Vol. 17 No.1(2026), 1-16

DOI: https://doi.org/10.61841/turcomat.v17i01.15476

WEB APPLICATION FOR HEALTH MONITORING THROUGH ACTIVE BREAKS IN THE UNIVERSITY SETTING

Augusto José Ángel Moreno[1], Javier Daza Piragauta[2], Hernán Ávila Puentes[3], Kilian De Jesús Diaz Miranda[4]

[1] Facultad de Ingeniería y Ciencias Básicas, Fundación Universitaria los Libertadores, Bogotá, Colombia. Miembro del grupo de investigación GUIAS. E-mail: ajangelm@libertadores.edu.co
CVLAC: https://scienti.minciencias.gov.co/cvlac/visualizador/generarCurriculoCv.do?cod_rh=0001544108 Orcid: https://orcid.org/0000-0002-6136-9886

[2] Facultad de Ingeniería y Ciencias Básicas, Fundación Universitaria los Libertadores, Bogotá, Colombia. Miembro del grupo de investigación GUIAS. E-mail: jdazap@libertadores.edu.co
CVLAC: https://scienti.minciencias.gov.co/cvlac/visualizador/generarCurriculoCv.do?cod_rh=0001339951 Orcid: https://orcid.org/0000-0002-1770-9118

[3] Facultad de Ingeniería y Ciencias Básicas, Fundación Universitaria los Libertadores, Bogotá, Colombia. Miembro del grupo de investigación GUIAS. E-mail: havilap@libertadores.edu.co

[4] Facultad de Ingeniería y Ciencias Básicas, Fundación Universitaria los Libertadores, Bogotá, Colombia. Miembro del grupo de investigación GUIAS. E-mail: kddiazm@libertadores.edu.co

Abstract: This article explores the importance of active breaks as a strategy to counteract sedentary behavior and improve physical and emotional health in the university environment. The proposal includes the design of a web application that sends automatic reminders to students, faculty, and administrative staff to take active breaks.
The application will offer personalized recommendations on activities that can be performed during these breaks, encouraging healthy habits and promoting overall well-being. This approach seeks to reduce the risks associated with prolonged inactivity, such as musculoskeletal injuries, stress, and fatigue, while improving productivity and morale in the university setting.
The proposal combines technology, ergonomics, and occupational health to offer an innovative and accessible solution.

Keywords: Active breaks, Sedentary behavior in universities, Occupational health, Wellness web applications, Ergonomics in academic work, Prevention of occupational stress.

Resumen: Este artículo explora la importancia de las pausas activas como estrategia para contrarrestar el sedentarismo y mejorar la salud física y emocional en el entorno universitario, la propuesta incluye el diseño de una aplicación web que envía recordatorios automáticos a estudiantes, docentes y personal administrativo para realizar pausas activas.
La aplicación ofrecerá recomendaciones personalizadas sobre actividades que pueden realizarse durante estas pausas, fomentando hábitos saludables y promoviendo el bienestar general. Este enfoque busca reducir los riesgos asociados a la inactividad prolongada, como lesiones musculoesqueléticas, estrés y fatiga, mientras mejora la productividad y la moral en el ámbito universitario.
La propuesta combina tecnología, ergonomía y salud ocupacional para ofrecer una solución innovadora y accesible.

Palabras claves: Pausas activas, Sedentarismo en universidades, Salud ocupacional, Aplicaciones web de bienestar, Ergonomía en el trabajo académico, Prevención del estrés laboral.

1. Introduction

Sedentary lifestyles and physical inactivity represent a serious public health problem, as they not only increase the risk of chronic diseases such as cardiovascular disease, diabetes, obesity, and certain types of cancer, but also significantly impact mental health, contributing to the development of depression, anxiety, sleep disorders, and low self-esteem (Castro Sibaja, Delgado Villalobos, González Cordero, & Huang Qiu, 2022).

While physical inactivity refers to not meeting the minimum activity levels recommended by the WHO, sedentary behavior is associated with prolonged periods of rest with low energy expenditure. Both factors, together, reduce quality of life and increase mortality. However, scientific evidence highlights physical exercise as an effective, accessible, and multifactorial intervention capable of improving physical, psychological, and social health, serving as both a preventative and therapeutic measure against more than 35 diseases and emotional disorders linked to modern lifestyles (Alòs Colomer & Puig-Ribera, 2022).

Active breaks have been proposed as an effective strategy to mitigate the negative effects of sedentary behavior. These brief, scheduled interruptions in daily activities allow for stretching and mobility exercises that improve blood circulation, reduce muscle tension, and promote mental alertness (Gutiérrez Cabello, Torres Zavaleta, & Zavaleta Evangelista, 2018). Furthermore, the implementation of active breaks in the university setting has demonstrated significant benefits for the health and well-being of the academic community. (Quizhpi Quinde & Pérez Portelles, 2023).

The integration of digital technologies in promoting healthy habits has gained relevance in recent years. Furthermore, the development of applications that remind users and suggest activities to perform during active breaks can be a valuable tool for fostering healthy habits within the university community. These applications would not only facilitate the integration of active breaks into daily routines but also provide personalized recommendations to maximize their benefits. (Bedoya Restrepo, Campiño Monsalve, Echeverry Duque, Herrera Torres, & Pabón Álvarez, 2023).

Table 1. List of Latin American countries with the highest rates of sedentary lifestyles.

