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Usability Analysis of the Authentication Feature in the Andal by Taspen Application Using the System Usability Scale Method

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Abstract: This study evaluates the usability of the authentication feature in the Andal by Taspen application for pensioners, focusing on challenges faced by elderly users, as initial reviews indicate issues with its effectiveness. **Objective**: This study aims to assess the usability of the Andal by Taspen authentication feature using the System Usability Scale (SUS) method, identify usability issues affecting elderly users, and provide recommendations for improvement. Specifically, the study focuses on evaluating whether the selfie-based authentication process meets the needs of elderly pensioners, who may face challenges in digital literacy and physical limitations. **Methodology**: This quantitative study involved distributing the System Usability Scale (SUS) questionnaire to PT Taspen pensioners in the Cempaka Putih District, Jakarta. The responses were analyzed using the SUS method to generate a usability score for the authentication feature and to identify areas for improvement. **Findings**: The findings reveal that the Andal by Taspen authentication feature received a SUS score of 61, which corresponds to Grade D on the SUS scale, with an adjective rating of "OK" and an acceptability range classified as "Marginal (Acceptable)." The primary issues identified include difficulties in the self-authentication process, particularly for elderly users, as well as challenges related to digital literacy and physical constraints. **Implications**: The study recommends the development of an heir-based authentication feature to assist elderly pensioners in the authentication process. Additionally, the study emphasizes the importance of improving digital literacy among elderly users to ensure that they can effectively use digital platforms. **Originality**: This research offers a unique contribution to the field of digital public services by providing an empirical evaluation of selfie-based biometric authentication in mobile applications for elderly users, a topic that remains underexplored in existing literature. The findings provide valuable insights into the usability challenges faced by older adults, particularly in the context of pension services, and propose actionable solutions to enhance accessibility and usability.

Keywords: Usability, Authentication Feature, Digital Public Service, System Usability Scale, User Experience

INTRODUCTION

The rapid development of information technology has accelerated digital transformation across sectors, including public services delivered through mobile applications to improve access, efficiency, and service coverage

(Habibillah & Hadjri, 2024; Prasodjo, 2023). Within this shift, authentication functions as a foundational cybersecurity mechanism for verifying identity so that only authorized users and entities can access organizational resources, thereby reducing the risk of unauthorized access and misuse (Microsoft, 2025). In Indonesia's pension administration, authentication has direct operational implications because it helps ensure that pension benefits are disbursed to eligible recipients. PT Taspen (Persero), a state-owned enterprise responsible for social security programs for civil servants and state officials, strengthened this digital direction by implementing a new pensioner authentication mechanism effective 1 January 2025 through the Andal by Taspen super application, which emphasizes selfie-based biometric verification to improve convenience, security, and data accuracy. The usability and accessibility of such authentication features are increasingly consequential because Indonesia is entering an ageing population phase, meaning older adults will remain a dominant user group of pension-related digital services (Indonesia, 2024). This demographic context is further supported by Statistik Penduduk Lanjut Usia 2024 published by the national statistics agency, which provides macro-level demographic and socioeconomic evidence relevant to understanding older adults as service users (BPS, 2024). Consequently, even when authentication is redesigned to be procedurally simpler, the real-world success of the service depends on whether older beneficiaries can complete selfie-based verification comfortably and reliably under everyday conditions, including variability in digital literacy and physical capability (BPS, 2024; Indonesia, 2024).

Prior research on digital public services and mobile government (m-government) consistently indicates that usability is a key determinant of citizen trust, satisfaction, and adoption, and that usability breakdowns often stem from task-flow disruptions, navigation complexity, and interface design issues in mobile public-service applications (Alabdulrahman et al., 2025; Almarashdeh & Alsmadi, 2017; Ozturk et al., 2019). Design-oriented studies further emphasize that user interface decisions in m-government should reflect the specific characteristics of public services and heterogeneous citizen profiles rather than relying on generic mobile design assumptions (Kureerung & Ramingwong, 2019). Methodologically, the System Usability Scale (SUS) is widely used because it is brief, technology-agnostic, and produces a standardized 0–100 usability score that supports comparison across systems and contexts (Vlachogianni & Tselios, 2022). Benchmarking research and meta-analyses frequently reference a practical mean benchmark around 68 for

interpreting whether a system's usability is above or below typical expectations, while also acknowledging that benchmark distributions can vary by domain (Hyzy et al., 2022; Nicora et al., 2025). In addition, multiple cross-cultural adaptation and validation studies provide psychometric support for SUS reporting acceptable measurement quality and internal consistency across different languages and settings thereby reinforcing its suitability for usability evaluation in diverse user populations (Ensink et al., 2024; Lourenço et al., 2022; Mohamad Marzuki et al., 2018; Sheu et al., 2017).

