



An AI-Supported Digital Platform for Accessible and Usable Rehabilitation Information Management in Community-Based Rehabilitation

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Abstract

The increasing adoption of digital technologies in rehabilitation services creates opportunities to improve information management, operational efficiency, and accessibility for rehabilitation personnel. However, community-based rehabilitation staff may still face challenges in accessing fragmented rehabilitation-related information and managing routine administrative activities efficiently. This study presents RehabServE, a digital platform developed to support the operational and information-management needs of staff at Pusat Pemulihan Dalam Komuniti (PDK). The study employed a system development and usability evaluation approach involving requirements identification, system design, development, and user evaluation. RehabServE that integrates centralized rehabilitation-related information, information retrieval, monitoring, reporting, and AI-supported functions within a user-friendly interface. The evaluation focused on three key dimensions: accessibility, usefulness, and user satisfaction. The findings indicate that the system provides easier access to digital functions and rehabilitation-related information, supports users in performing routine tasks more efficiently, and generates generally positive user satisfaction with its interaction and functionality. The structured interface, logical organization of information, and integration of relevant digital functions contribute to a more efficient and accessible user experience. Overall, the findings suggest that RehabServE can support improved rehabilitation information management, task efficiency, and digital service delivery within the PDK environment. The study demonstrates the potential of combining usability-oriented design and AI-supported functions to develop inclusive digital solutions for community-based rehabilitation services.

Keywords: Artificial Intelligence, Assistive Technology, Accessibility, Rehabilitation Information Management, Usability, Pusat Pemulihan Dalam Komuniti (PDK)

1.Introduction

Effective rehabilitation service delivery requires efficient access to accurate, organized, and relevant information to support the day-to-day operations and administration of rehabilitation staff. In a community-based recovery environment, staff often need to manage various forms of information related to rehabilitation services, guidelines, client records, and administrative activities. Reliance on manual and non-integrated information management processes can increase the time required to obtain relevant information, create administrative burden, as well as affect service delivery efficiency. Therefore, the use of digital platforms that facilitate centralized information management is becoming increasingly important in supporting more efficient recovery service operations. To meet these needs, the RehabServE System has been developed as a digital platform to support the operational and administrative needs of staff at Community Rehabilitation Centres (PDKs). The system provides centralized and structured access to recovery-related information, guidelines, and service resources in a single platform. By reducing reliance on manual information handling and facilitating quick access to relevant information, RehabServE aims to improve workflow efficiency, strengthen coordination among staff, and support information-driven decision-making in the delivery of community-based rehabilitation services.

Apart from the functional aspect, the usability of the system was also identified as an important consideration in the development of RehabServE. PDK staff may have varying levels of digital literacy and technical experience; Therefore, the system needs to be intuitive, accessible, and easy to operate. Previous studies have shown that perceptions of ease of use, perception of usability, and usability of the system as a whole are important determinants of the acceptance of technology and its continued use. Systems that are considered easy to understand and operate by users are more likely to be applied in daily work practices and maintained their use in an organizational environment. In this regard, the development of RehabServE not only emphasizes the provision of relevant rehabilitation information, but also prioritizes the production of a user-friendly interface that supports effective interaction with the system. This focus is especially important in a community-based recovery environment, where digital solutions need to meet practical operational needs



while remaining accessible to users with varying levels of technical expertise. As such, RehabServE is an effort to integrate centralized information management and usability-first design into a single digital platform that can support the efficiency and effectiveness of PDK operations. Community Rehabilitation Centers (PDK) staff commonly rely on manual records and fragmented digital tools to manage rehabilitation-related information. This practice often leads to data inconsistency, difficulties in retrieving information, and inefficiencies in daily operations. The absence of a centralized system limits the ability of staff to access updated client records, monitor rehabilitation progress, and generate reports efficiently. Furthermore, poorly designed or difficult-to-use systems may reduce user acceptance and hinder effective adoption. Therefore, there is a need for a user-friendly digital system that centralizes rehabilitation data and supports PDK staff in managing information efficiently.

