

DEXPERIENT: Mobile Application for Solidarity Actions Focused on Providing Life Experiences for People with Disabilities

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Abstract

It is assumed that people with disabilities, along with the entire population, have the right to enjoy their full and effective participation in society. Therefore, the understanding of disability has become a social phenomenon, with its physical, sensory, and/or intellectual restrictions being present in discussions worldwide with the objective of seeking the total inclusion of these individuals in society. A project was developed regarding the generation of an application offering and searching for experiences: DEXPERIENT. The mobile solution is intended for people with some degree of disability to be able to access through location and filters concerning various opportunities for gastronomy, and art, among other forms of accessibility, with respect to their restrictions. Projections from tools that optimize the definition and creation of projects, such as canvas and flowcharts, with subsequent implementation as mobile application prototype. As a result, a platform was developed capable of connecting doctors, people with disabilities, and volunteers who offer such experiences with location via GPS. It was concluded that the developed application is an inclusion program that aims to benefit people with some type of disability within the psychosocial scope.

Keywords: Mobile Applications; People with Disabilities; Life Experiences

1. Introduction

Research on disabilities has emerged in the field of social and human sciences. These injuries have been interpreted for decades as “punishment from the gods”, as inadequacy to moral norms, or even as a suitable disease of isolation (Diniz et al., 2009). Until the second half of the 1990s, the medical model dominated the definitions of disability, and demographic surveys reflected disability as bodily defects (an irreversible situation) (Kane et al., 1998; Bampi et al. 2010). The meaning of disability has changed, consisting of people with physical, intellectual, or sensorial impairments; however, in interaction (with some constraints), they can enjoy their full and effective participation in society (Diniz et al., 2009; Kisner et al., 2017).

Disability has become a social phenomenon, as an individual experience has been understood as oppression caused by bodily injury and the restrictions of capabilities resulting from it (Diniz et al., 2009). Social models include the concept of disabilities as a result of limitations imposed by the body on a social organization (Bampi et al. 2010; Mederios & Diniz, 2004). There are at least two ways of understanding disability (Robson, 2005; Saffran, 2018; Nunes et al., 2021):

- A manifestation of human diversity of a body that experiences physical, intellectual, or sensory impediments, with social barriers as a source of the experience of inequality.
- A natural distress, where efforts should focus on repairing bodily impediments, to guarantee to all people a standard of functioning typical of the species.

In Brazil, social protection for people with disabilities came into force under the Federal Constitution of 1988. Before that, policies and actions for the protection and care of people with disabilities were situated in the spheres of welfarism, charitable practices, and family care. From that moment on, legal provisions have been created in areas such as education, work, social assistance, and physical accessibility, to guarantee the social inclusion of people with disabilities (Santos, 2008).

According to the 2010 Census, almost 46 million Brazilians, about 24% of the population, declared having some degree of difficulty in at least one of the skills investigated (seeing, hearing, walking, or climbing stairs) or having a mental/intellectual disability. Disability is still understood by many as a pathological phenomenon and not as an expression of human diversity. This makes it difficult to treat disability with equity, with adjustments to social environments and specific work, education, and social assistance policies (Nunes et al., 2021). People with disabilities face several effects of this social vulnerability and, in general, are not recognized as productive and are hardly placed in recognized jobs. Additionally, they are not valued in public or private environments, highlighting the lack of accessibility in several establishments. Furthermore, the non-visibility of people with disabilities in the social relationship context determines the isolation and exclusion of this group (Santos, 2008).

The incessant search to reduce these problems has raised discussions about the inclusion of the disabled; however, in Brazil, this concept is understood as the structural improvement of environments and the education of children and young people with special needs in regular schools. On the other hand, full inclusion must also contain the expansion of social relationships, recognition of intellectual or physical capacity, the notion of social competence, and equity in living experiences. Several challenges faced by the medical society regarding the topic under discussion have been supported by technologies aimed at accessibility, connections between the parties involved in process/treatment, and the feasibility of services with availability and data connection (Souza et al., 2021; Alves et al., 2019; Pereira et al., 2021; Silva et al., 2021; Vaz et al., 2020).

Thus, aiming to provide a better quality of life and promote the well-being of this neglected group since the previous centuries, the main objective of the present study is to present a mobile application structure designed to help people with disabilities, putting dreams into practice, fulfilling desires, and modifying ways of personal fulfilment. With the development of the project, the intention was to associate all forms of this group's experiences in a modern, low cost, simple to access, and highly functional application. The platform was developed to connect the parties involved in the process: a person with a disability and a person who wants to offer such an experience.