A further body of research highlights that modern authentication design must navigate a security–usability trade-off. While biometric and multifactor authentication can strengthen security and reduce password burden, they can also introduce friction when successful completion depends on strict interaction and environmental conditions such as camera positioning, lighting, and instruction compliance (Menegazzo Verzeletti et al., 2018; Zhang et al., 2019). Accessibility-focused biometrics research similarly cautions that biometric solutions can become barriers for users with physical constraints if inclusive design and alternatives are not considered (Blanco-Gonzalo et al., 2018). Complementing this, studies on older adults' mobile-app use show that age-related visual, cognitive, and psychomotor changes together with digital literacy gaps can intensify usability problems and increase reliance on support mechanisms, underscoring the importance of accessible design and error-tolerant interactions (Amouzadeh et al., 2025; Li & Luximon, 2020; Quinn et al., 2019). Despite these insights, empirical evidence remains limited regarding usability performance and improvement needs for selfie-based biometric authentication in pension-service mobile applications used predominantly by older adults, which motivates focused evaluation in the Andal by Taspen context.

This study aims to analyze the usability of the authentication feature in the Andal by Taspen application using the System Usability Scale (SUS) in order to identify existing usability issues and provide improvement recommendations so that the authentication process becomes more user-friendly and better meets users' expectations, particularly among older pension beneficiaries.

This study is grounded in the argument that reducing procedural steps in authentication does not necessarily yield a usable experience for older users because usability emerges from the interaction between system demands (e.g., selfie capture requirements and instruction clarity) and user capabilities (e.g., digital literacy and physical/health constraints) (Blanco-Gonzalo et al., 2018; Li & Luximon, 2020). Accordingly, the

authentication feature is expected to exhibit below-benchmark usability relative to commonly used SUS reference standards and fall within a marginal acceptability range, indicating the need for usability enhancements that better accommodate older adults' real-world conditions (Hyzy et al., 2022; Nicora et al., 2025).

RESEARCH METHOD

This study was conducted through several systematic stages to evaluate the usability of the authentication feature in the Andal by Taspen application. The research began with problem identification, which aimed to recognize and define the issues experienced by users, particularly pensioners, when using the authentication feature. This initial stage was essential to ensure that the research focus was aligned with real usability problems encountered in practice. Following this, a literature review was conducted by examining relevant academic sources, including books, scientific journals, e-books, and previous empirical studies related to usability evaluation and digital public services. This step provided a strong theoretical foundation and supported the selection of the System Usability Scale (SUS) as the analytical method.

Data collection was carried out by distributing a System Usability Scale (SUS) questionnaire to pensioners who use the Andal by Taspen application in the Cempaka Putih District, Central Jakarta. The questionnaire employed a five-point Likert scale ranging from strongly disagree to strongly agree to capture users' perceptions accurately. The collected questionnaire data were then processed using the SUS method by applying standardized scoring rules. Each item response was converted into a usability score, and all scores were aggregated to obtain an overall usability value. The calculated usability scores from all respondents were subsequently averaged to produce a final usability score, which was then interpreted based on the established SUS evaluation standards to determine the usability level of the authentication feature. Finally, the results of the analysis were summarized to provide clear conclusions reflecting the overall findings of the study.

The population of this research consisted of PT Taspen (Persero) pensioners residing in the Cempaka Putih District, Central Jakarta, who use the Andal by Taspen application for authentication purposes. According to Sugiyono, population refers to a group of subjects or objects within a specific area that share characteristics relevant to the research objectives. Due to the unknown total number of pensioners using the application in the study area, sample size determination was conducted using the Lemeshow formula

(Richard, 1990). The calculation indicated a minimum required sample of 35 respondents. However, this study successfully obtained data from 50 respondents who met the research criteria, thereby exceeding the minimum requirement and strengthening the reliability of the analysis.

