

Development and Validation of Token Pedia: A Gamified Digital Mental Health Application for Adolescents in Islamic Boarding Schools

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Abstract:

Adolescent mental health issues in Islamic boarding schools are escalating due to academic pressures, strict regulations, and pervasive stigmas. Conventional interventions remain insufficient, underscoring the need for accessible digital strategies. This study developed and evaluated "Token Pedia," a smartphone application integrating token economy psychotherapy, screening tools, psychoeducational modules, and gamification tailored for boarding school environments. A quantitative cross-sectional design was employed at an Islamic boarding school in Malang, Indonesia. Purposive sampling recruited 85 students aged 13–18 years. Participants completed a validated 20-item readability questionnaire assessing presentation, graphics, and integration. Content validity was analyzed using Aiken's V based on expert evaluations. User characteristics and readability metrics were evaluated using descriptive statistics and the Somers' D, Mann–Whitney, and Chi-square tests, with a significance level of $p < 0.05$. The application demonstrated exceptional readability among respondents. Linear regression analysis revealed no significant correlations between socio-demographic factors, including age, gender, length of stay, and psychiatric history, and application readability scores, indicating universal accessibility. Content validation utilizing Aiken's V yielded high scores across all items, ranging from 0.826 to 0.915. These results classified the application as highly valid and culturally aligned with the target demographic. Token Pedia represents a valid, comprehensible, and culturally adaptive digital innovation. The application effectively enhances mental health literacy, mitigates social stigma, and fosters autonomous self-care and professional help-seeking behaviors among adolescents in religious educational settings.

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INTRODUCTION

Mental health disorders among adolescents represent a critical global public health challenge, with rising prevalence rates of emotional distress, anxiety, depression, and psychosis in educational settings worldwide (Astutik & Dewi, 2022). School-age children and teenagers constitute a high-risk demographic for these emotional and psychological disturbances, necessitating targeted and accessible interventions (Yuniarta et al., 2023). The transition into structured educational environments inherently tests the psychological resilience of young individuals, making proactive mental health promotion an urgent global priority to prevent long-term psychiatric morbidity (Wiedermann et al., 2022).

Students residing in Islamic boarding schools face compounded psychological vulnerabilities due to their unique living and learning arrangements (Khayati, 2025). These adolescents navigate intense academic and religious demands alongside strict institutional regulations and complex social adaptations (Tian et al., 2025; Ahmad et al., 2026). Epidemiological data indicate that approximately 30% to 45% of these students experience mild to severe mental health problems during their first year, primarily driven by an inability to cope with the rigorous boarding school learning system and isolation from family support networks (Ningrum & Mulyawan, 2026).

This challenging environment frequently fosters low mental health literacy and pervasive social stigma regarding psychological distress (Kusumawati et al., 2025). Students often misinterpret mental health symptoms, sometimes attributing them to spiritual possession, which leads to inappropriate treatments and severely worsens their clinical condition (Alfianto et al., 2022). The resulting lack of professional help-seeking behavior manifests in severe consequences, including academic decline, disciplinary violations, and psychosomatic problems that significantly reduce overall psychological well-being and disrupt the educational ecosystem (Kristiati et al., 2024).

Digital health interventions have emerged as highly effective, accessible alternatives to traditional, clinic-based psychotherapy (Cwinn et al., 2022). Rapid technological advancements have fundamentally shifted adolescents' daily habits, making smartphones and internet connectivity primary means of education and health management (Shin et al., 2023). These digital platforms create unprecedented opportunities to deliver interactive, engaging, and easily accessible health promotion innovations to diverse populations, thereby improving mental health literacy and enabling rapid early detection without geographical barriers (Nastiti et al., 2021).

Integrating evidence-based behavioral strategies into these digital platforms offers a robust mechanism for sustained psychological support. Token economy psychotherapy, traditionally used by clinical psychologists and psychiatrists, effectively prevents behavioral problems by systematically reinforcing positive actions (Kayaoğlu & Altun, 2022; Syahdiba et al., 2021). Digitalizing this approach through gamification, psychoeducational modules, films, and digital rewards transforms conventional therapy into an engaging, interactive learning experience that motivates students to maintain healthy coping behaviors independently and sustainably (Castellano-Tejedor & Cencerrado, 2024).

