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Designing Inclupedia Mobile App Based on Tepo Seliro Local Wisdom as a Disability Empowerment Platform

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ABSTRACT

This research has three objectives, namely analyzing the validity of the Inclupedia mobile app as a platform for empowering people with disabilities with the local wisdom principle of Tepo Seliro (tolerance), as well as analyzing the assessment instrument of the mobile app and testing its usability from the end-user perspective. This research uses the Research and Development (R&D) method with a waterfall model consisting of five stages, namely: (1) requirements and definition; (2) system and software design; (3) implementation and unit testing; (4) integration and system testing; and (5) operation and maintenance. Based on a series of tests and analysis, it shows that the validity score of the Inclupedia mobile app is 3.53 and 3.55 in terms of content and construct, respectively, with the interpretation of the data being in the highly valid category. Meanwhile, the score for the average validity is 3.54 which is also in the very valid category. Furthermore, the results of the validity test of the assessment instrument in the Inclupedia application resulted in a score of 3.46 or in the very valid category. Meanwhile, the results of usability testing to end-users, namely potential new users, show that the Inclupedia mobile app obtained a mean score of 3.75 or very feasible. Based on the results of the analysis that has been carried out, it is concluded that Inclupedia has good internal quality, so it has the potential to be used in empowering people with disabilities based on the local wisdom of tepo seliro.

Keywords: disability, inclupedia, mobile app, platform, tepo seliro.

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INTRODUCTION

Inclusivity as a paradigm for living in a global society has been implemented more massively in the 21st century, especially since digital technology became prevalent. The awareness of the importance of equality and fair access for everyone is widespread as digital technology is used as an intermediary in distributing this value (Fadilah et al., 2024). Internationally, this paradigm has been formally stated as part of the 2030 Sustainable Development Goals (SDGs), specifically in point 16, namely in order to promote inclusive and equitable communities for all people in both formal and non-formal spheres, and point 4.a, namely specifically building educational spaces that are sensitive to the needs of children, disabilities, and gender (United Nations, 2015). According to research conducted by Wulandari et al. (2024), This is a positive awareness movement, as inclusivity can help realize the ideals of justice in all corners of the world.

Furthermore, in Indonesia itself, awareness of inclusiveness, especially in the context of protecting the rights of persons with disabilities, has also been recognized as an important part of

state administration. Law No. 8/2016 on Persons with Disabilities provides legal guarantees for the enforcement of inclusiveness in this country, which includes the fulfillment of rights in all aspects of life, including respect, protection, and the provision of disability-friendly public facilities (Pemerintah Indonesia, 2016). The concrete form of this regulation is empowerment efforts from upstream to downstream, ensuring that every person with disabilities has access to education that can optimize their potential and provide the right path in the career field. Nadhiroh & Ahmadi (2024) revealed that in the education sector, the inclusivity paradigm is not only used as a framework to protect the rights of every child and prevent any discriminatory behavior, but more than that, namely to maximize the talents that exist in them to develop optimally, so that all children without exception can improve their lives. In addition, as an output of the education process, the government is also committed to providing inclusive employment. Through the same juridical basis, the state requires the government, regional governments, state-owned enterprises, and regional-owned enterprises to employ at least 2% of people with disabilities from the total number of employees, while in private companies the percentage is at least 1%. This provision is a real commitment to the realization of an inclusive environment in Indonesia, which is expected to help the productivity of the younger generation in various different conditions (Adi Sudharma & Nur Shadrina, 2024).

The awareness of the importance of inclusiveness has been believed to be urgent, not only by the Indonesian government, but also by the entire global community represented in the United Nations blueprint as described. However, in reality, there are still serious problems in the process of upholding inclusivity in Indonesia, especially in practical aspects. In its implementation, children with disabilities are still the most marginalized group in terms of education, especially when talking about formal education. According to data officially published by World Bank Group (2024) shows that in Indonesia almost 30% of children with disabilities do not yet have good access to education, and some of those who have attended school still do not receive proper facilities. This means that the big commitment to inclusive education based on equity in the fulfillment of facilities and services has not been well achieved, so further efforts are still needed to strengthen it. This of course has a domino effect on employment opportunities for people with disabilities, where the lack of educational status results in the lack of disability labor absorption.