2. Methods

This study proposes a solution based on a mobile application project with an exploratory description, cross-sectional, quantitative, and qualitative approach. An analysis of possible experiences that benefit the lives of disabled people within the psychosocial scope was carried out. Before the implementation process, a comparative analysis of the solutions was first performed, which could compose a range of solutions that had the same (or similar) objective, as shown in Table 1.

At the comparison process, some variables has been used as reference definition of capabilities (would be favorable elements to the proposed project objective) and weaknesses (the application does not perform such a task that would be important for the proposed objective): is there ability to connect people with disabilities with people who can offer support? are there facilitates contact with people responsible for the patient with a disability? does it connects with a responsible doctor? is there a Brazilian Portuguese version? is it possibility to favorite a contact ?is there points that could serve as inspiration for the proposed project? Thus, an implementation process was outlined based on two major steps: definition of the mobile solution action's scope (based on analyses of competitors and their differences); and a definition of the modelling process and implementation of the proposed tool. Thus, during the design of the mobile application, some questions were the references for the capacities and types of functionalities to be implemented:

1 **Registration and connection of the people we must connect:** to favor a life experience for a person with a disability, it would be necessary to implement

structures (application screens and functionalities) that would allow the registration of the 4 characters of the process: the person with a disability, the doctor in charge, the person in charge of the patient and the person who wants to offer an experience.

2 Registration, description, and availability of the experience to be proposed: The application must provide the possibility to insert and record the proposed experience, as well as results, both with testimonials from those involved, as well as with photos and statements.

3 A structure for monitoring and connecting those responsible: both the doctor and the responsible person must have access and notifications about the events of the experience.

These three assumptions guided the development of the application in its entire procedural concept, from the Adapted Canvas to describe the necessary characteristics, the BPMN for the conduction process, to its implementation. The application should be developed to connect people with disabilities, whether physical, sensory and/or intellectual, in different activities that would include them, such as a gastronomic visit to the best restaurant in the city of Tiradentes – MG (Brazil) or a tour of Lagoa da Pampulha in the city of Belo Horizonte – MG (Brazil), with all experiences focused on the needs of disabled people.

Table 1: Similar Applications Comparison

Similar Application	Reference	Capabilities	Weaknesses	Dexperient Differential
Rovo 4.5	Rovo 4.5 (ND)	Connects people with interests in the same sports and with similar skill levels. Allows users to rank users. Create open or closed groups with friends. It publicizes events organized for sporting purposes. Allows publication of photos and comments about the activities developed.	It does not connect people to activities other than sports. It has few users from Brazil. English language. It does not cover the demands of the disabled.	Greater attention to the disabled public, favors the formation of groups for different interests. Language in Portuguese. Presence of a specialized guide (health professional).
Zingr 2.8	Zingr 2.8 (ND)	It connects neighbors to find out what interests they have, to ask for help, among others. Calculates the distance between users through the GPS. Allows publication of photos and comments. Allow private message.	It does not form interest groups. Confusing and inaccessible interface.	Accessible, includes people with disabilities. Ensures security in meetings.
Broder 5	Broder 5	It connects people who are	Does not expose close	It favors the presence of a

	(ND)	willing to accompany the elderly or disabled in outdoor activities, such as doctor visits, leisure activities and shopping.	contacts by GPS. Non-specialized escorts.	specialized guide in the health area. Provides fun activities.
Devotee 1.8 Discontinued, but it has 10k downloads	Devotee 1.8 (ND)	It connects disabled people and people interested in disabled people, favoring love encounters.	Not very secure and does not guarantee physical proximity to the other user found.	It favors an innovative experience, with a greater chance of finding people with similar interests in the same region. It favors security in meetings.
Be My Eyes 4.7 Helps many people	Be My Eyes 4.7 (ND)	It connects volunteers and people who are blind or have limited vision, to help the visually impaired at various times when they need the sense of sight.	It does not favor meeting these people.	It favors face-to-face meetings and encompasses other deficiencies.
Airbnb	Airbnb (ND)	Hosting application with tab that shows various activities that will take place in the city where the user will be.	It does not offer filters for people with disabilities.	It favors an innovative experience, with a greater chance of finding people with similar interests in the same region.

Source: (Authors, 2023)

The main idea of the application was to bring together people and companies that could offer these activities. Therefore, a prototype of an application offering and searching for experiences was generated for people with disabilities who can search for different activities using location and filters (leisure, gastronomy, art, car, exercise, etc.). The work was and is considered to be significantly relevant, as it contributes to the integration of the disabled into society, although access to the application is open to anyone. Those involved are presented in the organizational chart in Figure 1.