A significant research gap exists regarding the development of digital mental health tools specifically tailored to the socio-religious dynamics of Islamic boarding schools. Existing applications often lack the cultural sensitivity needed to mitigate local stigmas or to integrate seamlessly into the strict daily routines of these institutions (Naderbagi et al., 2024). There is a distinct need for an innovative, culturally adaptive solution that combines early detection screening with behavioral reinforcement to address the specific vulnerabilities of this demographic, ensuring the intervention is both scientifically valid and religiously congruent.

This study aims to develop and evaluate "Token Pedia," a smartphone-based digital application designed explicitly as a mental health promotion medium for students in Islamic boarding schools (Ghojoghi, 2024). By integrating token economy psychotherapy with mental health screening, psychoeducational modules, and interactive gamification, this research provides an urgent, scalable solution to a persistent public health issue. The ultimate purpose is to foster autonomous self-care, mitigate stigma, and motivate sustainable help-seeking behaviors among adolescents in religious educational settings, thereby bridging the gap between traditional religious education and modern psychological support.

METHOD

Design

This study employed a quantitative research design with a cross-sectional approach. The research was conducted as a post-development evaluation to assess the readability and content validity of the Token Pedia application as a digital-based mental health promotion medium for adolescents in Islamic boarding schools. This approach was selected to describe the initial user acceptance and experience of the application at a single measurement point.

Setting and Time

The study was conducted at the Nailul Falaah Islamic Boarding School located in Malang City, East Java, Indonesia. The research timeline was executed immediately following the completion of the initial development and expert revision phases of the Token Pedia application prototype.

Population, Sample, and Sampling

The target population comprised students residing at the Nailul Falaah Islamic Boarding School. A total of 85 students, aged 13 to 18 years, were recruited as study respondents using a purposive sampling technique based on predetermined criteria. The inclusion criteria were: (1) active students at the boarding school, (2) capable of reading and comprehending the application's contents, (3) possessing access to an Android smartphone, and (4) willing to participate in the entire research process. The exclusion criteria included students who were absent during the data collection period or those experiencing cognitive impairments that prevented them from completing the questionnaire.

Intervention

The intervention evaluated in this study was the "Token Pedia" application, a smartphone-based digital platform designed to promote mental health. Prior to user testing, the application prototype underwent rigorous evaluation by expert validators to assess its content, visual appearance, language, and overall readability. Feedback from these validators served as the basis for necessary revisions, ensuring the application's interface and content were appropriately tailored to the characteristics and needs of adolescent users in an Islamic boarding school environment.

Instrument and Measurement Properties

The primary research instrument was a 20-item application-readability questionnaire written in Indonesian. The questionnaire was developed based on the concepts of usability and readability for digital media, specifically tailored for youth mental health applications. It comprised three main components: presentation (items 1–7), graphical components (items 8–13), and integration components (items 14–20). Responses were measured on a 4-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree), with higher scores indicating greater app readability.

Content validity was assessed using Aiken's V based on expert evaluations. The Aiken's V coefficient was calculated from the ratings provided by validators, with values interpreted as valid when $V \geq 0.80$ and very valid when $V \geq 0.90$. Instrument reliability was evaluated using Cronbach's alpha to determine the internal consistency of the questionnaire.

Data Collection Procedure

Data collection commenced after respondents were provided with a comprehensive explanation of the research objectives and a tutorial on navigating the Token Pedia application. Following this briefing, respondents were instructed to independently access and explore the application's features. Upon completing the trial, they were asked to complete the 20-item readability questionnaire to provide feedback on the user experience.