Based on the identification results, it was found that the causes of these problems are very complex. First, in terms of the availability of special schools (SLB) in Indonesia, the quantity is still not ideal. The proportion of special schools is still one of the major challenges in this country which triggers the ineffectiveness of the implementation of inclusiveness (Dewi & Jasmina, 2023). According to Kemendikbudristek (2023), out of a total of 40,165 special schools, 49% are located on the island of Java, so access to education for people with disabilities outside the island is still difficult. Unfortunately, this is not the only obstacle, because in addition to facility issues, there are also human resource issues. Only 10,244 regular teachers and 4,695 special assistant teachers are trained to assist people with disabilities intensely (Kemendikbudristek, 2023). Furthermore, the mechanism for providing competent educators is still not optimal. Based on data released by BAN-PT (2024) There are only 13 universities that provide special education study programs at the undergraduate level. When compared, the growth between the number of students with disabilities and educators in SLB is still not comparable. It is known that the growth in the number of teachers in SLB in the 2021-2023 period is only 5%, while the growth in the number of students with disabilities is three times greater in percentage, namely 15% (Kemendikbudristek, 2023). The urgency of these problems is high, and shows the importance of alternative solutions that can help access education for children with disabilities, as well as provide access to employment, both in the private and government sectors.

Overcoming these problems, an alternative solution that can be provided is through designing a digital platform that can be used to empower people with disabilities by referring to the local wisdom of tepo seliro. *Tepo Seliro* is an expression in the philosophy of Javanese society which literally means tolerance, and has a deep meaning about respecting each other's differences, realizing, feeling what others suffer,

and trying to solve other people's problems (Nugraha et al., 2022). These local values were used as the foundation in the design of the Inclupedia platform as the basis for its service provision (Suprapto et al., 2024). Through services that are accessible to caregivers of people with disabilities, with a focus on assessing the barriers experienced by people with disabilities, training and information on treatment, consultation services with therapists, and access to various job vacancies relevant to each category of people with disabilities, Inclupedia is present as a holistic solution to overcome existing problems. According to research conducted by Indahni (2022), People with disabilities can be better supported by the use of digital technology, especially in the context of children's education, where digital media can increase their motivation. In addition, through the right approach, digital media can be more efficient in assisting children's learning process as it reduces the need for physical activity (Biki et al., 2023). Moreover, the right digital media can increase innovation in the learning process, especially for people with disabilities (Yuana et al., 2024). Through the integration of the local wisdom value of tepo seliro, which emphasizes the importance of tolerance and initiative to solve other people's problems, Inclupedia, which utilizes digital technology in the form of a mobile app, has the potential to be used to empower people with disabilities, both to obtain proper treatment and education, as well as access to relevant job vacancy information.

The novelty of this research lies in the application of the waterfall development model, which remains underexplored in studies related to disabilities. Additionally, this study uniquely focuses on disability caregivers as the primary end-users, aiming to empower them in assisting individuals with disabilities in accessing their rights through the Inclupedia application. Another innovative aspect is the integration of holistic services and features, as Inclupedia offers a comprehensive process encompassing assessment, treatment, consultation, and job vacancy information.

Furthermore, this research incorporates usability testing in the evaluation of Inclupedia, ensuring that insights from potential users are considered alongside those of media and subject matter experts. Previous studies have explored digital media for individuals with disabilities, such as Medyasepti et al. (2023), who developed a high-fidelity digital educational tool based on user experience for parents of children with disabilities. Similarly, Surya et al. (2024) examined the role of digital media in disability empowerment by creating audio films for visually impaired individuals, while Susanti et al. (2023) focused on assisting individuals with visual impairments in reading Arabic script. A review of these studies highlights the novelty of the present research, particularly in terms of its development model, target users, service offerings, and testing methodologies.