Position in the world list	Country	% of adolescents with sedentary lifestyles
48	Costa Rica	82,0
52	Uruguay	82,2
61	México	83,2
64	Paraguay	83,5
67	Brasil	83,6
72	Honduras	83,8
73	Colombia	83,9
92	Perú	84,7
95	Argentina	84,8
99	Bolivia	85,5
106	El Salvador	86,1
111	Ecuador	86,5
116	Guatemala	86,9
133	Chile	87,6
139	Venezuela	88,8

Source: https://n9.cl/eli8dy

Recent studies have shown that implementing active break programs contributes to improved academic performance and reduced stress in university students (Lovón Cueva, 2021). These practices have also been observed to promote a healthier and more productive work environment, decreasing the incidence of occupational illnesses. Furthermore, the promotion of active breaks has been associated with improvements in students' attention, concentration, and emotional well-being—key factors for academic success (Abreu Aday, 2025); (Aparicio Huamán & Ureta Orcon, 2022).

1.1. Justification

In the university environment, students, faculty, and administrative staff are often exposed to long hours of sedentary work in front of computers or other electronic devices. This lifestyle contributes to health problems such as physical fatigue, stress, muscle and postural pain, as well as decreased concentration and productivity.

Active breaks have been recognized as a simple and effective practice for mitigating these problems, as they consist of brief stretching, breathing, and mobility exercises that help improve circulation, reduce accumulated tension, and promote physical and mental well-being. However, their implementation in academic and work settings remains limited, mainly due to a lack of tools that promote their regular, accessible, and engaging practice.

In this context, the development of a web application focused on promoting active breaks offers an innovative and relevant solution, providing a digital resource that not only benefits the entire university community—students, faculty, and administrative staff—but can also be used by anyone interested in improving their quality of life through healthy habits. The application will allow users to schedule reminders, access guided routines, and track their breaks, facilitating the integration of physical activity into their daily routine.

In this way, the project not only addresses a specific need within the university setting, but also becomes a tool for general use, with the potential to generate a positive impact on preventative health and the overall well-being of diverse populations. Furthermore, it aligns with the principles of health promotion and the Sustainable Development Goals related to well-being and quality education, reinforcing its social and academic relevance.

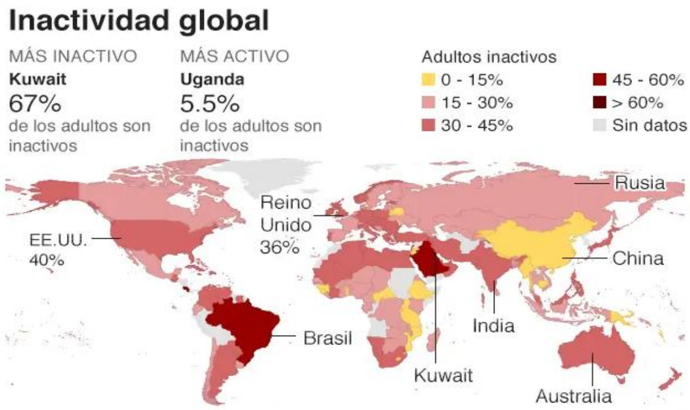
1.2 Theoretical Framework

1.2.1 Sedentary lifestyle and how to combat it

Sedentary behavior has become a significant risk factor for various chronic non-communicable diseases, including obesity, type 2 diabetes, and cardiovascular disease. In Colombia, studies have shown a high prevalence of sedentary behavior in adults, associated with an increased incidence of these conditions (Forero, Morales, & Forero, 2023).

Furthermore, prolonged screen time has been shown to contribute to the development of metabolic and psychological disorders, such as depression and anxiety.

Figure 1. Map of sedentary lifestyles in the world.



Source: https://n9.cl/r4jc

To counteract the negative effects of sedentary lifestyles and stress, various strategies have been implemented in university and work environments. One of the most effective is the incorporation of active breaks during the academic and work day. These breaks consist of short sessions of physical activity that interrupt prolonged periods of inactivity, improving blood circulation and reducing muscle fatigue. Regular physical exercise, such as dance or recreational activities, has been shown to be effective in reducing stress and anxiety levels, promoting a better quality of life (Garzon Mosquera & Aragón-Vargas, 2021); (Remor & Pérez Llantada Rueda, 2014).

1.2.2 Healthy eating to combat sedentary lifestyles and stress

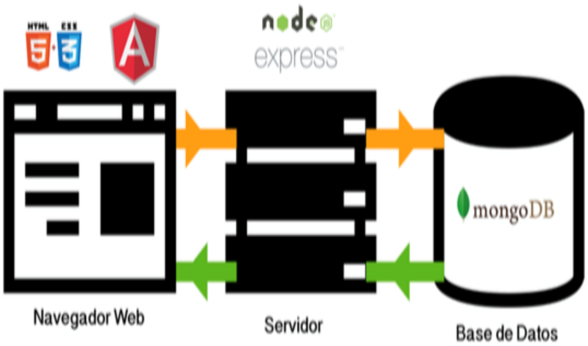
A balanced diet plays a crucial role in preventing sedentary behavior and its associated consequences. Studies have shown that unhealthy eating patterns, characterized by a high consumption of processed foods and fast food, promote sedentary behavior and contribute to weight gain, which in turn increases the risk of developing chronic diseases such as obesity and type 2 diabetes. Furthermore, the combination of an inadequate diet and a lack of physical activity can negatively affect mental health, increasing the prevalence of disorders such as depression and anxiety (Vázquez Morales, et al., 2019).