The System Usability Scale (SUS), introduced by John Brooke in 1986, was used as the data analysis method in this study. SUS is widely recognized as a reliable, efficient, and easy-to-use instrument for assessing users' perceptions of system usability (Wahyuningrum, 2021). The SUS questionnaire consists of ten statements designed to be completed quickly and understood easily by respondents. One of its key advantages is its technology-agnostic nature, allowing it to be applied to various systems, including websites and mobile applications. The SUS scoring system produces a final score ranging from 0 to 100, which simplifies interpretation and comparison of usability levels (Rachmawati & Setyadi, 2023). The SUS questionnaire utilizes a five-point Likert scale, as presented in Table 1, where respondents indicate their level of agreement with each statement.

Table 1. Likert Scale

Response	Score
Strongly Disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly Agree	5

In calculating the SUS usability score, specific scoring rules were applied. For odd-numbered items (1, 3, 5, 7, and 9), the score was calculated by subtracting 1 from the respondent's answer. For even-numbered items (2, 4, 6, 8, and 10), the score was calculated by subtracting the respondent's answer from the maximum Likert scale value of 5. After all item scores were calculated, the total score was summed and multiplied by 2.5 to obtain a final SUS score ranging from 0 to 100. The average usability score was then calculated by dividing the total score by the number of respondents using the following equation:

$$\bar{x} = \frac{\sum x}{n}$$

The final SUS score was interpreted using the SUS interpretation scale, as shown in Table 2, to determine the usability grade, acceptability range, and adjective rating of the authentication feature.

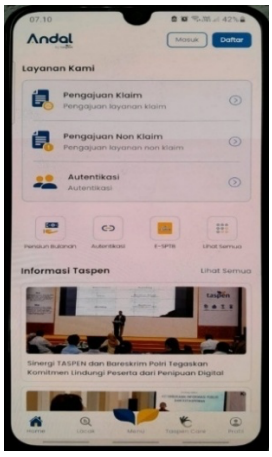
Table 2. SUS Score Interpretation Scale

Grade	SUS Score Range	Percentile Range	Adjective Rating	Acceptability	NPS
A+	84.1 – 100	96 – 100	Best Imaginable	Acceptable	Promoter
A	80.8 – 84.0	90 – 95	Excellent	Acceptable	Promoter
A−	78.9 – 80.7	85 – 89	Good	Acceptable	Promoter
B+	77.2 – 78.8	80 – 84	Good	Acceptable	Passive
B	74.1 – 77.1	70 – 79	Good	Acceptable	Passive
B−	72.6 – 74.0	65 – 69	Good	Acceptable	Passive
C+	71.1 – 72.5	60 – 64	OK	Acceptable	Passive
C	65.0 – 71.0	41 – 59	OK	Marginal	Passive
C−	62.7 – 64.9	35 – 40	OK	Marginal	Passive
D	51.7 – 62.6	15 – 34	Poor	Marginal	Detractor

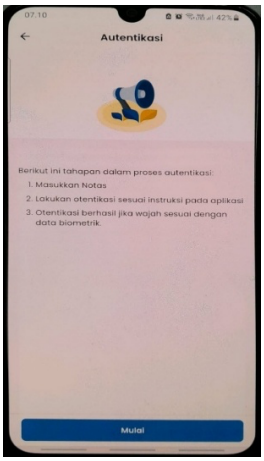
RESULT AND DISCUSSION

Authentication Feature Interface of the Andal by Taspen Application

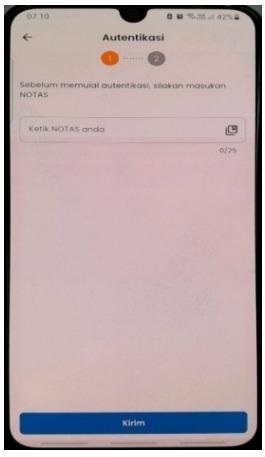
Figures 1 illustrate the sequential steps of using the authentication feature in the Andal by Taspen application. Pension beneficiaries can complete the authentication process by following the provided instructions, which begin with entering the NOTAS information, followed by taking a selfie. Users are required to ensure that the selfie image is clear and not blurred. Upon successful completion of the process, the system displays a notification indicating that the authentication has been successfully completed. If the authentication attempt fails, pension beneficiaries must repeat the selfie process and ensure that the captured image is clearly visible.



