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Digital Innovation in Early Detection of Student Burnout: Development and Validation of the Android-Based Assessment Application BURNTES

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ABSTRACT

Academic burnout among secondary school students has become an increasing concern, particularly in digital learning environments where systematic assessment and early detection remain limited. This study aimed to develop and validate BURNTES (Burnout Test for Students), an Android-based burnout assessment application designed to support guidance and counseling services in Indonesian secondary schools. Using a research and development approach, the study adopted the 4D model (Define, Design, Develop, and Disseminate). Data were collected through needs analysis, expert judgment, small-group trials, and preliminary effectiveness testing. Content validity was evaluated by five experts using Aiken's V index, yielding a coefficient of 0.67, which indicates high and acceptable validity. Practicality testing involving 20 students and three counseling teachers resulted in a usability score of 88.7%, categorized as very practical. The effectiveness of BURNTES was examined using the Wilcoxon Signed-Rank Test, demonstrating a significant improvement in students' ability to detect and understand burnout symptoms after application use ($p < 0.001$), supported by a large effect size ($r = 0.873$). These findings indicate that BURNTES is a valid, practical, and effective digital assessment tool that enhances the accuracy and efficiency of academic burnout detection and supports data-driven early intervention in school counseling contexts.

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1. INTRODUCTION

Student burnout has received growing attention in educational and psychological research due to its consistent association with reduced learning engagement, academic persistence, and student well-being (Jolicoeur, 2025). Originally conceptualized in occupational contexts, burnout is defined through three primary dimensions: emotional exhaustion, depersonalization or cynicism, and reduced personal efficacy (Messina et al., 2024). Subsequent theoretical and empirical developments have extended this

framework to educational settings, where academic burnout refers to emotional exhaustion related to learning demands, detached or cynical attitudes toward academic activities, and a decreased sense of academic competence. In this perspective, burnout is not merely temporary fatigue but a multidimensional psychological condition that can disrupt motivation, learning regulation, and academic adjustment (Guzmán et al., 2020).

Recent psychometric validation work on the Burnout Assessment Tool for Students (BAT-S) confirms that academic burnout is empirically associated with study overload and perceived instructional support, reinforcing its relevance as a measurable educational risk construct (Carmona-Halty et al., 2024). Meta-analytic findings further indicate that structured psychological interventions—such as mindfulness-based approaches and rational behavioral techniques—are associated with reductions in student burnout indicators (Madigan et al., 2024). These converging findings position academic burnout as a meaningful predictor of educational and psychological outcomes rather than a situational or incidental learning complaint (Cano et al., 2024; Matos & De Andrade, 2023; Radack et al., 2022; Poorgholamy et al., 2020). Consequently, early identification and systematic monitoring of burnout symptoms have become increasingly important within student support and school counseling systems.

Burnout among students is widely recognized as a multifaceted phenomenon influenced by interacting academic, personal, social, and institutional factors (Lin & Yang, 2022; Liu et al., 2023; Nafa Aulia Rahma & Prihatsanti, 2023). From an academic perspective, high workload, prolonged study hours, and performance pressure are repeatedly identified as primary contributors to burnout risk (Subarkah & Iskandar, 2024). Students in high-demand fields and performance-oriented environments show higher burnout prevalence due to continuous evaluation pressure and uncertainty regarding future opportunities (Qiang et al., 2024; Dopmeijer et al., 2022). Personal and psychological characteristics—including anxiety proneness, emotional instability, low self-esteem, and weak stress-management skills—also increase vulnerability to burnout symptoms (Fesun, 2019). In addition, social and financial stressors, such as limited social support and economic strain, further intensify emotional exhaustion and disengagement (Yang, 2022). Institutional and environmental conditions—including perceived lack of fairness, low autonomy, rigid curricular structures, and insufficient mentoring—have likewise been shown to contribute to student burnout trajectories (Sholeh et al., 2024).