It has been suggested that maintaining a balanced diet, based on fruits, vegetables and whole grains, contributes to promoting metabolic health and reducing stress, especially if accompanied by consistent physical activity.

1.2.3 Web application creation

Developing a web application involves a series of fundamental stages that transform an idea into a functional tool accessible through web browsers. Initially, a requirements analysis is performed to understand user needs and define system functionalities. Subsequently, the architecture is designed, selecting appropriate technologies for both client-side (frontend) and server-side (backend) development (Párraga Ricardo, Boné Andrade, & Mora Olivero, 2023).

Figure 2. Basic operation of a web application.



Source: https://n9.cl/qv7tl

Representation of communication between the web browser and server:

Languages such as HTML, CSS and JavaScript are essential for the frontend, while for the backend technologies such as PHP or Python are used, along with database management systems such as MySQL (Hernández Bejarano & Baquero Rey, 2020).

Once the architecture is defined, the implementation phase begins, where the previously established functionalities are coded. It is crucial to follow good programming practices and use frameworks that facilitate code development and maintenance (Guamán Gutiérrez & Rosillo Cumbicus, 2012).

In addition, thorough testing must be performed to guarantee the application's quality and security. Finally, deployment is carried out on a web server, allowing access to end users. It is important to consider aspects such as scalability and maintainability to ensure that the application can adapt to future needs and technological changes (Mendieta López, 2014; Meza González, 2017).

1.2.4 Creating an active breaks app

The development of a web application for active breaks represents an innovative strategy for promoting health and well-being in work and academic environments. These platforms allow users to schedule reminders to perform brief exercises throughout the day, contributing to the reduction of sedentary behavior and the prevention of musculoskeletal disorders. Studies have shown that implementing active breaks improves attention and performance, especially in educational and work contexts (Aparicio Huamán & Ureta Orcon, 2022); (Meza González, 2017).

The integration between the web and mobile applications allows for efficient data synchronization, facilitating the tracking of activities performed and the personalization of routines according to the user's needs. For example, a web application development project could offer active break exercises adapted to the work environment, highlighting the importance of ergonomics and occupational health (Tunja Castro, 2021); (Tobar Zapata, Sánchez Matallana, & Bernal Fonseca, 2020).

When developing a customized application, it is crucial to integrate specific functionalities such as the ability to configure personalized schedules for active break reminders. Additionally, it is important to offer a library of physical exercises and relaxation techniques, supported by occupational health experts. Incorporating healthy eating recommendations can also be beneficial for comprehensively addressing sedentary behavior and stress. An intuitive and accessible interface design is key to encouraging continued use of the application (González Rojas & Tobar Sotelo, 2021); (Diaz Masmela, Murillo Rodríguez, & Rico Varón, 2020).

1.3 State of the Art

The starting point for creating a web application about active breaks is to review the options already available on the market, since it has been proven that these types of tools contribute to reducing stress and promoting the physical and psychological well-being of their users.

Stretchly (PC – Multiplatform): This is an open-source desktop application available for Windows, macOS, and Linux. It runs in the background and sends automatic reminders to take regular breaks. It offers short micro-breaks and configurable longer breaks, including advance notifications and activity suggestions for each break. Its interface is customizable in terms of intervals, sounds, and colors, and it also has a "strict mode" that prevents skipping breaks, thus ensuring ergonomic care during long days in front of the computer (Hovancik, 2025).

Workrave (PC – Windows and Linux): This free software focuses on preventing repetitive strain injuries and problems associated with prolonged sedentary behavior. It includes reminders for three types of breaks: micro-breaks, extended breaks, and a daily usage limit, which can be configured according to the user's needs. During each break, the app presents animated exercises that guide the user through them, while its statistics system details the frequency of breaks taken, ignored, and skipped, encouraging conscious control of healthy habits (Penners & Caelers, 2020).

Rize (PC – Multiplatform with AI): This is a modern application that incorporates artificial intelligence to optimize rest and concentration habits. Unlike traditional timers, Rize automatically detects user activity and sends smart notifications to take breaks at the most appropriate times. It also allows users to block distracting apps and websites, offers concentration music, focus sessions, and daily or weekly reports that categorize work time. Its AI integration facilitates personalized support that simultaneously improves productivity and well-being (Rize, 2025).

Aictive (Software con inteligencia artificial para pausas activas): Aictive es una plataforma avanzada diseñada para promover pausas activas durante la jornada laboral, tanto en entornos de oficina como en modalidad de teletrabajo. Su solución estrella, Work Break uses artificial intelligence to analyze human movement captured by the computer's camera, providing personalized feedback on exercise performance. It offers 10- to 15-minute break routines, available for morning and afternoon shifts, and a ranking system that rates users based on their performance, fostering continuous motivation. It also allows companies to monitor their employees' access to and performance on the platform, contributing to the physical and mental well-being of workers and improving the work environment. (3IE, 2025); (aictive, 2025).

Active Breaks (Android): Developed by Safe Mode SAS, this mobile application offers an accessible solution to promote the habit of taking active breaks through guided exercises that are updated daily. It includes step-by-step explanations, visual support through images and videos, and the option to share content among users, contributing to the prevention of biomechanical risks, the promotion of healthy habits, and the reduction of work-related illnesses. Furthermore, it can be used in various work and academic contexts. (smsafemode, 2025); (SAS, 2025).