Application Dashboard



Authentication Instructions



Authentication Instructions

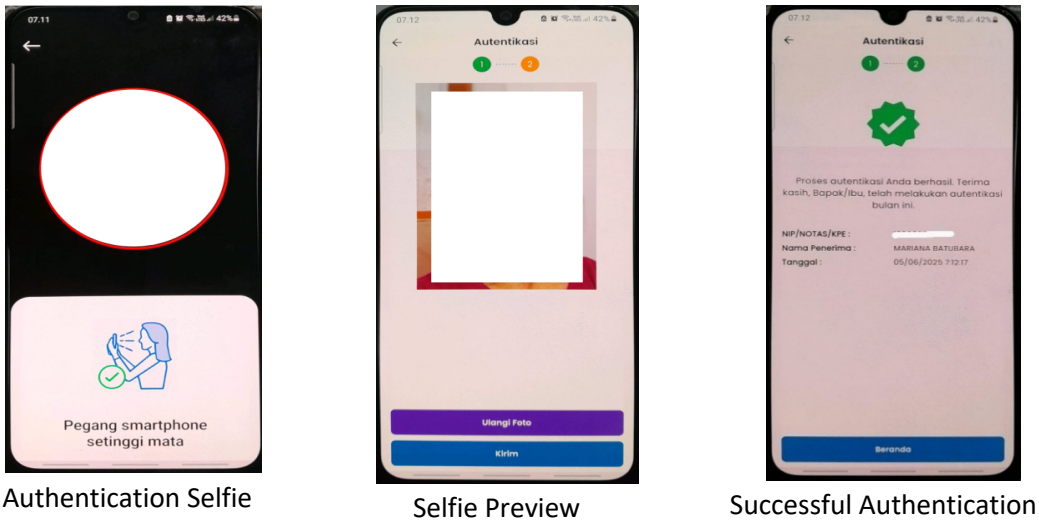


Figure 1. Authentication Feature Interface

After presenting the interface and workflow of the authentication feature in the Andal by Taspen application, the following section shifts focus to the characteristics of the respondents involved in this study, providing an overview of the user profile that forms the basis of the usability evaluation.

Respondent Characteristics

1. Respondent Characteristics Based on Gender

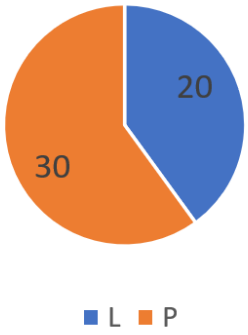


Figure 2. Respondent Characteristics Based on Gender

Based on Figure 2, out of a total of fifty respondents, the majority were female, accounting for thirty respondents, while male respondents totaled twenty. These results indicate that pension beneficiaries who use the Andal by Taspen application in this study are predominantly female.

2. Respondent Characteristics Based on Age

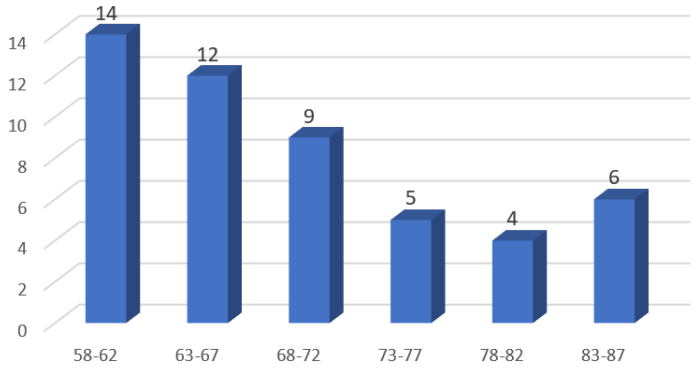


Figure 3. Respondent Characteristics Based on Age

Figure 3 presents the distribution of respondents based on age range. The figure shows that the largest proportion of respondents falls within the age range of 58–62 years, with 14 respondents, followed by those aged 63–67 years, totaling 12 respondents. The smallest number of respondents is found in the age range of 78–82 years, with 4 respondents.

Results and Discussion of the SUS Method

Validity and Reliability Testing

Validity testing aims to assess whether each item in the developed questionnaire can be considered valid based on respondents' answers. Based on a significance level of 5%, the r-table value for 50 respondents is 0.284.