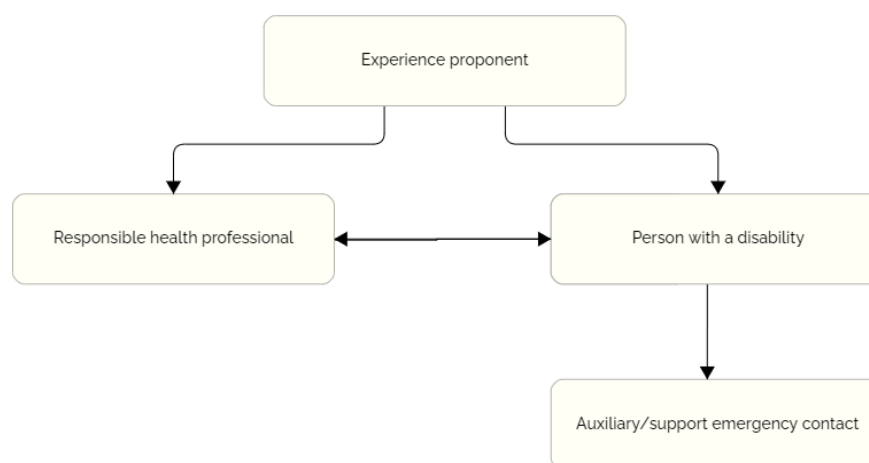


Figure 1: Personas Interaction

Source: (Authors, 2023)

It appears that the project involved people with disabilities, health professionals willing to provide experiences for them, and emergency contacts trusted by users. In addition, the project encompassed companies interested in providing these experiences, such as restaurants, concert halls, transportation companies, and travel agencies.

Second step was the modelling and implementation process. During the modelling of the proposed solution, three main results were developed:

- An analysis via an adapted Canvas to evaluate the scenario and potential of the project (Souza et al., 2020).
- An analysis via BPMN (Business Processes Model and Notation) of the working flow of the tool.
- The development of prototype's interfaces to be used by the mobile application.

3. Results

As shown in Figure 2, the issues relevant to the development of the application were analyzed through a canvas adapted to produce applications and systems.

During the solution development process, an adapted canvas was developed according to the canvas adapted by Souza et al. (2020) for mobile solutions, where the objectives were sectorized by color. The blue sector focused on the application's objectives, the green sector refers to contributions and data that would be treated by the solution, the pink sector focuses on the basis problem and the proposed solution, and yellow focuses on the project's risks and challenges.

Through this canvas, it was possible to perceive that the solution was inserted in a social context of high relevance but had few impact solutions for the proposed public. It was also envisaged that the solution would not have only one answer that fits all proposals, since each disability offers a type of demand, resource, and possibilities making it complex (but necessary) to create experience opportunities for the patient.

Figure 3 shows the flow of the application, based on the BPMN model. In this process, it is possible to describe that registration of each person involved is independent.

