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ARTICLE 2

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"INCLUAPP," PROTOTYPE OF A MOBILE APPLICATION TO FACILITATE ACCESS TO SUPPORT AND SERVICES FOR PEOPLE WITH DISABILITIES IN DOLORES HIDALGO, GTO

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Abstract: In the city of Dolores Hidalgo, Guanajuato, there are approximately 17,000 people living with some form of disability. Despite being an important part of the community, many of them do not have the information they need to access the support, services, and benefits available in their environment. Today, information related to discounts in stores, specialized services, support programs, accessible spaces, or care institutions is scattered across different media such as social networks, or is not even shared publicly, as the information remains only with the entities that generate it. This lack of a centralized channel creates confusion and limits opportunities for social, economic, and cultural participation. When a person with a disability or their family seeks information, they often face complicated processes or procedures: asking in multiple places, relying on third parties for data, or physically going to spaces that may not be accessible. This causes unnecessary barriers, wasted time, frustration, and, in many cases, exclusion. The information exists, but it does not reach those who need it most in a timely manner. This is why there is a need to create an accessible, easy-to-use technological solution designed for everyone. A digital tool that brings together accurate information on support, services, benefits, and resources from different local institutions and establishments, allowing people with disabilities to make informed and autonomous decisions and access the various benefits on offer. This type of platform facilitates access to useful data, strengthening the sense of inclusion and belonging in the community. Connecting people with disabilities to the various appropriate resources is not only an information service, it is a step towards a more just society where technology can be used to promote equal opportunities, full participation, and the recognition that all people have the right to develop in a dignified manner and without barriers.

Keywords: people with disabilities; accessibility to information; social inclusion; community support services; access barriers; assistive technologies; digital interface.

INTRODUCTION

The growing presence of digital educational platforms has transformed the way users access knowledge; however, sectors of the population with some type of disability have found that, despite efforts to promote inclusion, there is no efficient and centralized means of providing information about the support, services, or benefits available in establishments such as restaurants, clinics, laboratories, or other spaces. This creates barriers to access, misinformation, and social exclusion. Given this problem, there is a need to design an accessible technological solution that connects people with disabilities to the services and support available in their environment. A project of this type could help reduce the information gap, strengthen decision-making, and promote equal opportunities within the municipality. It is also seen as a means of raising awareness of accessibility in establishments and promoting social responsibility in different productive sectors. The aim is to contribute to improving people's quality of life and promoting a more inclusive and equitable environment for all.

LITERATURE REVIEW AND NEEDS ANALYSIS.

Document review and analysis of existing apps.

General context

Accessible mobile applications are a key tool for promoting social inclusion and improving the quality of life of people with disabilities. In Mexico, there are several apps that facilitate mobility, communication, access to services, and autonomy for users with different types of disabilities.

These apps highlight the importance of geolocation, adapted communication, and mobility assistance in improving accessibility

ACCESSIBILITY ASSESSMENT AND INCLUSIVE DESIGN

To ensure the effectiveness of an app intended for people with disabilities, it is essential to apply accessibility standards, such as the WCAG Guidelines and the EN 301 549 standard. The evaluation should include testing on multiple devices and operating systems, considering screen readers, voice navigation, and alternative controls.

Key aspects for development include:

- Inclusive design from the project's conception.
- Integration of assistive technologies (e.g., TalkBack on Android).
- Testing with real users with different disabilities.
- Adaptable interfaces for visual, hearing, and motor disabilities.

IMPLICATIONS FOR THE PROJECT IN DOLORES HIDALGO, GTO

The project should consider integrating features that respond to the specific needs of the local population with disabilities, such as geolocation of accessible services, visual and hearing assistance, and adapted communication. In addition, it must comply with accessibility standards to ensure that the app is usable by all users, promoting social inclusion and equitable access to support and services. And, of course, it must promote community participation to keep accessibility information up to date and comply with national and international regulations to ensure effective digital inclusion.

METHODOLOGY

General Objective:

To design and develop a mobile application that allows people with disabilities to access up-to-date information on support, services, and benefits available in their locality.

Specific Objectives:

1. Identify the information and accessibility needs of people with disabilities in the locality.
2. Collect data on the services, benefits, and support offered by local businesses and organizations.
3. Design a prototype mobile application with an accessible and functional interface.

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Application	Description	Type of disability addressed
Be My Eyes	Connects people with visual impairments with sighted volunteers via video call to assist with everyday tasks.	Visual
LazarilloApp GPS	Accessible GPS that emits audible messages to facilitate safe navigation in the environment.	Visual
Magnifier	Magnifies text and objects using the mobile phone camera with functions for low vision.	Visual
Disabled parking	Locate parking spaces reserved for people with reduced mobility and report misuse.	Motriz
TUR4all	Find hotels and services accessible to people with motor disabilities.	Motriz
Mapatón	Collaborative platform for rating and geolocating the accessibility of establishments.	Multiple disabilities

Table 1. Notable applications and relevant functionalities

Category	Description	Subtopics	Examples
Barriers	Factors that prevent access to accessible services	Technological	Lack of accessible platforms, low connectivity.
		Social and cultural	Lack of knowledge, lack of awareness.
		Institutional	poor coordination, lack of centralized data.
Needs	Actions required to develop an effective solution	Technological accessibility	Accessible application, adapted functions
		Active participation	users involved in design and testing
		Institutional coordination	agreements, information updates.
		Dissemination and awareness	accessible campaigns, inclusive materials

Table 2. Analysis of Barriers and Specific Needs

Phase	Instruments	Type of data
Diagnosis	Survey + semi-structured interview	Quantitative/Qualitative
Prototype evaluation	Usability tests + SUS scale	Quantitative
Final feedback	Focus group	Qualitative

Table 3. Instruments applied to the sample.