Table 1. Validity Test

Statement	r-value (calculated)	r-value (table)	Significance	Remark
P1	0.504	0.284	< .001	Valid
P2	0.875	0.284	< .001	Valid
P3	0.883	0.284	< .001	Valid
P4	0.692	0.284	< .001	Valid
P5	0.726	0.284	< .001	Valid
P6	0.786	0.284	< .001	Valid
P7	0.609	0.284	< .001	Valid
P8	0.833	0.284	< .011	Valid
P9	0.758	0.284	< .001	Valid
P10	0.378	0.284	0.007	Valid

Based on Table 1, it can be concluded that all SUS statements used in the questionnaire demonstrate good validity, as the calculated r-values exceed the r-table value of 0.284 and

the significance levels are below 0.05. Reliability testing was then conducted to assess the consistency of the questionnaire used in this study.

Table 2. Reliability Test

Reliability Statistics	Value
Cronbach's Alpha	0.885
Number of Items	10

Based on Table 2, the Cronbach's Alpha value obtained for the 10 questionnaire items is 0.885. This value indicates that the questionnaire instrument is reliable, as it exceeds the reliability standard value of 0.60.

2. Calculation of Questionnaire Results Using the SUS Method

At this stage, the questionnaire responses from 50 respondents are calculated using the System Usability Scale (SUS) method. The following presents the results of the questionnaire analysis based on the SUS method:

Table 3. SUS Calculation Results (**Score (Total × 2.5)**

No	Respondent	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Total	SUS
1	R1	2	1	1	0	2	1	1	1	1	2	12	30
2	R2	3	1	2	3	4	2	4	1	1	0	21	52.5
3	R3	3	3	4	3	4	3	3	3	3	1	30	75
4	R4	3	0	1	1	4	3	3	1	1	1	18	45
5	R5	2	2	2	1	3	2	2	2	2	1	19	47.5
6	R6	4	3	4	2	4	3	3	3	3	1	30	75
7	R7	4	3	4	0	4	4	4	4	3	1	31	77.5
8	R8	4	3	3	1	3	3	4	3	3	1	28	70
9	R9	3	3	3	3	3	3	3	3	3	1	28	70
10	R10	3	3	3	2	3	3	3	3	2	2	27	67.5
11	R11	4	1	2	1	3	2	2	1	2	1	19	47.5
12	R12	4	1	2	1	3	2	2	3	1	3	22	55
13	R13	4	3	4	2	4	3	4	3	1	0	28	70
14	R14	3	3	3	3	3	2	2	2	3	1	25	62.5
15	R15	3	1	1	0	2	2	3	1	1	1	15	37.5
16	R16	4	1	2	0	2	2	3	2	1	2	19	47.5
17	R17	2	1	1	1	1	1	1	1	1	2	12	30
18	R18	3	3	3	1	3	1	3	3	3	1	24	60
19	R19	3	3	3	3	3	3	3	3	3	3	30	75
20	R20	3	3	3	3	3	3	3	3	3	3	30	75
21	R21	4	3	3	3	3	3	3	3	3	3	31	77.5
22	R22	3	2	3	0	3	2	3	3	2	1	22	55

No	Respondent	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Total	SUS
23	R23	3	1	1	1	2	2	3	1	0	2	16	40
24	R24	3	3	3	4	3	4	3	4	3	1	31	77.5
25	R25	4	3	3	1	3	3	4	3	3	1	28	70
26	R26	3	3	3	3	3	3	3	3	3	3	30	75
27	R27	4	1	2	0	2	2	3	2	3	1	20	50
28	R28	3	3	3	3	3	3	2	3	3	1	27	67.5
29	R29	3	1	2	1	3	2	3	2	2	1	20	50
30	R30	4	4	4	4	4	4	4	4	4	1	37	92.5
31	R31	4	4	4	4	4	4	4	4	4	3	39	97.5
32	R32	3	3	3	1	3	3	2	3	3	1	25	62.5
33	R33	3	3	3	3	3	3	2	3	1	1	25	62.5
34	R34	2	2	1	1	2	2	1	3	2	1	17	42.5
35	R35	3	3	4	1	3	3	3	3	3	1	27	67.5
36	R36	3	2	3	0	3	3	3	4	3	1	25	62.5
37	R37	3	1	1	1	2	1	1	1	1	1	13	32.5
38	R38	3	1	1	1	1	1	3	1	1	0	13	32.5
39	R39	3	2	2	1	3	3	3	2	1	1	21	52.5
40	R40	4	4	4	4	4	4	4	4	4	4	40	100
41	R41	2	3	3	1	3	2	2	2	3	1	22	55
42	R42	3	2	2	0	2	3	3	3	3	0	21	52.5
43	R43	3	2	2	2	3	1	2	2	3	1	21	52.5
44	R44	3	2	3	2	2	4	2	2	0	1	21	52.5
45	R45	4	3	3	3	3	3	3	3	3	4	32	80
46	R46	3	2	3	2	3	3	3	2	3	1	25	62.5
47	R47	3	3	3	3	3	3	4	3	3	3	31	77.5
48	R48	2	3	3	1	3	3	4	3	3	1	26	65
49	R49	3	1	1	2	2	2	3	1	1	3	19	47.5
50	R50	3	3	3	3	3	4	2	2	3	1	27	67.5
Overall Total												**3050**	