Active Pause (Android): Active Pause, developed by MOVILIXA SAS, is a health and wellness app that aims to prevent the harmful effects of repetitive work or prolonged static positions. The app offers guided workouts without the need for equipment; it includes a text-to-speech engine and audio prompts per second to facilitate the correct execution of each exercise, as well as warm-up and cool-down stretches. Users can create and personalize routines while accumulating trophies that unlock new workouts. Exercise categories include general, visual, hand, neck, hip, shoulder, abdominal, and back breaks, in addition to "seat," "partner," and "brain gym" options, making the app a comprehensive tool for promoting healthy habits during the workday or school day (SAS M., 2025), (movilixa, 2025).

The proposed application will incorporate a significant innovation in its design and deployment: it will be conceived as a Progressive Web App (PWA). This feature will ensure that its functionality and features remain consistent across various platforms, including Android devices, web browsers, and desktop computers. Thanks to this approach, users will enjoy a uniform and intuitive experience, regardless of the device used, as the same design, interaction logic, and all functionalities will be maintained in all environments. This guarantees accessibility, scalability, and consistency in the use of the tool, promoting the adoption of healthy habits without technological limitations.

2. Methodology

This research was conducted using an applied research approach focused on developing a functional prototype and evaluating its usefulness in a university setting. Software development was combined with data collection and analysis techniques to validate the relevance of active breaks as a wellness intervention.

2.1. Research Approach and Methodological Design

The methodological design is based on a mixed-methods approach (quantitative and qualitative) for collecting and analyzing information on the acceptance, usability, and effectiveness of active breaks, and on the waterfall development model for managing the software lifecycle.

The choice of the waterfall model responds to the need for a sequential and documented process that facilitates the delivery of clear artifacts (requirements, design, implementation, verification, and maintenance) and their verification at each stage.

Figure 3. Phases of the waterfall methodology.

Source: https://n9.cl/in6tk

The implemented solution is the creation of the application, ActivaYA, which would be developed as a web application based on Next.js with TypeScript and styles with Tailwind CSS; in addition to having PWA features and quick installation on devices.

2.2. Methodological approach

Type of research: applied, explanatory, and design-experimental in its technological component: an artifact (web application) is created, and empirical evaluations are conducted to verify its functionality and acceptance.

Methodological design: mixed.

Qualitative: semi-structured interviews and usability tests with users (students, faculty, and administrative staff) to gather perceptions, identify barriers, and offer suggestions.

Quantitative: pre- and post-intervention surveys and usage metrics (logs, number of completed reminders, session time) to measure changes in behavior and adherence.

Justification: the mixed-methods approach allows for both the technical design and validation of the application (software engineering) and the measurement of its practical impact on health and habits, integrating numerical results and contextual explanations.

2.3. Phases of the methodology

The following describes the phases applied to the project, and what was done in each one.

2.3.1 Analysis Phase

Objective: To identify system needs, stakeholders, and requirements.

Activities performed:

Gathering functional requirements (configurable reminders, guided exercises, PWA) and non-functional requirements (responsiveness, performance, basic security).

Identifying stakeholders: students, faculty, and administrative staff.

Literature review on active breaks and sedentary behavior in university settings.

Deliverables: Requirements document / functional specification (summary in README and user manual).

The readme.md and user_manual.pdf files were created to document features and usage.

2.3.2. Design Phase

Objective: To define the architecture, user experience (UI/UX), and data structure.

Activities performed:

Architectural design: Monolithic web application using Next.js (frontend + lightweight server-side logic), routing structure, and reusable components.

Interface design: Prototypes and adaptive components (mobile-first, basic accessibility).

Definition of the local storage structure (e.g., use of localStorage/IndexedDB for local configurations or implementation of an API if applicable).

Deliverables: Architecture diagrams, prototypes, and configuration files (next.config.ts, tailwind.config.ts, tsconfig.json) available in the repository, demonstrating the technological decisions.

2.3.3 Implementation Phase

Objective: To build the application according to the design.

Activities performed:

Frontend development using Next.js and TypeScript (components in src/), creation of views for scheduling reminders, displaying exercises, and controlling active breaks.

Use of Tailwind CSS for styling and responsive design.

Preparation for PWA (installability) and deployment (e.g., Netlify: activaya.netlify.app).

Deliverables: Source code (src and public folders), configuration files, and package.json with dependencies. The repository documents the technologies and the published demo.

2.3.4 Verification Phase (testing and validation)

Objective: To verify that the system meets requirements and is usable.

Activities performed/proposed during the investigation:

Functional testing: Verify the correct scheduling of reminders, playback of guided exercises, and PWA behavior.

Integration testing: Walkthrough between views, configuration persistence, and reactivity.

Usability testing: Sessions with representative users to gather task times, difficulties encountered, and satisfaction levels.

Acceptance testing: Defined acceptance criteria (e.g., 90% of configured notifications trigger correctly in local tests).

Deliverables: Test reports, bug fixes implemented in commits, and a user manual (user_manual.pdf) to facilitate third-party evaluation.

2.3.5 Maintenance Phase

Objective: To ensure the continuous evolution of the system and the resolution of incidents.

Activities planned:

Correcting user-reported errors and updating dependencies (package-lock.json / package.json).

Incorporating new features (pause statistics, account tracking, wearable and calendar integration).

Security and framework updates.

Future deliverables: Releases, changelog documentation, and technical support.