HYPOTHESIS

The implementation of a mobile application with an inclusive approach will significantly improve access to information on support and benefits for people with disabilities in the city of Dolores Hidalgo, C.I.N., Gto.

APPROACH

This study will be conducted using a mixed approach, combining quantitative and qualitative methods. The quantitative approach will provide statistical data on the level of knowledge, access, and needs of people with disabilities. The qualitative approach will provide a deeper understanding through interviews and testimonials.

TYPE OF RESEARCH

Applied and technological development, as its purpose is to create a technological tool that addresses a real problem. It is also descriptive, as it characterizes the current conditions of access.

DESIGN

Non-experimental and field-based, observing reality without manipulating variables.

Population and sample:

The target population is approximately 17,000 people with disabilities in Dolores Hidalgo, C.I.N., and surrounding municipalities. We will work with an intentional sample of at least 100 people, and service providers will also be interviewed.

Data collection techniques and instruments: Structured surveys, semi-structured interviews, and document review will be used.

RESEARCH DESIGN

The design consisted of three sequential phases:

DIAGNOSIS OF THE PROBLEM

PROBLEM ADDRESSED BY THE RESEARCH PROJECT

The research project addresses the lack of a centralized, accessible, and efficient means for people with disabilities in the city of Dolores Hidalgo, Guanajuato, to access information about support, services, and benefits available in places such as restaurants, clinics, laboratories, among others. Currently, there is misinformation, physical and social access barriers, and limited full inclusion of this sector of the population.

CONSTRUCTION OF THE PROTOTYPE SOLUTION

Initial survey to identify difficulties in educational platforms.

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PROTOUSERS

Profile	Needs
Person with a disability, resident of Dolores Hidalgo. **Objectives when using the app:** • Find businesses that offer discounts on treatments, services, and products. • Access reliable information about accessible establishments. • Save time and money when planning activities or treatments.	• Clear information about places and spaces equipped for people with disabilities, opening hours. • Easy validation of discount coupons. • Notifications about promotions or new services and treatments.
Motivations	**Frustrations**
Real-time information. Availability of information from anywhere. Improve your autonomy. Take advantage of economic benefits. Feeling included and respected.	Not finding up-to-date information. Promotions are not valid when you arrive at the location. Interfaces that are not very accessible.

Image 1. User prototype 1 – person with a disability.

Source: own creation

Profile	Needs
Business registered in Dolores Hidalgo. **Example: Orthopedic and prosthetic products store.** Objectives when using the app: • Increase its customer base with disabilities. • Publish promotions for services, treatments, and products. • Improve your reputation as a socially responsible company.	• Platform for registering coupons and benefits. • Targeted promotional tools. • Statistics on coupon usage and publication reach.
Motivations	**Frustrations**
• Real-time information. • Statistics with accurate data. • Availability of information from anywhere. • Increase sales. • Stand out from the competition. • Comply with inclusion policies.	• Inability to easily contact potential customers. • Difficulty updating product information. • Low visibility of promotions on traditional channels.

Image 2. User prototype 2 – registered business.

Source: own creation

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DATA ANALYSIS

Quantitative:

- Based on data obtained from surveys and usability tests:
- 82% of participants indicated that they did not have a centralized source of information on accessible support and services.
- 76% said they had stopped going to a particular establishment due to a lack of prior information about accessibility.
- Average time spent searching for accessible information: 27 minutes per establishment.
- Average time to complete a task on the prototype platform evaluated:
  - First interaction: 4.8 minutes
  - Second interaction (after familiarization): 2.3 minutes
- 87% indicated that the ability to filter services by type of disability would facilitate their social participation.

Qualitative:

- Categorical content analysis was applied to comments made in interviews and observations:
- Lack of reliable information: frequent comments about "having to ask in many places" or "depending on other people to find out."
- Desire for autonomy: expressions such as "I want to get around on my own," "not depend on my family for everything."
- Appreciation of digital accessibility: frequent requests for features such as screen readers, voice commands, pictograms, and sign language videos.
- Perception of exclusion in the community: mentions of feeling "not considered" or "invisible" in shops and services.
- Willingness to use technology: most expressed enthusiasm as long as the interface was simple and compatible with their needs.

PROTOTYPE DEVELOPMENT / DESIGN PROCESS

TECHNOLOGIES USED FOR DESIGN AND DEVELOPMENT

Adobe XD was used to design the user interface, a tool that allowed for the creation of high-fidelity prototypes, navigation flows, and early user interaction testing before moving on to functional development.