Prevalence studies indicate that burnout symptoms affect a substantial proportion of student populations across educational levels. Large-scale surveys report that a significant percentage of students experience moderate to high burnout symptoms, with higher prevalence often observed among upper-grade cohorts and professionally demanding study tracks (Karani, 2015; O'Marr et al., 2022). Empirical studies consistently show that burnout is associated with decreased academic motivation, lower engagement, reduced performance, and increased withdrawal risk. Emotional exhaustion and cynicism, in particular, demonstrate strong negative relationships with academic achievement and persistence (ATİK & ÇELİK, 2022; Drăghici & Cazan, 2022). These patterns highlight burnout as both an educational performance risk and a student well-being concern that warrants structured assessment and preventive response.

In secondary education contexts, academic pressure has intensified due to performance demands, workload accumulation, and rapid digital learning transitions (Douse & Uys, 2018). The expansion of online and blended learning environments has introduced new forms of cognitive and emotional demand, including digital fatigue and attentional overload (Palalas & Doran, 2023; Al-Enezi, 2025; Skulmowski & Xu, 2022). Cyber-pedagogical research has identified links between poorly structured digital learning exposure, learning fatigue, and mental health risk, underscoring the importance of balanced and well-designed digital systems (Tari & Mahaardhika, 2025). At the same time, Indonesian studies have begun to explore technology-assisted counseling responses to student burnout (Kurniawan et al., 2023). For example, Sholihah et al., (2023) reported that an Android-based counseling application (Edu-Cons) was associated with reduced burnout indicators among university guidance

and counseling students. However, validated digital burnout assessment tools specifically designed for secondary school populations remain limited.

Although standardized instruments such as the Maslach Burnout Inventory–Student Survey (MBI-SS) and BAT-S provide validated measurement structures, their implementation in school settings often relies on paper-based administration (Wongtrakul et al., 2023; López-Gómez et al., 2025; Aypay, 2011). This approach presents operational constraints, including administrative burden, delayed scoring, limited feedback responsiveness, and restricted integration with ongoing counseling monitoring systems. Static scoring formats also constrain adaptive follow-up and real-time decision support. Such limitations may reduce institutional responsiveness to emerging student mental health risks, particularly in schools with high counselor–student ratios.

Advances in mobile and digital assessment technologies provide promising alternatives for scalable psychological screening and monitoring. Research in mobile health (mHealth) and digital assessment demonstrates that user-centered systems can improve accessibility, engagement, and response efficiency (Bradway et al., 2020; Ologeanu-Taddei, 2020). Applications designed with human-centered principles—emphasizing usability, clarity, and interaction simplicity—show stronger user adherence and functional effectiveness (Lyon et al., 2025; Fonda et al., 2023; Shania et al., 2023). Digital assessment platforms also offer operational advantages over paper-based tools, including broader accessibility through smartphones, automated scoring, faster data processing, immediate feedback, secure storage, and the potential for adaptive assessment pathways (Ze en Yi, 2025; Isnaini et al., 2021). These features are particularly relevant for school counseling services that require rapid screening and timely follow-up decisions.

Despite these technological and methodological developments, contextually validated mobile applications for assessing academic burnout among Indonesian secondary school students remain scarce. Existing digital counseling and assessment tools have largely focused on higher education populations, while systematic development and validation efforts for secondary school settings are still limited. Furthermore, although global and national frameworks increasingly promote digital transformation in education and school-based mental health innovation, the practical implementation of digital burnout screening tools in routine counseling services remains uneven.

Accordingly, this study addresses several identified gaps by undertaking the systematic development and preliminary validation of an Android-based burnout assessment application tailored to Indonesian secondary school students. The study examines usability and preliminary outcome sensitivity within school counseling contexts and applies a structured development framework to support methodological transparency and replicability. The resulting product, BURNTES (Burnout Test for Students), is positioned not as a standalone intervention but as a digital screening support tool intended to strengthen early identification and data-informed counseling follow-up. Through the integration of burnout theory, psychometric assessment principles, and digital design practices, this study seeks to contribute a contextually appropriate and operationally feasible screening instrument for secondary school guidance and counseling services.