2.4 Application structure

The ActivaYA application structure was designed following a modular approach that allows for a clear separation of the different elements of the system, facilitating its analysis, maintenance, and scalability.

```
src/
├── app/
│   ├── break/
│   ├── stats/
│   ├── favicon.ico
│   ├── globals.css
│   ├── layout.tsx
│   └── page.tsx
│
├── components/
│   ├── ui/
│   ├── BreakCard.tsx
│   ├── BreakForm.tsx
│   ├── BreakList.tsx
│   ├── BreakSession.tsx
│   ├── HelpGuide.tsx
│   ├── NotificationManager.tsx
│   ├── PwaInstaller.tsx
│   └── WelcomeScreen.tsx
│
├── hooks/
│   ├── use-mobile.tsx
│   ├── use-toast.ts
│   └── useLocalStorage.ts
│
└── lib/
├── data.ts
├── notifications.ts
├── types.ts
└── utils.ts
```

The LICENSE file corresponds to the license under which the software is distributed. This document defines the legal terms for the use, modification, and distribution of the ActivaYA application. Its presence ensures that the project operates under clear conditions of access and reuse.

The components.json file contains configurations related to the management of interface components. This file supports development by establishing parameters that allow for organized control over the visual elements used in the application.

The user_manual.pdf document is a guide for the end user. This file explains the steps to follow for the installation, configuration, and use of the application, serving as evidence of the analysis phase and as a support tool to facilitate the adoption of the system within the university setting.

The next.config.ts file contains the general configuration of the Next.js framework. Its function is to establish execution parameters, resource optimization, and compilation rules that allow the application to function correctly in development and production environments.

The package.json file is the core configuration file for the project, containing dependencies and runtime scripts. It defines the libraries necessary for the system to function correctly, as well as the commands used to compile, run, and deploy the application. This file provides direct evidence of the design and implementation phases.

The package-lock.json file is automatically generated and ensures that the versions of the dependencies installed on the system are identical across all installations. This element contributes to the stability and consistency of development, guaranteeing that errors due to version incompatibility do not occur.

The postcss.config.mjs file manages the configuration of PostCSS, a stylesheet processing tool that facilitates cross-browser compatibility and allows the incorporation of advanced features into styles.

The readme.md file serves as the initial project documentation. It contains the application's general description, objectives, the steps required for installation and execution, and relevant information for developers and contributors. The tailwind.config.ts file contains the configuration for the Tailwind CSS library. This file allows you to customize the application's appearance by defining color palettes, fonts, and other design parameters that are applied globally.

The tsconfig.json file contains the TypeScript compiler configuration. This document establishes how the project files should be interpreted, ensuring strict type control and clear code organization.

The lib folder includes files that contain auxiliary functions and support logic. Within it, the data.ts file manages static data and initial configurations. The notifications.ts file handles the logic related to notification delivery and is one of the application's essential components.

The types.ts file defines the types and interfaces used in TypeScript, ensuring that the data used in the system is consistent and preventing runtime errors. Finally, the utils.ts file contains utility functions that are reused in different parts of the application.

The public folder stores the system's static resources. These files, such as images and icons, can be accessed directly by the browser and are necessary for the application's graphical representation and to include the installation manifest as a Progressive Web App (PWA).

The src folder is the core of the project, as it contains the application's main implementation.

Within this folder, the app folder organizes the main pages and views following the Next.js structure. This folder contains the break and stats subdirectories, dedicated to executing active breaks and displaying usage statistics, respectively. It also includes core files such as favicon.ico, which corresponds to the icon displayed in the browser; globals.css, which contains the application's global styles; layout.tsx, which defines the base structure of all pages; and page.tsx, which represents the system's initial page.

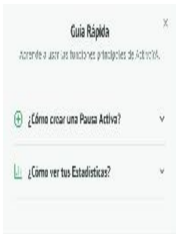
The components folder contains the reusable visual and functional components used throughout the application. The BreakCard.tsx file generates individual cards to display information about active breaks. The BreakForm.tsx file contains the form that allows you to schedule or record breaks. The BreakList.tsx file displays lists of scheduled or completed active breaks. The BreakSession.tsx file guides the user through the execution of an exercise session.

3. Results

Once its creation and upload to the web are complete, we can see the functionalities of the web application.

The following table shows the main functionalities of the application along with their descriptions and how they are displayed.

Table 2. Application Functionalities.

Functionality	Image	Description
Welcome Menu		Welcome menu, created to greet and familiarize the user with the application
Main Menu		Main menu of the application where active breaks are managed.
Guide panel		Panel where the guides for creating active pauses and viewing statistics are displayed.
Form for creating active breaks		Form where you will add the data and functions for creating active breaks, such as name, break duration, optional reminders, and notification days and times.

Exercise Panel		Panel where the exercises of the break are shown, the duration of the exercise and the total break, as well as the options to pause, skip exercise and end the active break.
General statistics menu		Menu displaying statistics on the user's active break usage.
Exercises submenu		Submenu where the exercises most frequently performed by the user are displayed.
PWA installation module		Displays the option to install the application as a PWA.
Installation result		Shows the successful installation of the application as a PWA.
Notification Function		Notification function is successfully displayed, reminding the user of their active pause.

Source: Self-made.