For the development of the mobile application and service platform, a set of complementary technologies was used, selected for their stability, scalability, and compatibility with digital accessibility criteria:

- Flutter as the main framework for cross-platform development (Android and iOS).
- Material Design as a design guide for a clear visual hierarchy and accessible components.
- Java and Spring Boot in the backend to implement business logic, authentication control,

and request handling from the application.

- PostgreSQL as the database management system for storing information on users, services, and available support.

RESULTS

The assessment carried out on a purposive sample of 100 persons with disabilities from Dolores Hidalgo, C.I.N., and surrounding municipalities, as well as 15 service providers, identified quantitative and qualitative patterns regarding access to information on accessible support and services in the region.

MAIN FINDINGS

The data indicate a lack of centralized information on accessibility in public and private establishments and services. Most of the people surveyed reported relying on third parties or in-person exploration to find out if a place was accessible, which limits their autonomy and social participation.

RELEVANT OBSERVATIONS DURING TESTING

Visually impaired users reduced their browsing time by up to 52% when the interface included high contrast and a screen reader.

People with hearing disabilities requested that informational videos include sign language and subtitles, noting that only one of the resources evaluated did so.

Service providers showed interest in appearing on the platform, but mentioned the need for training and advice on how to capture and keep accessibility data up to date.

The active participation of people with disabilities in the testing allowed for adjustments to be made to navigation functions, facilitating their user experience.

ANALYSIS AND DISCUSSION

Among the contributions and strengths of the study, it is noteworthy that the evaluation involved real users with a variety of disabilities and service providers, which allowed for a two-way understanding of the needs of both those seeking information and those who can provide it. In addition, the results support the feasibility of developing an accessible mobile application as a tool to reduce information barriers and promote conditions for greater social inclusion.

However, some limitations were identified. Because the sample was intentional and not probabilistic, the results cannot be generalized to the entire population with disabilities in the region.

CONCLUSIONS AND RECOMMENDATIONS

The results obtained are evidence of a problem in accessing information about accessible supports and services for people with disabilities in Dolores Hidalgo, C.I.N., and nearby municipalities.

The study highlights that the evaluation involved real users with a variety of disabilities and service providers, which allowed for an understanding of the needs of both those seeking information and those who can provide it. In addition, the results favor the development of an accessible mobile application as a tool to reduce information barriers and promote conditions for greater social inclusion.

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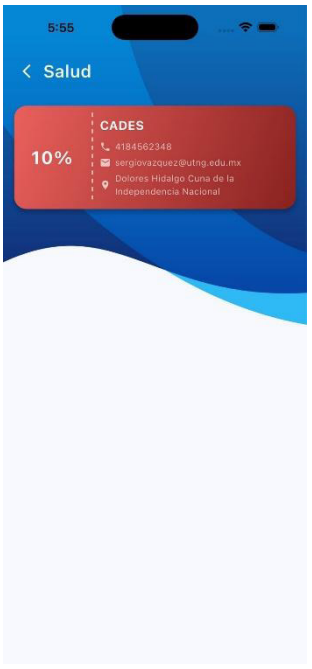
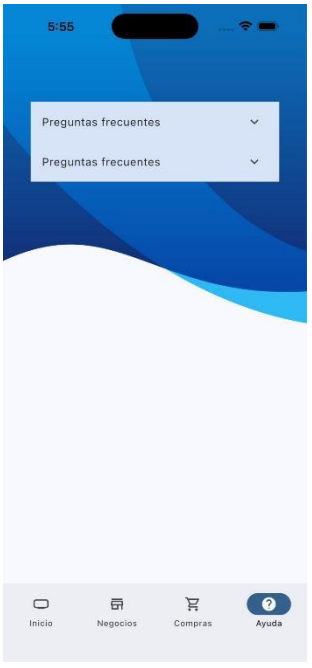
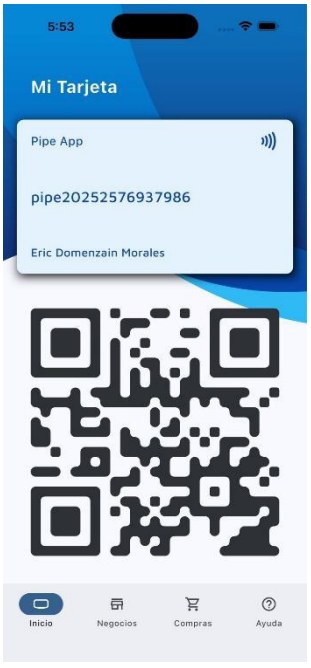
PROTOTYPE SCREENS







In relation to the research hypothesis, the data confirm that an accessible technological solution could directly contribute to reducing information barriers and facilitating access to services, support, and inclusive spaces, as long as it is developed under accessibility principles and with the active participation of people with disabilities at each stage of the process. The evaluation of the prototype showed improvements in search and navigation times, which reinforces the relevance of continuing with its implementation and optimization.

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