In the 21st century, the adoption of digital technology has become essential for enhancing the effectiveness and efficiency of developed systems and solutions (Azizah Siti Lathifah, 2024). Leveraging such technology can expand both the reach and impact of these innovations (Saphira et al., 2024). Based on the identified challenges and opportunities, this research aims to evaluate the validity of the Inclupedia platform, which is grounded in the *Tepo Seliro* local wisdom framework, while also assessing the validity of its assessment tools and testing its usability.

METHOD

The method used in this research is Research and Development (R&D), where researchers develop a product in the form of the Inclupedia platform, then test it. This research is at level 2 as stated by Sugiyono (2021), where researchers make products and then test their quality.

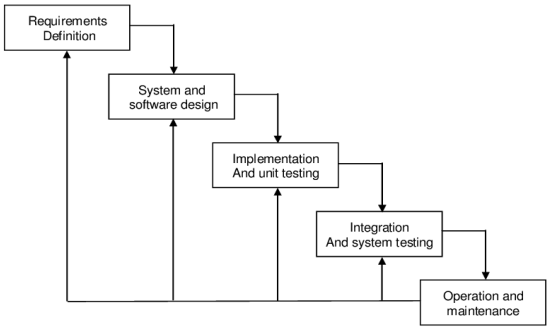

Figure 1. *Waterfall model* (Sommerville, 2011)

Testing in this study includes three types, namely: (1) Inclupedia mobile app validity test; (2) Inclupedia assessment validity test; and (3)

usability testing. This research uses the waterfall model which was adopted and developed with the latest version. There are five stages in the waterfall model to develop the Inclupedia platform as visualized in Figure 1, namely: requirements and definition, system and software design, implementation and unit testing, integration and system testing, as well as operation and maintenance (Sommerville, 2011).

The Inclupedia mobile app validity test process was carried out by media experts (n = 2) and material experts (n = 8) with a questionnaire data collection technique that assesses the content and constructs of the Inclupedia platform (Nieveen, 1999). Furthermore, the validation process of the assessment instrument was also carried out with the same data collection technique, namely a questionnaire, assessed by 8 disability experts. Meanwhile, the usability testing process was carried out on 5 end-users with a questionnaire, as described by Nielsen (2012) the minimum criteria for usability testing is n = 5 with the perspective of the end-user or prospective user. The questionnaire used in the data collection process uses a Likert Scale consisting of 1-4, with criteria: Strongly Disagree/STS=1; Disagree/ TS=2; Agree/S=3; Strongly Agree/SS=4 (Likert, 1932).

The data analysis technique used is descriptive statistics, by calculating the mean or average value of the collected expert assessment data. The data analysis technique was used to analyze three types of tests, namely the validity of the mobile app, the validity of the assessment instrument, and usability testing. Furthermore, the data is interpreted using the interval between the levels contained in the Likert Scale using the interval formula Widyoko (2012).

$$\text{Interval Range}(i) = \frac{\text{Highest Score} - \text{Lowest Score}}{\text{Number of Interval Classes}}$$

Through the interval formula, the amount of interval or score range can be categorized. The following are the calculation results, where the results of each category have a score range of 0.75, with interpretation criteria as shown in Table 1, Table 2, and Table 3.

Interval Range = (4 – 1) / 4 = 0.75

Table 1. Validity Criteria (Widyoko, 2012)

Score Range		Interpretation
0.	V ≤ 4.00	Very Valid
0.	V ≤ 3.25	Valid
0.	V ≤ 2.50	Less Valid
1.	V ≤ 1.75	Invalid
Description: V = Validity Score.		

Table 2. Usability Criteria (Widyoko, 2012)

Score Range	Interpretation
3.25 < U ≤ 4.00	Very Valid
2.50 < U ≤ 3.25	Valid
1.75 < U ≤ 2.50	Less Valid
1.00 < U ≤ 1.75	Invalid
Description: U = Usability Score.	