2. METHODS

Research Design

This study employed a Research and Development (R&D) approach to design, construct, and validate a digital assessment product called BURNTES (Burnout Test for Students). The development aimed to provide a reliable and practical Android-based application that assists Guidance and Counseling (BK) teachers in identifying and collecting data on students' burnout levels efficiently and accurately. The BURNTES application enables teachers to perform assessments in a digital, automated, and continuous manner, reducing dependence on traditional paper-based instruments while improving data processing speed and usability for counseling interventions.

The development process was guided by the 4D model (Define, Design, Develop, and Disseminate) introduced by Thiagarajan, Semmel, and Semmel (Waruwu, 2024; Ade Rahayu, 2025;

Indaryanti et al., 2025). This model was chosen for its structured and iterative nature, which aligns with the principles of systematic product development in educational technology research.

Development Procedures

The research followed four primary stages in accordance with the 4D framework:

1. Define (Definition Stage).

The Define stage focused on conducting a comprehensive needs and context analysis to identify key factors associated with student burnout and to map challenges faced by Guidance and Counseling (BK) teachers in employing manual assessment instruments. This phase involved triangulated data collection through preliminary field observations, semi-structured teacher interviews, and document analysis of existing practices. The outputs were used to formulate functional, measurement, and pedagogical requirements of the BURNTES application. This approach reflects contemporary recommendations emphasizing user-centered needs analysis as a critical foundation for educational R&D.

2. Design (Design Stage).

During the Design stage, the conceptual schema, psychometric blueprint, and system architecture of the BURNTES application were formulated. This included operationalizing burnout indicators into measurable items, mapping UI/UX requirements grounded in accessibility and cognitive clarity principles, and structuring automated scoring logic. Design considerations were informed by established instructional development standards that integrate assessment validity with user experience principles, ensuring both theoretical alignment and practical feasibility prior to prototype construction.

3. Develop (Development Stage)

In the Develop stage, the prototype was constructed through systematic coding, feature integration, and internal functionality checks. After the initial system stabilization, small-group trials with BK teachers and students were conducted to evaluate usability, clarity of instructions, navigation flow, and perceived practicality under realistic conditions. In addition, expert validation was executed using standardized evaluation instruments. Content validation by subject matter experts ensured construct coverage and indicator relevance, while technical evaluations by educational technologists examined interface quality and operational performance. These multilevel validations align with systematic R&D practices that require both technical and pedagogical review before broader implementation.

4. Disseminate (Dissemination Stage).

The final stage involved controlled distribution and field implementation of the validated BURNTES application in selected partner schools. Dissemination activities included preparing structured user guides for BK teachers, conducting orientation sessions for users, and documenting findings for academic and practitioner audiences. Consistent with best practices in R&D dissemination, this stage focuses on responsible deployment and ongoing feedback rather than immediate full-scale adoption, highlighting the importance of continuous improvement and iterative evaluation in educational innovation.

In this phase, the conceptual and technical design of the BURNTES application was developed. This included the formulation of the burnout assessment instrument, interface design, item validation framework, and prototype architecture. The interface (UI/UX) was designed to ensure accessibility, clarity, and ease of use for teachers and students.

This stage involved the creation of the BURNTES prototype, including coding, system integration, and initial testing. The prototype underwent a small-group trial with a limited number of BK teachers and students to assess usability and content relevance. Furthermore, expert validation was conducted by material experts (educational psychologists and counseling specialists) and media experts (educational technologists) to ensure content validity and technical quality.

The final stage included the distribution and field testing of the validated BURNTES application in partner schools. The dissemination process also involved the preparation of a user manual for BK teachers and the publication of findings through academic reports and practitioner-oriented materials.

Data Collection and Analysis

Data collection in this study employed both qualitative and quantitative approaches.

1. Qualitative Data.

Qualitative data consisted of expert and user feedback obtained during validation and pilot testing. Comments, suggestions, and critiques were analyzed through verbal descriptive techniques to identify areas for improvement in the design, functionality, and instructional usability of the BURNTES application. Feedback was collected from five expert validators and from twenty students participating in the pilot test—ten male and ten female—who were eighth-grade students at SMPN 3 Palangka Raya. The results of this analysis were subsequently used to revise and refine both the application and its user guide.