<p>What types of users will be on the project?</p> <p>Disabled Health professionals Experience proponents</p>	<p>Expected tool contributions:</p> <p>Promote the meeting of disabled people and health professionals who wish to be volunteers in the same region; Find users for experiences favored by bidders; Make dreams come true for the disabled.</p>	<p>General purpose of the app/system:</p> <p>Promote experiences for people with disabilities with safety and support from health professionals</p>	<p>App/system challenges and risks:</p> <p>Users' permission to use GPS, availability compatibility to carry out the experiment</p>	<p>What statistical analyzes can be done using app/system?</p> <p>Localization of the disabled, volunteer health professionals and proponents. Most popular interest groups Experiences with the highest rate of effectiveness</p>
<p>What data is managed in the project?</p> <p>Disabled people (name, CPF, email, type of disability, name and telephone number of the assistant), health professionals (name, CPF, email, cell phone and professional code), applicants (name, CPF, email and cell phone), experience (type, description, availability in date/time, disability it supports, necessary financial support), social network (photos and comments)</p>	<p>Scientific references to the problem</p> <p>Diniz, Debora, Barbosa, Livia e Santos, Waderon Rufino dos/Disability, human rights and justice, south international Journal on Human Rights [online]. 2009, v. 9, no. 11 [Accessed 23 October 2022]. pp. 94-77. Available at: <https://doi.org/10.1590/S1808-4453200900020004> Epub 01 February 2011. ISSN 1983-3542. https://doi.org/10.1590/S1808-4453200900020004</p> <p>04. Nunes, Ana Celia, Lutz, Erika Aquino Marques and Barba, Patricia Carla de Souza DellaQualily of Family Life: an integrative review on families of people with disabilities. Science & Public Health [online]. v. 28, no. 07 [Accessed 23 October 2022]. pp. 2873-2888. Available at: <https://doi.org/10.1590/S1518-87782012128708962018> ISSN 1678-4501. https://doi.org/10.1590/S1518-87782012128708962018</p>	<p>Scientific References for the Tools</p> <p>SOUZA, B. Proposal for an electronic vaccine card based on mobile technology for process optimization and... ResearchGate. available at: <https://www.researchgate.net/publication/350021139_Proposta_de_cartao_de_vacina_eletronico_baseado_em_tecnologia_mobile_para_o_imizacao_do_processo_e_availability_de_dados_Proposal_of_mobile technology-based_electronic_card_for_processo_access_on_23_Oct_2022></p> <p>PAULO, ALICE RAMALHO TAVARES; SILVA, et al. DireconasUS: Mobile Applications and Stochastic Timed Petri Nets for Referral of Patients and... ResearchGate. Available at: <https://www.researchgate.net/publication/350209858_DireconasUS-Mobile_Applications_and_Stochastic_Timed_Petri_Nets_for_Referral_of_Patients_and_Dimensioning_Hospital_Beds_for_Health_Services> Access on: 23 Oct. 2022</p>		
<p>What works are related to this proposal?</p> <p>BRUNA LOPES SANTIAGO et al, Autistic Spectrum Disorder and Mobile Applications: A Proposed Tool to Support Treatment, ResearchGate, available at: <https://www.researchgate.net/publication/349992180_Autistic_Spectrum_Disorder_and_Mobile_Applications_A_Proposed_Tool_to_Support_Treatment>. access on: 23 Oct. 2022</p>				

Figure 2: Adapted Canvas Evaluation

Source: (Authors, 2023)

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and validate; if a volunteer user, he must enter the experience he wants to provide and its conditions.

- The third step also varies according to the user, but they are interconnected. If the experience occurs, there is a moment of feedback and analysis of the process; if it does not occur, the experience is deleted.