3. Objectives

The study aims to achieve the following objectives:

1. To implement a user-friendly and intuitive interface that improves usability, accessibility, and ease of interaction with the System among PDK staff.
2. To evaluate the effectiveness of the System in improving the efficiency of information access, monitoring of rehabilitation activities, and reporting processes.

3. Significance of the Study

The System contributes to the improvement of rehabilitation information management at Pusat Pemulihan Dalam Komuniti (PDK) by providing a centralised and structured digital platform for accessing and managing rehabilitation-related information. By reducing dependence on manual and fragmented record-keeping practices, the system facilitates faster information retrieval, improves data organisation, and reduces the potential for errors arising from inconsistent or duplicated records. The system also emphasises usability through a clear, intuitive, and user-friendly interface, enabling PDK staff with varying levels of technical proficiency to interact with the platform effectively. Improved usability can enhance staff productivity, user confidence, and acceptance of digital technology in daily operational activities. Furthermore, centralised access to relevant information supports more effective monitoring of rehabilitation activities and facilitates timely, informed decision-making. Overall, RehabServE has the potential to strengthen operational efficiency, improve information management practices, and support the delivery of more coordinated and effective rehabilitation services within the PDK environment.

4. Literature Review

AI and Assistive Technology

However, the implementation of AI for people with disabilities also presents challenges related to inclusiveness, accessibility, and the potential dominance of medical rather than user-centred perspectives (El Morr et al., 2024). Recent evidence further demonstrates the rapid development of AI-driven assistive technologies for individuals with neurodevelopmental disorders, highlighting the potential of AI to provide more personalized and adaptive support (Shahini et al., 2025). AI-based applications — such as speech recognition, language processing, computer vision, and recommendation systems — can assist individuals with visual, hearing, physical, or cognitive impairments in performing everyday tasks with greater autonomy. In the field of rehabilitation, AI also has the potential to support functional assessment, progress monitoring, and the adaptation of rehabilitation programs to individual needs, thereby improving access to rehabilitation services (Sumner et al., 2023).

Digital Accessibility

AI has growing potential to support people with special needs by enhancing accessibility, communication, mobility, learning, and social participation through more personalized assistive technologies. Accessibility, usability, and inclusion are three crucial elements to ensure that digital technology can be effectively used by people with disabilities. Accessibility refers to the ability of a system to be accessed by users with various types of disabilities through features such as screen readers, voice commands, captions, easy-to-read interfaces, and alternative input methods. Usability emphasizes the ease with which a system can be learned, understood, and utilized to perform tasks effectively; A fully functional but difficult-to-use system can suffer from low adoption and limited ongoing use. In turn, inclusion ensures that people with disabilities are not only users of the technology, but also participate in the design, development, testing, and evaluation processes of the system, thus ensuring that their needs and experiences are genuinely considered. Recent



studies highlight that AI and digital technologies should be developed based on inclusive and user-centred design principles, prioritizing accessibility, usability, engaging users with disabilities, and mitigating algorithmic biases (El Morr et al., 2024). A scoping review by El Morr et al. (2024) further indicates that AI has the potential to improve the life experiences and participation of people with disabilities through various forms of assistive technology. However, the implementation of AI must address issues such as algorithmic bias, data privacy, accessibility, accuracy of results, and the involvement of users with disabilities in the design process, since technologies not designed in an inclusive way risk creating new forms of digital barriers (El Morr et al., 2024). Therefore, AI should be seen as an empowering technology that complements, rather than replaces, human support and rehabilitation services.

Existing AI Assistive Systems

Artificial Intelligence (AI) has increasingly enhanced assistive technologies by enabling more adaptive and intelligent solutions to support individuals in daily activities, communication, mobility, and access to services (Pancholi et al., 2024). AI-based technologies can also improve digital accessibility across different disability groups, including visual, auditory, motor, and cognitive impairments (Chemnad & Othman, 2024).