Based on the results presented in Table 3, the overall total score obtained is 3,050. The average SUS score is then calculated by dividing the total SUS score by the number of respondents.

$$\bar{x} = \frac{\sum x}{n}$$

$$\bar{x} = \frac{3050}{50} = 61$$

After the calculation was performed, the average SUS score obtained was 61. To determine the usability level of the authentication feature in the Andal by Taspen

application based on the average SUS score, the following explains the interpretation of the SUS score results:

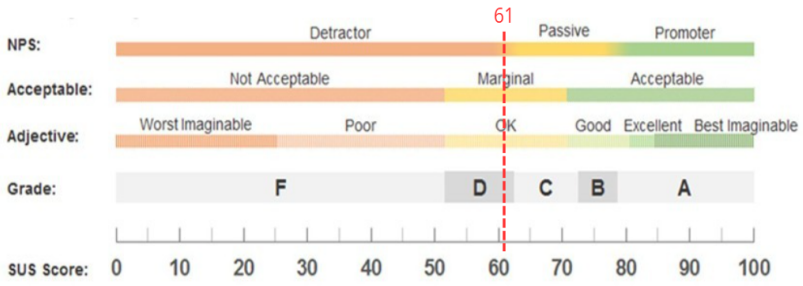


Figure 4. SUS Score Results

The System Usability Scale analysis shown in Figure 4 indicates that the usability of the authentication feature in the Andal by Taspen application is below average and classified as Grade D. The adjective rating places this score in the "OK" category, indicating that the feature is usable but does not yet provide an optimal user experience. It falls within the marginal acceptable range, suggesting that improvements are necessary to enhance user comfort. Furthermore, the Net Promoter Score categorizes this result as a "Detractor," approaching "Passive," which implies that most users are not fully satisfied, although there remains potential for improvement through better usability enhancements.

Findings and Recommendations

Identified Issues

Based on the analysis results and the researcher's experience during data collection, several issues were identified in the use of the authentication feature in the Andal by Taspen application. These issues form the basis for the recommendations proposed in this study. First, most users have limited digital literacy, as the majority of application users are older adults. Second, the application instructs users to take a selfie by holding the smartphone at eye level. In practice, many pension beneficiaries experience difficulties due to physical limitations or health conditions, which leads them to prefer visiting Taspen offices or partner payment offices directly to complete the authentication process. Third, although a special procedure through heirs is available, the process is time-consuming and requires heirs to visit Taspen offices or partner payment offices in person.

Recommendations

Although the SUS score indicates a moderate level of usability, field conditions reveal a clear need to improve accessibility and user comfort, particularly for pension beneficiaries with physical limitations or specific health conditions. While PT Taspen has provided a special application procedure, the process is relatively inefficient and burdensome for heirs because it requires in-person visits to Taspen offices or partner payment offices. This becomes a significant obstacle, especially in urgent situations or when beneficiaries live far from service locations. Therefore, this study recommends the implementation of an heir-assisted authentication feature, allowing heirs to act as companion users for pension beneficiaries. PT Taspen or partner payment officers would still conduct home visits to verify the beneficiary's condition, while the proposed feature would simplify the authentication process and ensure that pension beneficiaries continue to receive their entitlements. The following section presents the proposed design of the recommended heir-assisted authentication feature.