RESULTS AND DISCUSSION

Result

Requirements and definition

Requirements and definition were conducted through two data collection techniques, namely literature study and Focus Group Discussion (FGD) with eight disability experts from academia (lecturers).The results of the requirements and definition process are divided into two categories, namely functional aspects and device aspects which include hardware and software.

In the first aspect, namely the functional aspect, there are several needs that need to be accommodated in the Inclupedia mobile app service based on the value of tepo seliro, namely: (1) enabling the process of identifying disability categories in detail through an accurate and practical assessment process; (2) enabling the consultation process with experienced and certified therapists, where the consultation process can be done via chat; (3) providing regular information, in the form of relevant articles related to handling children with disabilities, such as practical guidelines for caregivers with simple, applicable, and easy-to-understand language; (4) provide information related to job vacancies that are relevant to each category of children with disabilities; (5) can be a liaison or can bridge the job application process to companies, both in the private and government sectors; (6) has features

that are simple and easy to understand; and (7) has an attractive and user-friendly design.

The second aspect is the software aspect, which is divided into two categories. In software, there are several needs that must be accommodated, namely: (1) Figma, useful in the process of creating a realistic and flexible User Interface / User Experience (UI / UX) design; (2) Android Studio, useful in the process of writing code and debugging; (3) Postman, functions in the process of testing and managing APIs, including testing them before integrating with the mobile app; (4) Firebase, as a backend for the Inclupedia mobile app without the need for a dedicated server; and (5) Appium, performs technical testing automatically. Furthermore, related to the hardware needed, namely: (1) computers or laptops, used in almost all processes, especially from the design process to the coding process; (2) smartphones and tablets, function in the testing process to obtain a real and realistic process; and also (3) internet routers.

System and software design

System and software design is an important stage that focuses on determining features, as well as converting concepts into visual forms. The features of the Inclupedia mobile app based on the design process that has been carried out are listed in Table 3. Meanwhile, the flowchart of each feature holistically is shown in Figure 2.

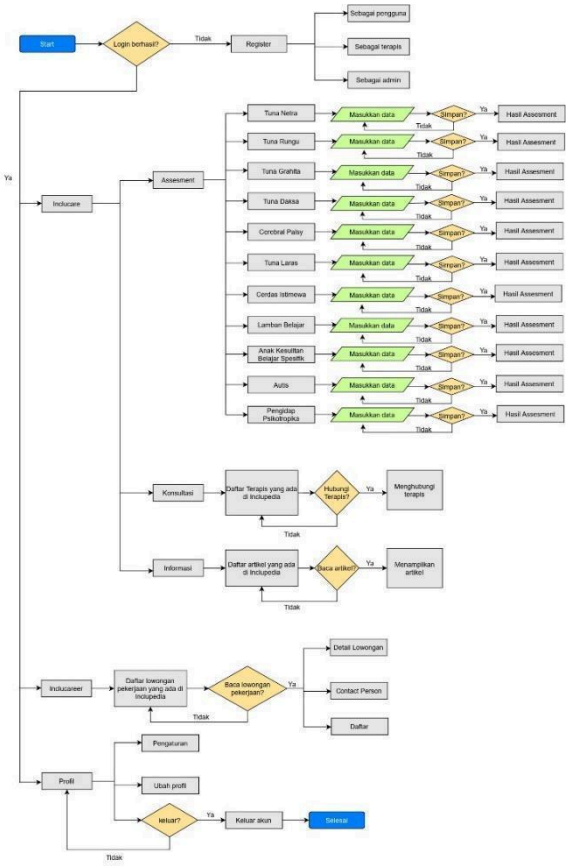

Figure 2. Inclupedia App Flowchart

Table 3. Inclupedia App Features

Pages	Functions
Login	Serves to enter and access the application through the username and password that has been registered.
Inclucare	Assessment, serves to identify disability categories through statement items that have been validly tested by experts. Consultation, serves to contact professional therapists for consultation on handling children with disabilities. Information, serves to access everyday information that is applicable to handling children with disabilities.
Inclucareer	Job information, serves to access various relevant job vacancies.