Data Analysis

The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were utilized to summarize respondent characteristics and the overall readability level of the application. Inferential statistical tests were selected based on the data type and variable distribution: the Somers's d test was used to analyze relationships involving ordinal data; the Mann–Whitney test was applied to compare nonparametric categorical data; and the Chi-square test was employed to examine relationships between nominal variables. Statistical significance was established at a p-value < 0.05.

Ethical Declaration

This research received formal ethical approval from the Chakra Brahmanda Lentera Institute under approval number 15.1/13/V/EC/KEP/LCBL/2025. Prior to participation, all respondents provided informed consent. The research team strictly maintained the confidentiality of the respondents' identities and ensured that all collected data were utilized exclusively for academic purposes.

RESULT

Table 1. Parts of the Token Pedia application

Parts	Content
Mental Health Screening	<ol style="list-style-type: none"> 1. Mental Health Knowledge Questionnaire (Mental Health Knowledge Questionnaire) 2. Perceived Devaluation Discrimination (PDD) (Stigma and discrimination regarding mental health issues) 3. General Self-Efficacy (Self-efficacy questionnaire) 4. Mindfulness Self-Care Scale (MSCS) (Self-care questionnaire) 5. DASS 42 (depression, anxiety, and stress)
Therapeutic	<ol style="list-style-type: none"> 1. Mental health self-care 2. Behavior modification
Health education or promotion	<ol style="list-style-type: none"> 1. E-Module on Psychoeducation for Mental Health in Islamic Boarding Schools 2. E-Module on Self-Care for Mental Health in Islamic Boarding Schools 3. Link to an online game on bullying prevention 4. Educational Psychoeducational Film
Collaborative	Animated films <ol style="list-style-type: none"> 1. Formal mental health care-seeking behavior 2. Informal mental health care-seeking behavior