Table 1. Comparison of Existing Assistive and Rehabilitation Systems

Existing System / Study	Main Purpose	Key Features	Target Users	Limitations
Assistive Technology Open Platform (AT Open Platform) (Ro et al., 2024; Kim et al., 2024)	To facilitate the development, sharing, and adoption of assistive technology through an open digital platform.	Assistive technology information sharing, stakeholder participation, co-creation, accessibility, and user interaction.	Persons with disabilities, developers, makers, and assistive technology stakeholders.	Focuses mainly on assistive technology development and adoption rather than the operational management of rehabilitation information and administrative activities.
MyRehabMaker (Mohd et al., 2022)	To support the development of customized assistive and adaptive devices through community-based collaboration.	Assistive device development, multidisciplinary collaboration, community participation, and technology-enabled solutions.	Persons with disabilities, rehabilitation professionals, caregivers, and community stakeholders.	Primarily focuses on assistive and adaptive device development rather than centralized rehabilitation information management, activity monitoring, and reporting.
ICT-supported Rehabilitation Platforms (Gåsvær et al., 2023)	To support communication, collaboration, information sharing, and decision-making throughout rehabilitation processes.	Digital communication, information sharing, data storage, collaboration, and shared decision-making.	Patients, healthcare professionals, rehabilitation providers, and other stakeholders.	Existing platforms may face challenges related to system complexity, implementation, flexibility, and differences in users' digital literacy.
RehaPro-SERVE (Klein et al., 2024)	To digitalize rehabilitation care planning and improve access to rehabilitation services.	Digital care planning, information exchange, communication, and rehabilitation coordination.	Patients with work disability and healthcare/rehabilitation professionals.	The system is oriented toward rehabilitation care planning and clinical service processes rather than the broader administrative and information-management needs of community rehabilitation centres.

As presented in Table 1, existing assistive and rehabilitation systems have demonstrated the potential of digital technologies to improve accessibility, collaboration, assistive technology development, and rehabilitation service delivery. However, most existing systems focus on clinical rehabilitation, assistive device development, patient support, or stakeholder collaboration. Limited attention has been given to an integrated platform specifically designed to support the operational and administrative information-management requirements of community rehabilitation staff. Therefore, RehabServE addresses this gap by providing a centralized, user-friendly platform that integrates rehabilitation information access, activity monitoring, and reporting functions to support the daily operations of PDK staff.

