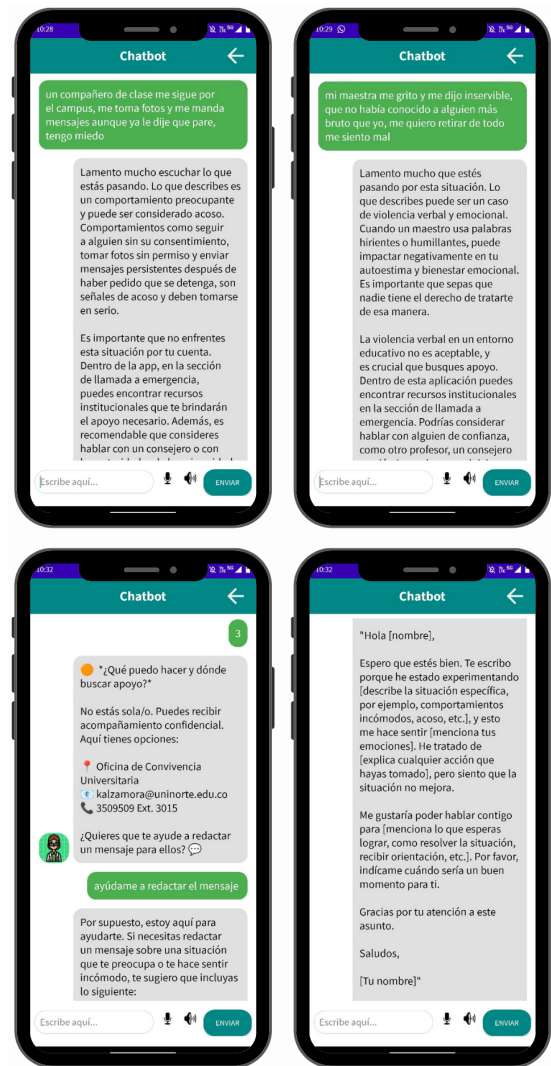


Fig. 6. Alma chatbot interactions within the Unisegura system.

visual contrast in dark mode, incorporate a progress bar within the surveys, and allow broader access to content without requiring scheduled appointments.

A relevant aspect of the results shows that 80% of the participants were highly satisfaction with its development and 85% expressed satisfaction with the comprehensive support provided by the application. As previously mentioned, the application allows users to establish contact with professional counselors, review the university's protocol for reporting acts of violence, view emergency hotlines, and view a visual chart based on the -Violentómetro- model (patented in Mexico).

A feature highlighted in the platform design was the inclusion of a chatbot. This tool, implemented exclusively as a support mechanism to redirect users to the appropriate support office, was considered helpful by 85% of respondents.

Twenty-five percent suggested increasing text size and incorporating a dark mode option. Based on these observations, modifications were implemented, including adjustments to the visual design, alert system, and improvements in mobile navigation. The web platform was tested by a professional in psychology, who provided feedback on its functionality and

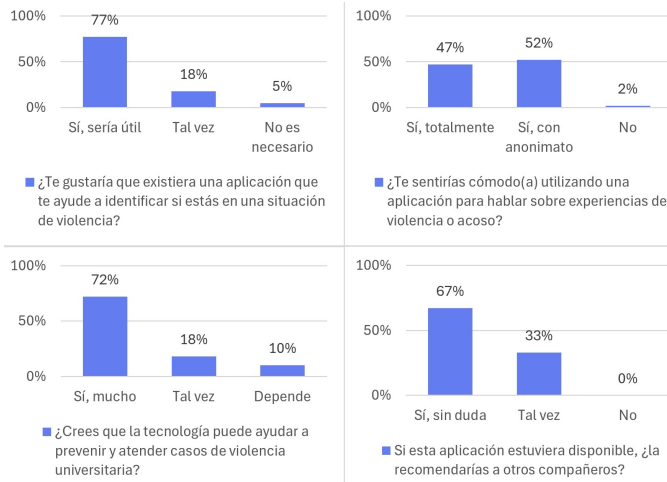


Fig. 7. Perception of the usefulness of technological tools.