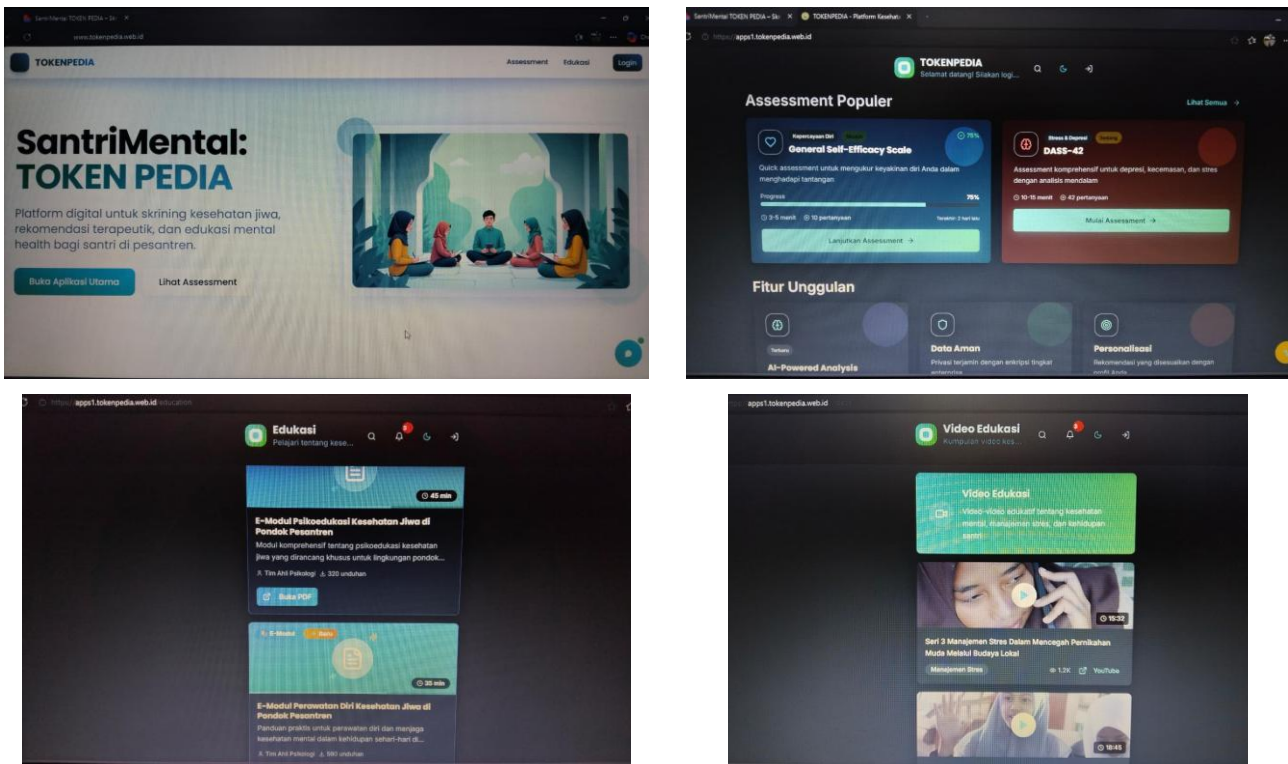


Figure 1. Token Pedia Application Interface

Figure 1 shows a view of the Token Pedia application, which includes health screening, animated videos, e-modules, and game links.

Table 2. Respondent characteristics (n=80)

Variables	Readability		Total	p-value	Explanation
	Sufficient n (%)	Good n (%)			
Age				0.356	Not significant
10-13 years (Early Adolescence)	1 (2.7%)	36 (97.3%)	37		
14-17 years (Mid Adolescence)	5 (10.6%)	42 (89.4%)	47		
18-24 years (Late Adolescence)	0 (0.0%)	1 (100%)	1		
Gender				0.964	Not significant
Male	0 (0.0%)	35 (100%)	35		
Female	6 (12.0%)	44 (88.0%)	50		
Length of stay at the Islamic boarding school				0.065	Not significant
< 1 year	1 (2.4%)	41 (97.6%)	42		
1-2 years	0 (0.0%)	8 (100%)	8		
≥ 3 years	5 (14.3%)	30 (85.7%)	35		
History of mental health disorders				0.244	Not significant
No	5 (6.3%)	75 (93.8%)	80		
Yes	1 (20.0%)	4 (80.0%)	5		

The table above shows no correlation between student characteristics and the Token Pedia app's readability. Therefore, this app can be used by anyone.

Table 3. Linear Regression

Variables	B	SE	Beta	t	p-value
Konstanta	69.725	1.238	-	56.332	0.000
Age	0.115	0.746	0.017	0.154	0.878

Most respondents had good readability. Age, gender, length of stay, history of mental health disorders, and reason for admission were not significantly related.

Table 4. Aiken's V Results

No	Question items	Aiken's V Result	Explanation
1.	The information in the app is presented clearly and is easy to follow.	0.853	Valid
2.	The material's order in the application makes it easy for me to understand the content.	0.826	Valid
3.	The delivery of the material is not confusing	0.857	Valid
4.	The application displays an easy-to-understand guide for use.	0.857	Valid
5.	Presentation of material according to the needs of students like me.	0.872	Valid
6.	The language used is communicative and easy for students to understand.	0.899	Very Valid
7.	The text display is clear and easy to read on the mobile screen.	0.899	Very Valid
8.	The app's content helps improve stress management skills.	0.884	Valid
9.	The text and background colors are comfortable on the eyes.	0.895	Very Valid
10.	The application menu display is easy to use and understand.	0.891	Very Valid
11.	The app design is attractive and makes me want to keep using it.	0.872	Valid
12.	The font size is appropriate and not too small.	0.899	Very Valid
13.	The material helped me understand the importance of maintaining mental health.	0.915	Very Valid
14.	The message is easy to remember and encourages positive action.	0.895	Very Valid
15.	The message aligns with the objectives of the mental health promotion program for students.	0.899	Very Valid
16.	The app helps me practice positive mental health practices.	0.891	Very Valid
17.	The application provides benefits or positive changes to me.	0.899	Very Valid
18.	Overall, the app is easy to use and helpful.	0.903	Very Valid
19.	I feel that the Token Pedia application helps me better understand how to deal with problems or stress in a healthy way.	0.884	Valid
20.	I am willing to continue using this application if it is further developed in the Islamic boarding school environment.	0.903	Very Valid

The Aiken's V test ensures that each item of the research instrument is valid, relevant, and suitable for use, based on expert assessments.