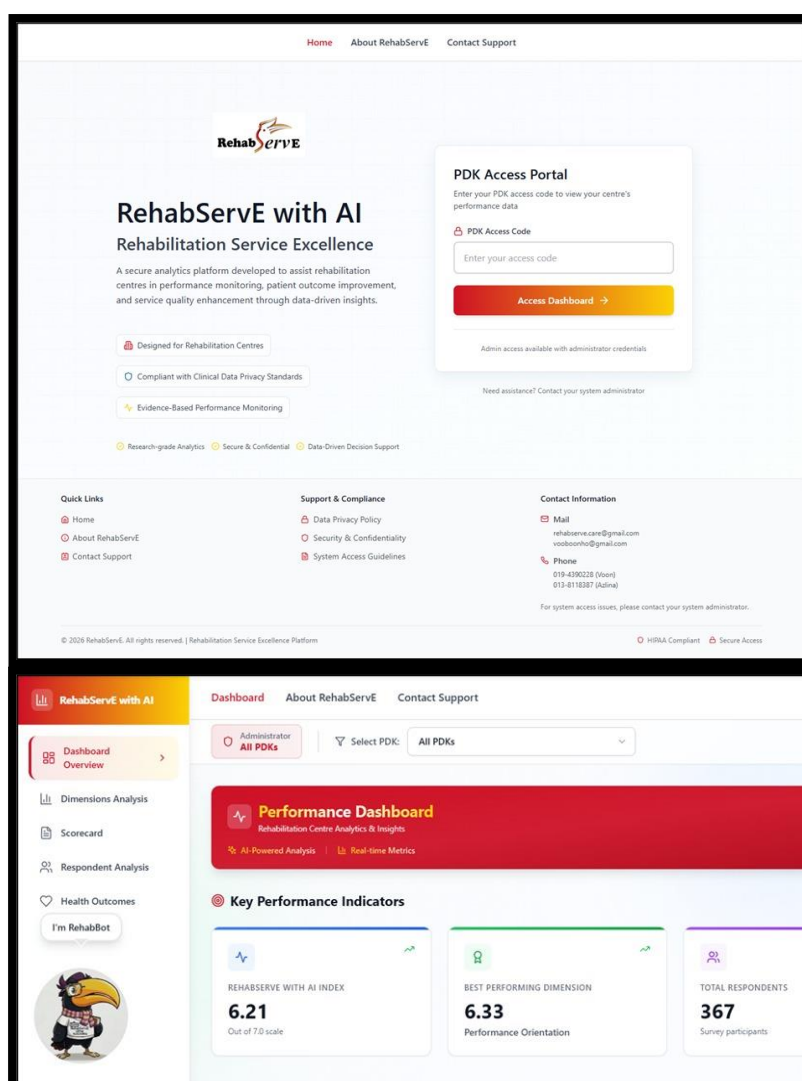


5. Methodology

This study employed a system development and usability evaluation approach to design, develop, and assess the RehabServE System for supporting the operational and information-management needs of PDK staff. The development process involved four main stages: *requirements identification, system design, system development, and system evaluation. The requirements were identified based on the information and operational needs of PDK staff, followed by the design of the system architecture, database, and user interface. The system was subsequently developed by integrating centralized rehabilitation-related information, information retrieval, activity monitoring, and reporting functions. Following system development, usability evaluation was conducted with intended users to assess the system in terms of ease of use, usefulness, accessibility, and user satisfaction. User feedback was collected through a structured usability questionnaire and analyzed using descriptive statistics to determine the overall level of system usability. This approach was selected because previous rehabilitation technology studies emphasize the importance of involving end users and evaluating multiple usability dimensions rather than relying solely on system functionality (Alhasani et al., 2023).

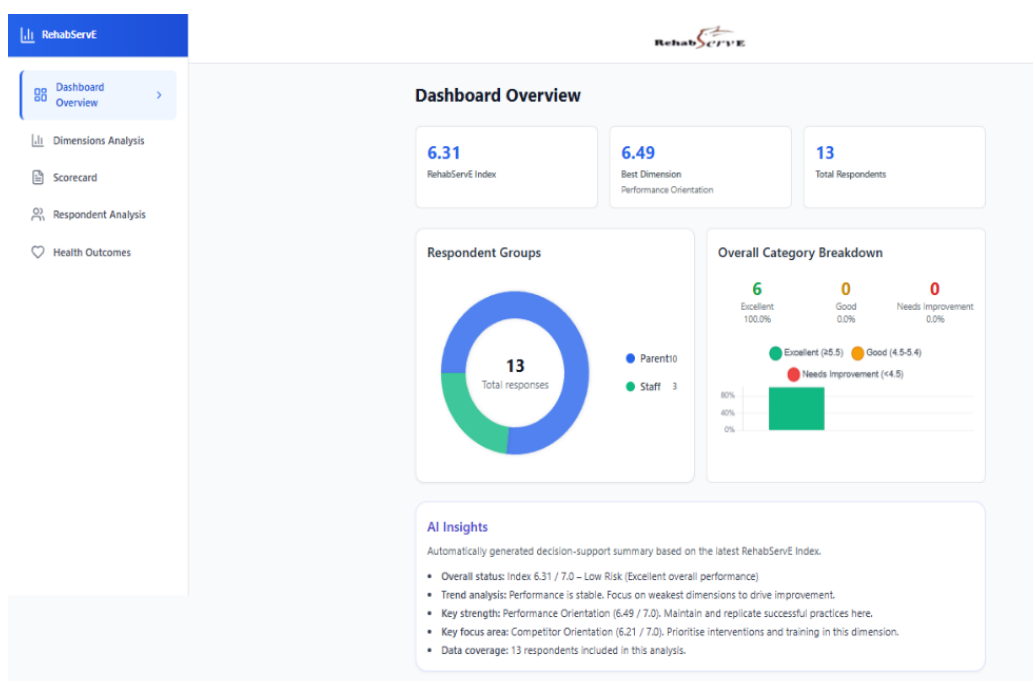
6. Rehabilitation Information Management