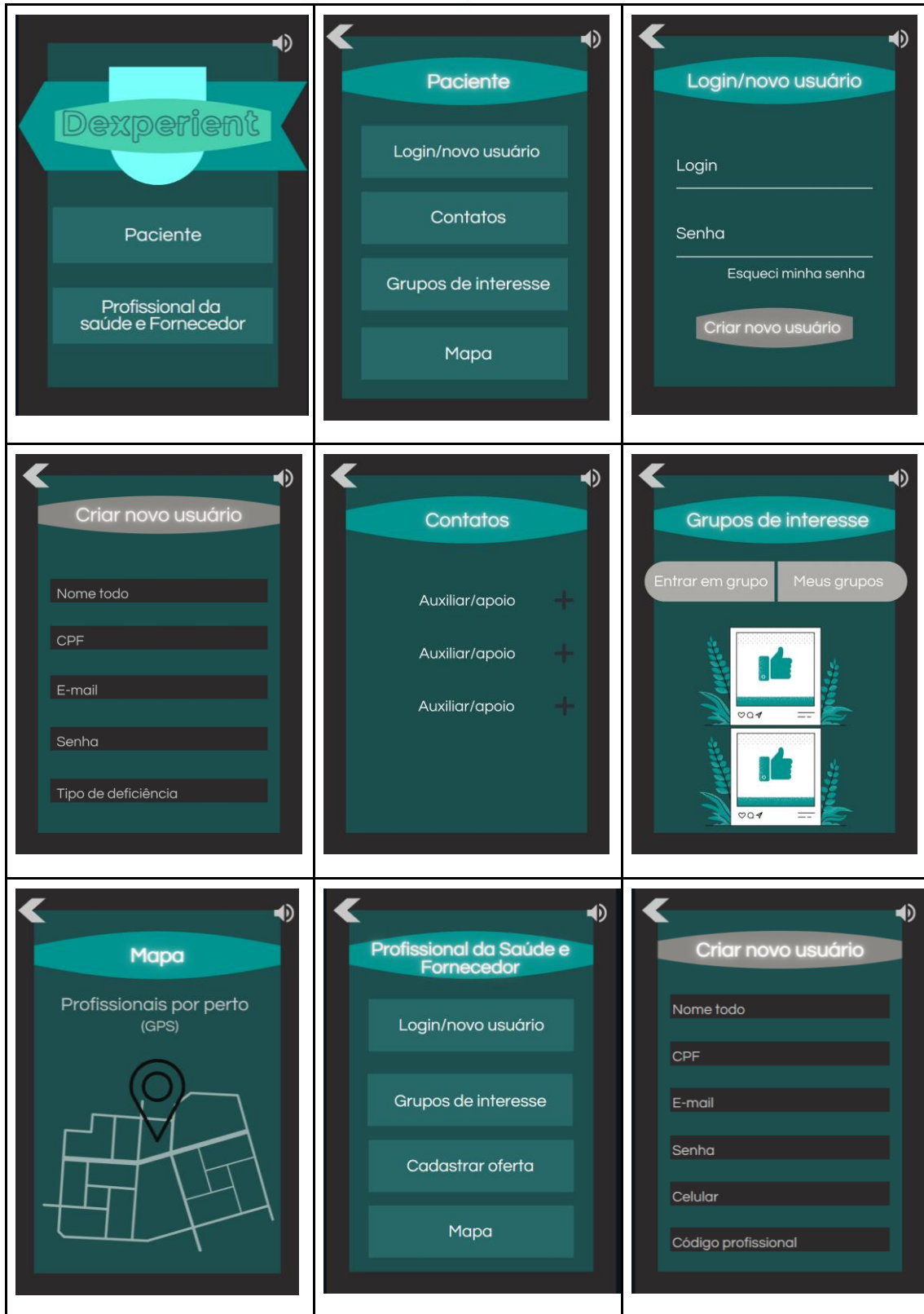


Figure 4: Interface Prototype

Source: (Authors, 2023)

In an explanation of each type of user, BPMN demonstrates:

- **Person with Disabilities:** In this flow, the user must login; if he is not registered, he must register. After login, they must check whether there are groups that have the same interest in their experiences. When finding these groups, they must check if there is an availability of others involved in the experience (professionals, volunteers, and places). If there is no availability, they must wait until they end their interactions. However, if available, a person with a disability must schedule an appointment. Feedback is provided if an event is fulfilled.
- **Health Professional:** Like other users, they must login. Users can create groups of experiences according to their professional competence and validate the proposed activities in the group. At this moment, there is interaction with the volunteer who proposes experiences. Once the experience has been proposed and validated, it is available on the app, awaiting an assessment by someone with a disability who wishes to participate in the proposal. If no one is interested, they can choose to make the proposal available. If the event occurs, the professional has access to data and contact with volunteers and people with disabilities.
- **Volunteer:** Must complete the login process. Once logged in, they can offer experiences that will be evaluated by a health professional. If the proposal is approved, it will be made available to other users. If the proposal is rejected, it is deleted.

This context highlights both the availability of the volunteer and the safety that will be evaluated by the professional until the patient can enjoy this moment, with all needs properly aligned. Figure 4 shows the interfaces developed during the prototyping process. As shown in Figure 4, the prototype screens have the following characteristics:

- Login screens, data registration to control user data and access to the application.
- Screens for registering interest groups and favorite groups, according to the type of experience.
- Map screen for positioning and location according to GPS.
- Screen for recording support and auxiliary contacts.

Such interfaces are optimized to become intuitive and easy to use (including voice commands). The screens, even if they are prototypes, represent some of the most important functionalities of the application. For example, on screen L1-C1 (line 1-column 1 of figure 4), the user can start his identification processes, showing himself as a "Patient" (person with a disability) or a health professional (or volunteer). If they are a Patient, he would enter the L1-C2 screen, where he can log in, see the contact list, interest groups, or check the map for location identification. Already at L1-C3 he inserts the login data.

At L2-C1, the patients can enter their registration data (necessary to complete their registration process). L2-C2 demonstrates an interface for entering patient contact data and L2-C3 has icons for each interest group. Finally, L3-C1 is the screen for demonstrating maps with GPS applications for localization. L3-C2 shows an example of a screen for choosing the possibility of user registration, interest groups, and registering offers and maps (however, focused on health professionals and volunteers). L3-C3 gives the possibility of registering a new user of the two profiles described.

4. Conclusion

Dexperient was designed for people with disability. Soon, a canvas presentation was made, demonstrating the population demands and all complications and objectives of the application for greater understanding by the creators and spectators.

Subsequently, flowcharts were made on the role of the three components: the first being the provider of experiences, the second the health professional, and the third the user. Furthermore, with the theoretical part complete, twelve screens were created so that potential investors demonstrate the Dexperient's structure.

The application is projected to be easy to use, inexpensive, with strong and contrasting colors, and with an audio option for the visually impaired. Therefore, it was concluded that Dexperient has factors that can improve the quality of life of physically, mentally, and/or intellectually disabled individuals, from the moment it benefits the psychosocial environment of these individuals.

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