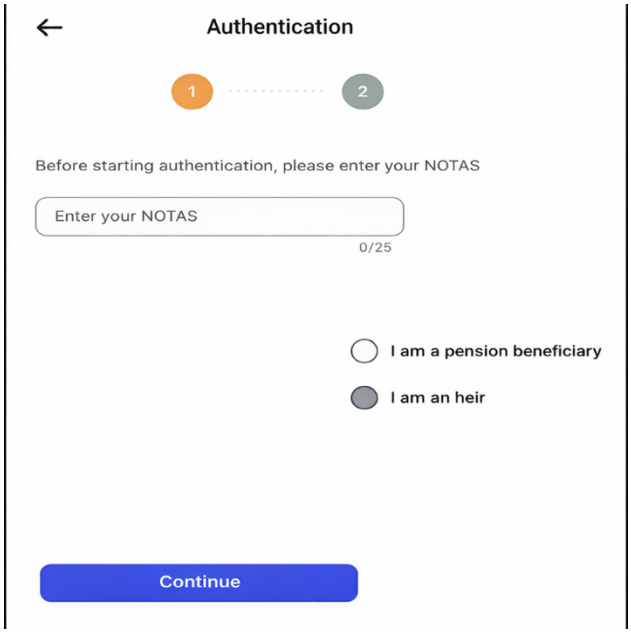


Figure 5. Heir Authentication

In Figure 5, after entering the pension beneficiary's NOTAS and clicking "Continue," the heir selects the option "I am an heir." Next, as shown in Figure 6, the heir is required to complete a form to proceed with the authentication process. The heir then performs a selfie and ensures that the captured image is clear and not blurred, as illustrated. Finally,

the researcher adds information displaying the name of the heir who performs the authentication on behalf of the pension beneficiary.

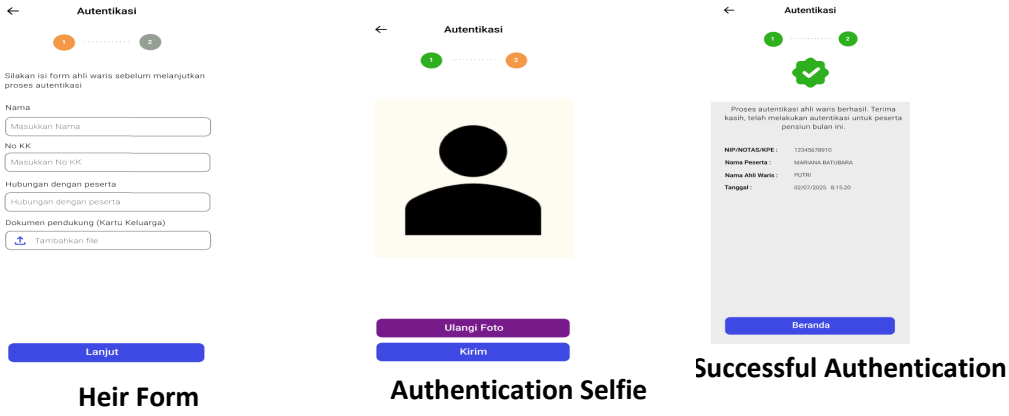


Figure 6. Authentication

Based on Figure 6 The heir is required to complete the identification form to continue the authentication process on behalf of the pension beneficiary. This step ensures that the system records the heir's information accurately. The heir performs a selfie authentication and must ensure that the captured image is clear and not blurred. This process is necessary to validate the identity of the heir during authentication. The system displays a notification indicating that the authentication process has been successfully completed. Information regarding the heir who performed the authentication on behalf of the pension beneficiary is also shown.

CONCLUSION

This study concludes that the authentication feature in the Andal by Taspen application demonstrates a moderate level of usability when evaluated using the System Usability Scale. The findings indicate that the feature is generally usable and acceptable for pension beneficiaries, yet it does not fully provide an optimal user experience. Several usability challenges remain, particularly for older users who face limitations in digital literacy and physical ability. These conditions affect users' comfort and confidence when interacting with the authentication process, especially during tasks that require precise actions such as taking a selfie.

The analysis highlights that usability issues are not solely related to system functionality, but also to user characteristics and contextual factors. Although the

application was designed to simplify the authentication process compared to previous systems, field observations reveal that certain design assumptions do not fully accommodate the needs of all users. This gap underscores the importance of inclusive and adaptive design in digital public service applications.

Based on these findings, the proposed recommendation of an heir assisted authentication feature offers a practical solution to enhance accessibility and service continuity. By allowing heirs to support pension beneficiaries during authentication, the application can better address real world user conditions while maintaining service integrity. Overall, this study emphasizes the need for continuous usability evaluation and user centered improvements to ensure that digital public services are accessible, efficient, and responsive to the diverse needs of their users.

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