The interface of the RehabServE System is designed as a dashboard to provide PDK staff with quick, centralised access to essential rehabilitation information (Figure 1). The dashboard layout emphasizes simplicity, clarity, and ease of navigation to ensure that users can interact with the system efficiently with minimal training. Key information such as rehabilitation records, client data, and system features is organised into clearly labelled sections. Visual elements, including icons and structured panels, are used to improve readability and help users identify system functions quickly. This design approach reduces cognitive load and supports faster task completion.





As illustrated in Figure 2, the dashboard serves as a centralized hub for data visualization and decision support. The top section features high-level Key Performance Indicators (KPIs), such as the RehabServE Index and Best Dimension scores, which allow PDK staff to assess organizational health briefly. The middle section utilizes a chart and a categorical bar graph to represent respondent demographics and performance distribution, respectively. This modular layout ensures that quantitative data is accessible even to users without advanced statistical training.



7. Discussion

The findings indicate that the RehabServE System provides a user-friendly and efficient digital platform that supports PDK staff in accessing and managing rehabilitation-related information in a timely and organised manner. System testing was conducted by obtaining user feedback regarding four dimensions as shown in Table 2.

Table 2. Dimensions Table

Dimension	Purpose
Accessibility	Is the system accessible?
Ease of Use	Is it easy to use?
Usefulness	Does it help users?
Satisfaction	Are users satisfied?

Table 3 shows the respondent demographic profile. A total of 90 respondents participated in the evaluation of the developed AI-enabled assistive system. The demographic profile included gender, age, and previous experience with technology. Overall, the demographic profile indicates that the evaluation involved users with different backgrounds and levels of technology experience, providing a useful basis for assessing the system.



Table 3. Demographic Profile

Characteristic	Frequency	Percentage (%)
Gender		
Male	40	44.44
Female	50	55.56
Age		
Below 30	35	38.89
30-40	30	33.33
Above 40	25	27.78
Technology Experience		
Beginner	20	22.22
Intermediate	45	50.00
Advanced	25	27.78

Table 4. User evaluation

Dimension	Mean	Standard deviation (SD)
Accessibility	4.30	0.55
Ease of Use	4.25	0.60
Usefulness	4.40	0.52
Satisfaction	4.35	0.58

Based on Table 4, overall, the respondents reported positive perceptions of the developed system. Usefulness recorded the highest mean score, followed by satisfaction, accessibility and ease of use. The findings suggest that the system was perceived as useful and accessible by the target users.

8. Conclusion

The development of the RehabServE system demonstrates the potential of AI-assisted digital technology to improve rehabilitation information management and operational support within the Pusat Pemulihan Dalam Komuniti (PDK). The system provides a centralized platform that facilitates easier access to rehabilitation-related information, supports more efficient task completion, and improves the overall user experience. The findings point to positive outcomes across three key dimensions, namely accessibility, usability, and user satisfaction. The structured interface and organized presentation of information allow personnel with different levels of technical experience to interact with the system more easily, while the integration of AI-assisted functions provides additional assistance in efficiently accessing and managing relevant information. Overall, RehabServE addresses an important gap in existing rehabilitation technologies by focusing not only on rehabilitation-related information, but also on the practical operational and administrative needs of PDK personnel. The findings suggest that the combination of AI, accessibility, usability, and inclusive design principles can contribute to more effective digital rehabilitation services. Nevertheless, the current evaluation is limited to the users and context involved in the study. Future research should involve a larger and more diverse group of PDK users, evaluate the system over a longer period of time, and examine additional metrics such as task performance, efficiency, accessibility, and long-term user adoption. Further development could also enhance the AI capabilities of RehabServE to provide more personalized information support and decision-making assistance. Thus, RehabServE provides a foundation for the development of more inclusive, user-centred, and intelligent digital solutions that can strengthen community-based rehabilitation service delivery.

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