Pages	Functions
	Job application, used to submit applications for jobs of interest.
Setting	Profile photo, serves to display a photo of yourself. Child CV, serves to upload personal data such as name, experience, education, and some other data that will be sent during the process of applying for a job through the Inclupedia application. 1. Security, serves to reset the username and password.

Implementation and unit testing

At the implementation and unit testing stage, the Inclupedia application is designed through a thorough coding process using the Kotlin programming language. The programming process in the Inclupedia application can be seen in Figure 3, while the results can be seen in Figure 4. The values of *Tepo Seliro* are not just a slogan, but are deeply internalized in every service presented by Inclupedia, the description of which is adopted from Javanese philosophy (Intania et al., 2021). Specifically, the values in *Tepo Seliro* local wisdom that are internalized in each Inclupedia service are: (1) introspection through openness to one's shortcomings, and being aware of accurately identifying personal needs, this is reflected in the assessment feature; (2) a critical mind in receiving information and analyzing it for the best decision making when caregivers try to serve the daily needs of people with disabilities; (3) a caring attitude born in diversity, represented through the consultation feature; (4) the value of rights, where it is embodied in the Inclucareer feature, as Inclupedia seeks to show that people with disabilities also have the right to obtain a job that suits their talents and interests, in order to also participate in nation building.

```
package com.example.inclupedia

import android.os.Bundle
import androidx.appcompat.app.AppCompatActivity
import androidx.lifecycle.ViewModelProvider
import com.google.android.material.snackbar.Snackbar
import com.example.inclupedia.databinding.ActivityMainBinding

class MainActivity : AppCompatActivity() {

    private lateinit var binding: ActivityMainBinding
    private lateinit var viewModel: MainViewModel

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        binding = ActivityMainBinding.inflate(layoutInflater)
        setContentView(binding.root)
```

Figure 3. Inclupedia Programming Code Example

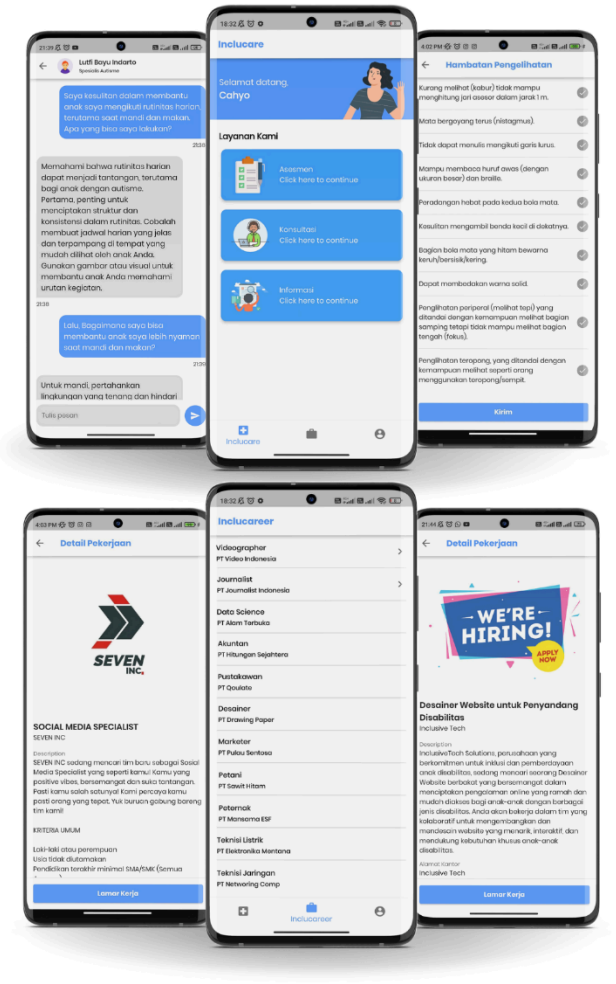

Figure 4. Inclupedia App Mockup

Table 4. Inclupedia Testing Results

Test Type	Test Results	Interpretation
Application validity	3.54	Very valid
Validity assessment	3.46	Very valid

Usability	3.75	Very valid

Based on the results of the tests that have been carried out, the data in Table 4 are obtained. In the Inclupedia application validity test by getting a mean of 3.54 or in the very valid category. Then, in the assessment validity test by experts, get a mean of 3.46, or can be interpreted as very valid. Meanwhile, the usability testing results obtained a mean value of 3.75 or in the very feasible category.