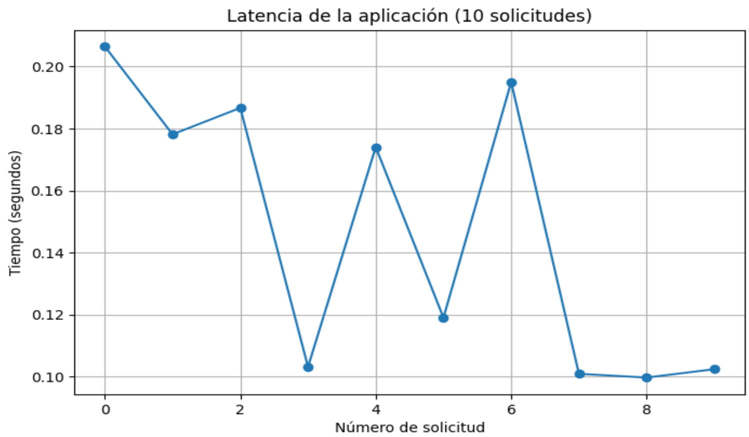
3.2 Testing

To evaluate the performance of the ActivaYA application, various analytical tests were conducted using Google Colab. These tests focused on measuring loading time, latency, static resource usage, and system response under simulated load. The results are presented below.

3.2.1 System Latency

Then, ten consecutive requests were made to the site https://activaya.netlify.app to measure the average latency of the home page load.

Figure 4. Latency variation in ten consecutive requests.



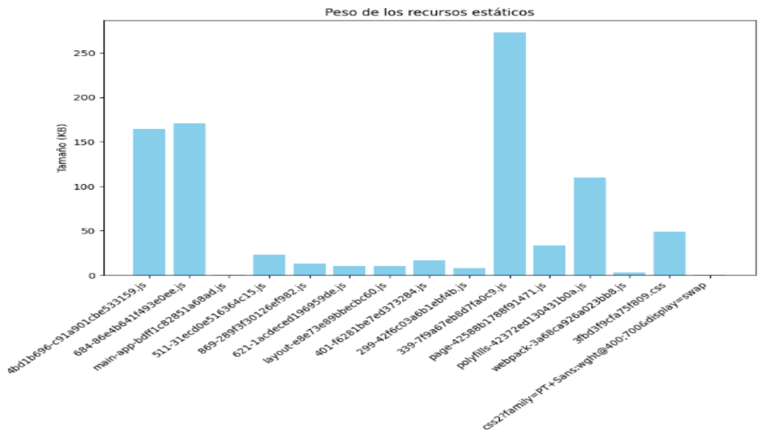
Source: Self-made.

In the Figure 4 shows the result of ten consecutive requests to the application. The latency ranged between 0.10 and 0.21 seconds, remaining within a stable and acceptable range for modern web applications. The slight variation between requests is due to external factors such as network connection, but in no case were critical times recorded that would affect the user experience.

3.2.2 Weight of static resources

The resources that the browser must download when starting the application were identified and analyzed: JavaScript files, CSS stylesheets, and images.

Figure 5. Application static resource weight.



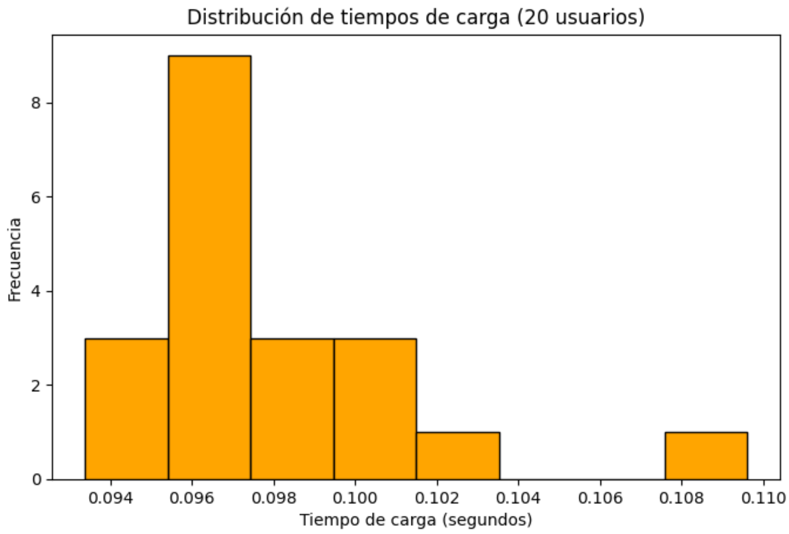
Source: Self-made.

In the Figure 5 details the static resources that the application downloads upon startup. The results show that JavaScript files account for the largest share of the file size, reaching up to 278 KB for a single resource, while CSS stylesheets and fonts add up to approximately 50 KB. In total, the file size does not exceed 600 KB, ensuring a fast initial load. This behavior is well-suited for progressive web applications, where response time depends heavily on resource optimization.

3.2.3 Load test with concurrent users

To simulate higher demand conditions, a test was performed with twenty concurrent users.

Figure 6. Load time distribution for 20 concurrent users.