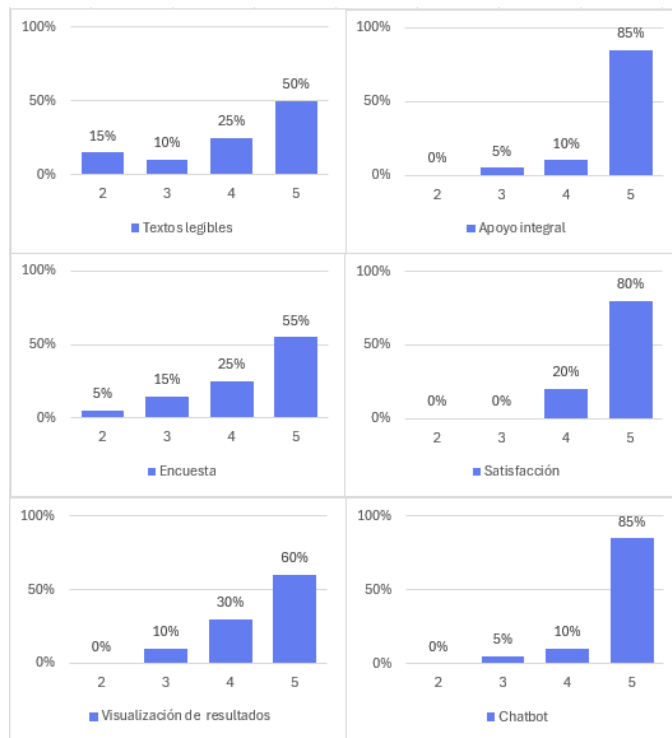


Fig. 8. Tool assessment 2 results.

content visualization.

To analyze and statistically validate the results of the first instrument, three hypothesis tests were performed, assuming that the collected data followed a Student's t distribution. The first test evaluated perceptions of the usefulness of technological tool using the 16-question survey. A decision threshold of 75% was established ($H_0 : \mu \leq 75\%$). The calculated mean was 85.30%, with a standard deviation of 16.30. The resulting t -statistic was 2.423. For 15 degrees of freedom (df) and $\alpha = 0.05$, the critical t value was 1.753. Since the calculated t exceeded the critical value, the null hypothesis was rejected, allowing the conclusion that the instrument was perceived as valuable and relevant, with an acceptance level above 75%.

The second test assessed the individual perceptions of the 60 participants by applying specific weights to each of the 16 survey questions, according to their contribution to evaluating the instrument's utility. The reference threshold was set at 83% ($H_0 : \mu \leq 83\%$). The calculated mean was 86.75%, with a standard deviation of 11.99, reflecting a positive evaluation with moderate variability in responses. The calculated t -statistic was 2.401, which exceeded the critical t value of 1.671 ($df = 59$; $\alpha = 0.05$). Consequently, the null hypothesis was rejected, confirming that the application was considered valuable and relevant, with an acceptance level above 83%.

The third test involved the same group of respondents but applied equal weighting to all 16 questions ($H_0 : \mu \leq 83\%$). The observed mean was 86.15%, with a standard deviation of 11.68. The calculated t -statistic was 2.06, exceeding the critical value of 1.67 ($df = 59$; $\alpha = 0.05$). As in the previous test, the null hypothesis was rejected. This result confirmed that even under a uniform weighting scheme, the application was perceived as valuable and relevant, with acceptance levels exceeding the 83% threshold.

Taken together, the results of the three tests demonstrate that the developed application meets the established acceptance criteria and is regarded by users as a valuable and relevant tool.

V. CONCLUSIONS

The development of the UniSegura platform illustrates how technological innovation can effectively address persistent challenges of violence, harassment, and discrimination in university settings. By combining a mobile application for students with a web platform for counseling professionals, the system enables continuous and secure information flows that support prevention, reporting, and timely intervention. Notably, the Alma chatbot, powered by GPT-4, proved to be a highly valued feature, with 85% of respondents considering it useful and more than 80% expressing overall satisfaction with its implementation.

Pilot testing with 60 students from Universidad del Norte provided robust evidence of the system's reliability and usability. Results from structured surveys showed that 85% of respondents rated their experience between 4 and 5 on a five-point Likert scale across functional, visual, and navigational dimensions. Statistical analyses further reinforced these findings, as three hypothesis tests consistently rejected the null hypotheses, confirming acceptance levels that were significantly above the established thresholds of 75% (perception of the tool's necessity) and 83% (perception of its relevance). For instance, the first test (which measured the need for and usefulness of a technological tool) yielded a mean score of 85.3% ($SD = 16.3$; $t = 2.423$), while the second and third tests achieved means of 86.75% ($SD = 11.99$; $t = 2.401$) and 86.15% ($SD = 11.68$; $t = 2.06$), respectively.

Overall, UniSegura demonstrates a high degree of acceptance and effectiveness, meeting the criteria established for technological adoption in educational contexts. The platform not only strengthens existing institutional mechanisms for addressing violence but also incorporates iterative improvements

based on user feedback, such as enhanced visual contrast, progress indicators, and expanded content access. As a scalable and adaptable solution deployed on AWS infrastructure and supported by advanced AI capabilities, UniSegura represents a relevant model of social innovation in engineering, contributing to the construction of safer, more informed, and more empathetic university environments.

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