Operation and maintenance

The operation and maintenance stage is a continuous process and can be carried out longitudinally along with the development of needs, as well as the development of technological flows that are present. Digital technology is a dynamic thing, therefore Inclupedia must continue to go through a regular maintenance process. In practical terms, its function is to respond appropriately to changes or updates in the latest hardware models, or also the latest software models, so that adjustments must be made flexibly and periodically, in order to maintain smooth accessibility of the Inclupedia application.

Discussion

Figure 5 shows comprehensively the results of the Inclupedia application validity test, which consists of content validity test, construct validity test, and also the mean of the overall validity test.

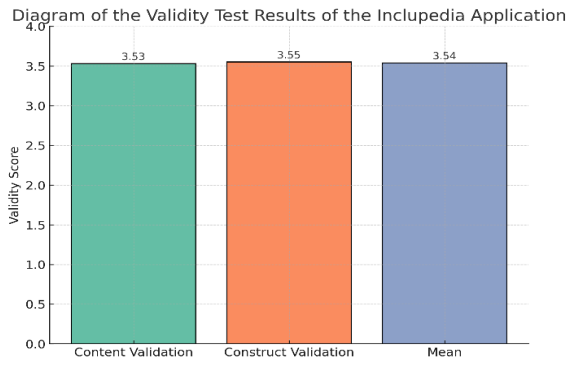

Figure 5. Inclupedia Application Validity Test Results

The validity test process was conducted by 10 experts, of which 8 were academics (lecturers) focusing on the field of disability, namely Psychology, Deafness, Blindness, Autism, Disability, Child Development, and PLB. While the other 2 people are practitioners engaged in information technology and informatics engineering. The mean of the validity test is 3.54. The content validation score shows 3.53 or is in the very valid category. The detailed content validation results from the experts stated that Inclupedia has content suitability with forms of disability empowerment, can provide diagnosis and motivation in increasing the willingness and ability of persons with disabilities, allows exploring the potential and resources for persons with disabilities through caregiver intermediaries, can provide stimulants for persons with disabilities through caregiver intermediaries, is flexible in time for consultation and assessment, can provide reliable information and further guidance for persons with disabilities, and can bridge the interests between therapists, companies, and caregivers with persons with disabilities (Poerwanti et al., 2024).

The construct validation score is in the highly valid category with a score of 3.55. According to the assessing experts, Inclupedia has consistency of button layout, ease of starting the application, ease of ending the application, attractiveness of background color and application design, harmony and attractiveness of object selection in the application, level of user interactivity with the media, regularity of the location of components (icons and navigation) of the application, clarity of images, and ease of application operation (Mushtaq & Wahid, 2024).

The quality of the app internally is very important because it directly affects the user experience, so it needs to be tested by experts. In terms of content, a materially correct application can provide a good experience and optimally assist user activities (Mushtaq & Wahid, 2024). Meanwhile, constructively, the development of a neat and structured digital application architecture minimizes the existence of bugs or errors which of course greatly disrupt the application's operations (Ke & Liang, 2023). The Inclupedia application that has been tested with experts, both in terms of content and construct, has good potential to be widely applied to end-users.

The next test process is the validity test of the assessment instrument. In the process of

identifying various disability categories, an accurate instrument is needed to analyze these categories. Therefore, expert judgment is necessary to provide a test regarding how the instrument used can accurately measure the disability category (Saidacmajaya & Marlina, 2024). Based on the test results, a score of 3.46 or in the very valid category was obtained, so the assessment instrument in the Inclupedia application is suitable for use in identifying disability categories in children. The assessment assessment team includes experts in Psychology, Deafness, Blindness, Autism, Disability, Child Development, and PLB with a total of 8 testers.