DISCUSSION

The primary finding of this study demonstrates that the Token Pedia application achieves exceptional readability and universal accessibility among adolescents in Islamic boarding schools, irrespective of their demographic backgrounds or prior mental health history. Statistical analyses revealed no significant correlations between user characteristics, such as age, gender, length of stay, or psychiatric history, and the perceived readability of the application. Linear regression models further confirmed this lack of demographic dependency, indicating that the application effectively circumvents the cognitive barriers often encountered in digital health interventions. Current

technology-based health initiatives often struggle to achieve adoption rates due to varying levels of digital literacy. A health digitalization strategy that can be seamlessly accessed without such barriers is the paramount indicator of success in adopting and implementing health intervention technologies (Alfianto & Lani, 2023). The Token Pedia application achieves this through intuitive navigation, enabling users to access and process the information effortlessly. This user-centric design facilitates the proper dissemination and absorption of crucial health information (Dwivedi et al., 2021). Such an approach is particularly vital in heterogeneous environments, such as Islamic boarding schools, where the socio-economic backgrounds of the student body vary significantly (Salim et al., 2021). The universal usability of this application establishes a foundational framework for delivering reliable, digital-based mental health support within religious educational environments.

This universal accessibility directly contrasts with conventional digital health interventions, which often face adoption barriers due to user demographics and cognitive load. Previous research often highlights a digital divide where adolescents from lower socio-economic backgrounds struggle to engage with complex mental health applications. The Token Pedia application overcomes this historical limitation by prioritizing a simplified, highly intuitive user interface that requires minimal technical proficiency. This design philosophy ensures that the application remains inclusive, allowing students from diverse backgrounds to engage with the content equitably. The absence of demographic predictors of readability suggests that the application successfully bridges the gap between complex clinical psychological theories and adolescents' capacity for psychological acceptance. Translating intricate mental health concepts into digestible, interactive formats aligns the application with contemporary best practices in digital health design (Philippe et al., 2022). This successful translation enhances user engagement and directly correlates with the intervention's potential clinical efficacy.

The robust content validity of the application, as evidenced by high Aiken's V scores, underscores the successful alignment of its psychoeducational modules, films, and gamified elements with adolescents' developmental needs. Expert validation revealed that all assessment items achieved valid or very valid predicates, with the highest scores attributed to items measuring the perceived importance of maintaining mental health and the overall utility of the application. These elevated scores indicate that the integrated psychoeducational modules, films, and online games possess strong substantive and theoretical relevance (Behuku et al., 2023). High content validation serves as a critical indicator that mental health intervention instruments and materials are precisely calibrated to the actual needs of the target population. The validity of psychoeducational materials serves as a primary driver of user interest and sustained engagement within the specific realm of adolescent mental health. The visualizations within the application are designed to be inherently attractive, while the language remains highly communicative and age-appropriate. This careful curation ensures that the application functions as a recognized and trusted instrument for both clinical experts and adolescent users.

The widespread acceptance of Token Pedia is deeply rooted in its deliberate adaptation to the unique sociocultural and religious dynamics inherent to the Islamic boarding school environment. The twenty-four-hour communal life and strict customs of these institutions, coupled with limited interaction with the outside world, can often lead to significant psychological stress among students. Stressors such as rigid supervision and interpersonal conflicts, including bullying, are well-documented catalysts for mental health problems within these settings (Dewi et al., 2021). Traditional interpretations within some Islamic boarding school cultures in Indonesia often mischaracterize depression, anxiety, and stress as indicators of weak faith, lack of gratitude, or insufficient worship (Asiyah et al., 2025). This prevailing viewpoint generates profound stigma and discriminatory devaluation, compelling students to conceal their emotional struggles for fear of ostracization or