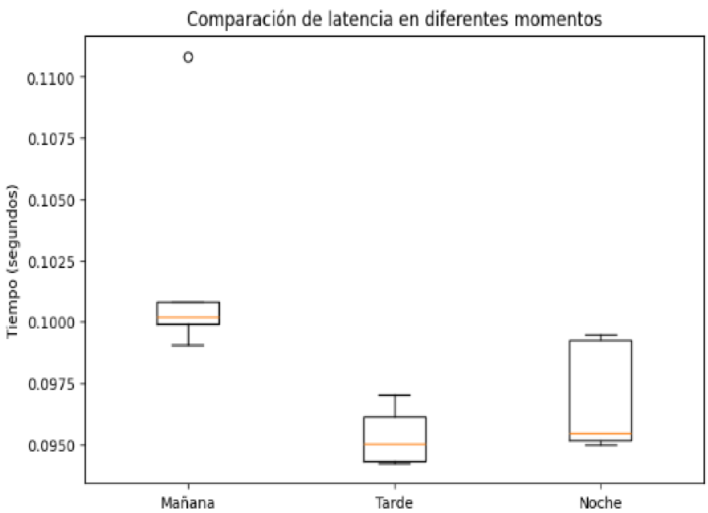


Source: Self-made.

The load time distribution is shown in Figure 6. The highest concentration is around 0.096 seconds, with very little variation towards higher values. This demonstrates that the application maintains consistent performance even when multiple users access it simultaneously, ensuring service stability.

3.2.4 Latency comparison at different times

Figure 7. Latency comparison at different times of day.



Source: Self-made.

Finally, Figure 7 compares the latency recorded in three simulated scenarios: morning, afternoon, and night. It was observed that in the morning, latency reached a maximum value of 0.11 seconds, while in the afternoon and night, the values remained between 0.094 and 0.099 seconds. This minimal variation demonstrates that deploying the application in the cloud (Netlify) guarantees a stable service throughout the day, without significant interruptions.

3.2.5 Discussion of the results

Performance test results indicate that the ActivaYA application offers optimal performance in terms of load time, resource usage, and stability under concurrent load conditions.

The average response time of less than one second ensures a smooth user experience, while the static resource usage remains within acceptable limits for modern web applications. Furthermore, the stability observed over various time periods confirms the reliability of the deployment environment.

These findings lead to the conclusion that the application is technically prepared to fulfill its purpose of promoting active breaks within the university setting, without any performance barriers hindering its adoption.

4. Conclusions

Sedentary lifestyles have become one of the main health problems among university students, due to prolonged screen time and a lack of physical activity during academic and administrative days.

Several studies link this condition to negative consequences such as fatigue, stress, musculoskeletal pain, and decreased productivity. In this context, the ActivaYA web application emerges as an innovative tool that integrates technology to promote well-being, offering reminders and guides for active breaks designed to interrupt prolonged inactivity.

The analysis of the application shows that its modular architecture, cloud deployment, and adaptable design make it a scalable, efficient solution with high potential impact on the university community. Furthermore, performance tests demonstrated optimal loading times, a stable user experience, and a lightweight footprint, ensuring fast and reliable access. In short, ActivaYA represents not only a technological contribution but also a preventative strategy that helps build healthy habits in the educational environment.

The research confirmed that prolonged inactivity negatively affects the physical and emotional health of students, faculty, and staff. Promoting active breaks through a digital application represents an effective strategy to mitigate these risks and promote a culture of self-care in the academic field.

The app's guided active breaks help reduce muscle tension, decrease mental fatigue, and improve blood circulation, resulting in greater overall well-being and increased productivity. The app facilitates the integration of these healthy practices into the university routine by automatically reminding users of the appropriate times to perform them.

The app's structure, based on components, hooks, and libraries, ensures clear code organization, facilitating maintenance, updates, and the addition of new features. This technical characteristic guarantees the system's continuity and scalability in the future.

Load and latency tests demonstrated that the application maintains average response times of less than one second, even under conditions of multiple concurrent users. This ensures a smooth and accessible experience, which is key to the system's adoption within the university community.

The cloud implementation of ActivaYA, using modern technologies such as Next.js and Tailwind CSS, opens the possibility of extending the system to other scenarios, such as non-university educational institutions and work environments. Furthermore, the future incorporation of additional functionalities is planned, such as personalized health indicators or the gamification of breaks, which would increase its impact on promoting active and healthy lifestyles.