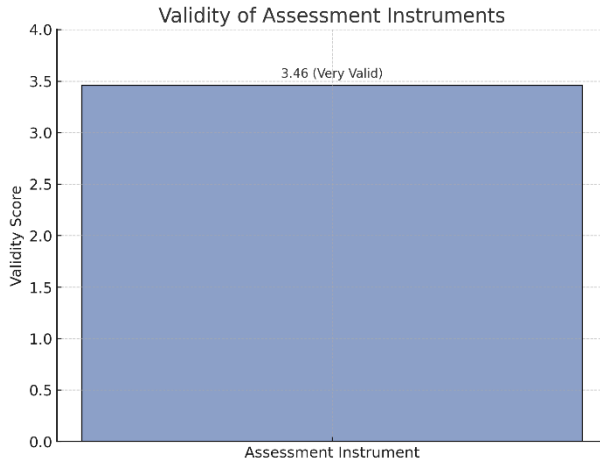

Figure 6. Assessment Instrument Validity Test Results

The last test result is usability testing, which is carried out by end-users or potential users, in this case carried out by 5 people. The usability testing results showed an average of 3.75 or in the very valid category. In detail, the usefulness aspect scored 3.65, the ease of use aspect scored 3.69, the ease of learning aspect scored a perfect score of 4, and the satisfaction aspect scored 3.82, where all aspects have a very valid category. The Inclupedia application can help end-users to be more effective in caring for children with disabilities, while helping to be more productive, provide more control, make it easier to complete what is done in the context of caring for children with disabilities, save my time when I use it so that the identification and care process becomes faster, relevant or according to needs, has features that are easy and practical to use, flexible, consistent, can learn the process of using it quickly, easy to learn how to use, creates personal satisfaction with the Inclupedia application, is fun to use, has a very good appearance, and is comfortable to use for its purpose of empowering people with disabilities through features or services that are presented holistically.

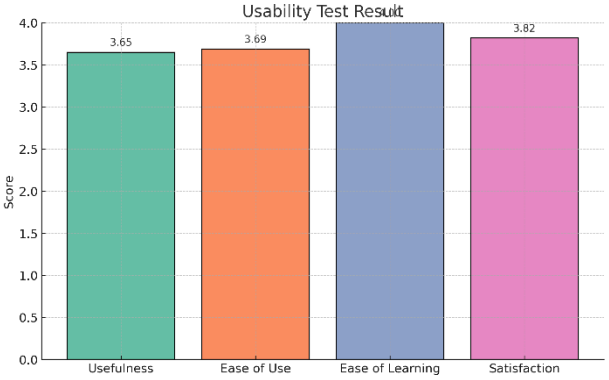

Figure 7. Usability Testing Results

CONCLUSION

Based on a series of tests and analyses that have been carried out, it can be concluded that the Inclupedia application designed based on *Tepo Seliro* local wisdom has a very valid category both in terms of content and construct, with an average score of 3.54. In addition, the assessment instrument used in the Inclupedia application is also very valid, with a test result score of 3.46. The results of usability testing to end-users also show that the Inclupedia application is very feasible, with an average score of 3.75. The Inclupedia application has great potential in providing positive implications for disability empowerment in Indonesia, especially in supporting the realization of the government's vision and supporting the achievement of SDGs 2030.

Recommendations

The advice given to the head of the Social Service engaged in disability empowerment, should be able to adopt the results of this study to expand the scope and effectiveness of the empowerment process. In addition, suggestions are also addressed to parents or caregivers of disabilities to adopt the Inclupedia application to facilitate their work. The last suggestion is addressed to future researchers, so that they can make the results of this research the basis for future studies, especially those related to the

topic of disability empowerment through digital technology with local wisdom principles.

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