judgment by their peers (Musaddad, 2021). The Token Pedia application directly addresses this cultural barrier by providing discreet, independent access to self-care resources and mental health screening tools, such as the DASS-42. This digital-based psychotherapy is meticulously applied without compromising the core values and cultural norms of the Islamic boarding school. The application delivers positive, objective information on mental health, effectively reducing stigma while offering alternative prevention measures that harmonize with institutional values (Kholili, 2021). The offered modules utilize a psychological approach that actively supports spiritual aspects, reinforcing concepts of self-efficacy and aligning with the Islamic values of introspection and surrender to God.

These findings carry profound practical and theoretical implications for the implementation of community-based mental health programs within religious educational frameworks in developing countries. Integrating community-based approaches with Islamic cultural principles represents a highly recommended strategy for deploying effective mental health programs in resource-constrained settings. Islamic boarding schools, equipped with applications such as Token Pedia, serve as a vital medium for seamlessly integrating traditional Islamic values, character education, and modern mental health practices (Arif et al., 2024). The implementation of this application supports the cultivation of a more open and supportive culture regarding mental health issues within these institutions. Digitalization in such communities has been shown to significantly improve adolescents' access to mental health services (Musaddad, 2021). Providing a structured, culturally sanctioned pathway for mental health support-seeking empowers students to seek professional medical assistance through formal channels, complementing traditional spiritual healing methods. This dual approach ensures that students receive comprehensive care that respects their religious identity while addressing their clinical psychological needs.

The integration of this application extends beyond individual self-care, catalyzing systemic transformation in how Islamic boarding schools approach mental health policies and support-seeking behaviors. The Token Pedia application does not merely function as a standalone digital tool; it actively transforms the foundational health pillars within the boarding school ecosystem. Embedding systematic, promotive, and preventive mental health policies into students' daily digital routines helps cultivate holistic, psychologically safe educational environments. This systemic shift encourages institutional leaders to recognize mental health literacy as an integral component of religious and academic education. The application facilitates a structured transition from reactive, stigma-driven responses to proactive, evidence-based mental health promotion. The boarding school environment evolves into a supportive ecosystem where mental health is normalized, and help-seeking is viewed as a sign of strength rather than a spiritual failing (Joseph, 2025).

The current study is constrained by its cross-sectional design and relatively small, single-site sample, necessitating rigorous future investigations to establish long-term clinical efficacy. The present research focused exclusively on content validation and initial readability evaluation, limiting the ability to draw definitive conclusions regarding the application's impact on actual mental health outcomes over time. Future research must implement randomized controlled trials with larger, multi-center samples to rigorously test the long-term effectiveness of the Token Pedia application in reducing depression, stress, and anxiety among boarding school students. Further technological enhancements could involve integrating Artificial Intelligence components to facilitate more dynamic, personalized interactions with mental health professionals. An in-depth qualitative evaluation is also required to fully understand the barriers and challenges associated with smartphone use as a digital medium in Islamic boarding schools. Such qualitative insights will be essential for refining the application to ensure it continuously maintains cultural sensitivity and aligns with evolving Islamic values while maximizing its therapeutic potential.

CONCLUSION

The Token Pedia application represents a highly valid, comprehensible, and culturally acceptable digital innovation for mental health promotion among adolescents in Islamic boarding schools. This study makes a significant scientific contribution by establishing an integrated digital intervention model that seamlessly combines mental health screening, self-care psychoeducational modules, and interactive, gamified learning within a single platform tailored to religious educational values. These findings underscore the substantial potential of leveraging digital technology in Islamic boarding schools to execute effective promotive and preventive mental health strategies. The application actively promotes improved mental health literacy, mitigates pervasive social stigma, and encourages autonomous self-care alongside professional help-seeking. Future research must expand upon these foundational results by conducting large-scale, randomized controlled trials to rigorously evaluate the long-term clinical efficacy and sustainable impact of the Token Pedia application on adolescent psychological well-being across diverse educational settings.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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