References

[1] 3IE, I. (2025). *Aictive: Software con Inteligencia Artificia busca motivar la realización de pausas activas para trabajadores.* Obtenido de universidad tecnica federico santa maria: https://3ie.usm.cl/aictive-software-con-ia-busca-motivar-la-realizacion-de-pausas-activas-para-trabajadores/
[2] Abreu Aday, S. O. (2025). Pausas activas para la mejora del desempeño laboral en el personal administrativo. *Revista de Investigación en Ciencias de la Educación, Actividad Física y Salud: (RICEAFS), Vol. 2, Nº. 1*, 57-72.
[3] aictive. (2025). *aictive*. Obtenido de aictive: https://aictive.co/
[4] Alòs Colomer, F., & Puig-Ribera, A. (2022). Inactividad física y sedentarismo. *Los principales problemas de salud*, 66-75.
[5] Aparicio Huamán, A., & Ureta Orcon, K. Y. (2022). *Implementación de pausas activas para mejorar la atención en estudiantes de 3 años de la IEI Cecilia Túpac Amaru – Cusco, 2022.* Cusco: Escuela de Educación Superior Pedagógica Pública.
[6] Bedoya Restrepo, J. C., Campiño Monsalve, M. C., Echeverry Duque, Y., Herrera Torres, N., & Pabón Álvarez, P. A. (2023). *Diseño de un plan de pausas activas para mejorar la productividad y el bienestar de los empleados de la Cooperativa de Yarumal durante el segundo semestre del año 2023.* Bogotá: Universidad Nacional Abierta y a Distancia UNAD.
[7] Castro Sibaja, M., Delgado Villalobos, S., González Cordero, L., & Huang Qiu, C. (2022). Impacto del sedentarismo en la salud mental. *Ciencia Y Salud*, 81-86.
[8] Diaz Masmela, D. M., Murillo Rodríguez, S. M., & Rico Varón, G. A. (2020). Aplicativo móvil como solución tecnológica en la identificación de peligros y valoración de riesgos. *Anova*, 47-56.
[9] Forero, A. Y., Morales, G. E., & Forero, L. C. (2023). Relación entre actividad física, sedentarismo y obesidad en adultos, Colombia, 2015. *Vol. 43 Núm. Sp. 3 (2023): Enfermedades crónicas no transmisibles*, 99-109.
[10] Garzon Mosquera, J., & Aragón-Vargas, L. F. (2021). Sedentarismo, actividad física y salud: una revision narrativa. *Retos, vol. 42*, 478–499.
[11] González Rojas, T., & Tobar Sotelo, A. M. (2021). Aplicación móvil como estrategia de prevención de riesgos laborales en estudiantes de enfermería de una institución en Popayán, Colombia. *Movimiento cientifico MCT Volumen 15*, 1-9.
[12] Guamán Gutiérrez, O. R., & Rosillo Cumbicus, L. J. (2012). *Construcción de un Framework para desarrollo de aplicaciones Web 2.0 con acceso a base de datos MySql.* Loja: Universidad Nacional de Loja.
[13] Gutiérrez Cabello, C. G., Torres Zavaleta, K. A., & Zavaleta Evangelista, K. L. (2018). *Efectividad de un programa de pausas activas para la reducción del nivel de estrés laboral en el personal administrativo en una clínica de Lima.* Lima: universidad peruana cayetano heredia.
[14] Hernández Bejarano, M., & Baquero Rey, L. E. (2020). *Fundamentos de programación web.* Bogota: Universidad ECCI .
[15] Hovancik, J. (2025). *Stretchly.* Obtenido de github: https://github.com/hovancik/stretchly
[16] Lovón Cueva, C. (2021). Uso de pausas activas en la modalidad de enseñanza virtual para promover el bienestar emocional en jóvenes universitarios durante el periodo de pandemia. *En Líneas Generales n.o 6*, 21-33.
[17] Mendieta López, I. (2014). *Desarrollo de Aplicaciones Web utilizando patrones de Análisis y Diseño.* Puebla: Benemérita Universidad Autónoma de Puebla - Facultad de Ciencias de la Computación.
[18] Meza González, J. D. (2017). *Factores de mantenibilidad en el desarrollo de aplicaciones web.* Medellín: Universidad Nacional de Colombia - Facultad de Minas, Departamento de Ciencias de la Computación y la Decisión.
[19] movilixa. (2025). *Pausas Activas – Política de Privacidad*. Obtenido de movilixa: https://movilixa.com/politica-privacidad-pausas-activas/
[20] Párraga Ricardo, C., Boné Andrade, M. F., & Mora Olivero, A. P. (2023). *Programacion web del frontend al backend.* Santo Domingo: Grupo AEA.
[21] Penners, R., & Caelers, R. (2020). *workrave*. Obtenido de workrave: https://workrave.org/
[22] Quizhpi Quinde, C. O., & Pérez Portelles, R. E. (2023). Impacto de las pausas activas en el rendimiento académico y el bienestar de los estudiantes en la Educación Básica. *Ciencias de la educacion y el deporte*, 31-48.
[23] Remor, E., & Pérez Llantada Rueda, M. C. (2014). La Relación entre Niveles de la Actividad Física y la Experiencia de Estrés y de Síntomas de Malestar Físico. *Psicología del Deporte, vol. 23, no. 1*, 123–130.
[24] Rize. (2025). *Automate Your Time Tracking*. Obtenido de rize: https://rize.io/
[25] SAS, M. (2025). *Google Play*. Obtenido de Pausas Activas: https://play.google.com/store/apps/details?id=com.movilixa.activepause
[26] SAS, S. M. (2025). *Pausas Activas*. Obtenido de Google Play: https://play.google.com/store/apps/details?id=pausasactivas.vinebre&hl=es_CO
[27] smsafemode. (2025). *Sobre Pausas activas APP*. Obtenido de smsafemode: https://smsafemode.com/blog/acerca-de-pausas-activas-app/
[28] Tobar Zapata, A., Sanchéz Matallana, D. F., & Bernal Fonseca, Y. C. (2020). *APLICATIVO WEB PARA PAUSAS ACTIVAS.* Bogota: UNIVERSIDAD PILOTO DE COLOMBIA - FACULTAD DE CIENCIAS

SOCIALES Y EMPRESARIALES.
[29] Tunja Castro, D. T. (2021). *Pausas activas para la disminución.* Ambato: Universidad Técnica de Ambato.
[30] Vázquez Morales, E., Calderón Ramos, Z. G., Arias Rico, J., Ruvalcaba Ledezma, J. C., Rivera Ramírez, L. A., & Ramírez Moreno, E. (2019). Sedentarismo, alimentación, obesidad, consumo de alcohol y tabaco como factores de riesgo para el desarrollo de diabetes tipo 2. *Journal of Negative and No Positive Results, vol. 4, núm. 10*, 1011-1021.