2. Quantitative Data.

Quantitative data were derived from expert evaluations concerning the acceptability, feasibility, and usability of the BURNTES application. The data were analyzed using Aiken's V coefficient (Azwar, 2016) to assess the content validity of each item. The average expert rating was calculated using the following formula:

$$V = \frac{\sum s}{n(c-1)}$$

where:
$\sum s$= total score obtained from n experts
n = number of experts
l_o= lowest validity rating score (in this study, 1)
c = highest validity rating score (in this study, 4)

Following the Wilcoxon test, the Effect Size was calculated to determine the magnitude of the treatment effect, using the equation:

$$\sum r = Z / \sqrt{N}$$

where:
r : Effect size coefficient representing the magnitude of the treatment effect.
Z : Standardized test statistic (Z-value) obtained from the Wilcoxon Signed-Rank Test.
N : Total number of observations (i.e., the number of paired cases or non-tie pairs used in the Wilcoxon analysis).

The interpretation of expert and user agreement levels was based on Aiken's V coefficient, with possible values ranging from 0.00 to 1.00. These coefficients represent the degree of agreement among raters regarding the product's content validity and overall feasibility. The interpretation categories are outlined in Table 3.8.

Table 1 Validity Level Based On Aiken's V Scale

Agreement Coefficient	Category
0.81 – 1.00	High
0.41 – 0.80	Moderate
0.00 – 0.40	Low

3. FINDINGS AND DISCUSSION

This developmental research implemented the 4D model (Define, Design, Develop, and Disseminate) by Thiagarajan, Semmel, and Semmel (Waruwu, 2024; Ade Rahayu, 2025; Indaryanti et al., 2025) to design, develop, and validate the BURNTES (Burnout Test for Students) an Android-based burnout assessment application for secondary school students. The following section presents the implementation of each stage, followed by an in-depth discussion of the findings.

1. Define Stage

During the *Define* stage, the researcher conducted a comprehensive needs analysis through classroom observations, document reviews, and interviews with Guidance and Counseling (BK) teachers. The results revealed a lack of digital tools for assessing student burnout within Indonesian secondary schools. Counselors relied primarily on manual, paper-based questionnaires that were time-consuming, prone to data loss, and less responsive to students' evolving needs.

The findings confirmed that BK teachers required a digital instrument capable of efficiently identifying levels of academic burnout and generating automatic reports for counseling follow-up. This stage provided the foundational justification for developing BURNTES as a contextually relevant and user-friendly digital assessment tool to enhance guidance practices in schools.

2. Design Stage

Following the needs analysis, the *Design* stage focused on the conceptual and technical development of BURNTES. The application's prototype was initially created using Google Sites and later adapted into an Android-based application to increase accessibility and usability among students.

Visual and interactive components were designed using Canva, while icons were sourced from Flaticon to ensure professional and consistent aesthetics. The interface design emphasized clarity, simplicity, and navigability to facilitate seamless use by both students and BK teachers.

The BURNTES application includes five major components:

Home Page – Serves as the main navigation center with access to *Assessment*, *Information Corner*, *Recommendations*, *Evaluation*, and *Developer* menus.

Assessment Page – Contains a Google Form–based burnout questionnaire. Students fill in their personal information and respond to the assessment items; results are automatically generated and sent to their registered email in PDF format.

Information Corner – Provides educational content on burnout, its causes, and coping strategies.

Recommendation Page – Displays categorized burnout levels (*High*, *Moderate*, *Low*) based on students' responses.

Evaluation and Developer Pages – Allow users to provide feedback and display researcher and supervisor profiles.

The resulting product is accessible via link or QR code, ensuring ease of distribution and scalability for school-wide use.

3. Develop Stage

At the *Develop* stage, the BURNTES prototype underwent expert validation and small-group trials.

1. Expert Validation

The first phase of data analysis focused on expert validation of the **BURNTES** instrument. Validation involved five experts in the fields of educational psychology, guidance and counseling, and instructional technology. Each expert assessed the product's *content validity*, *language clarity*, and *interface usability* using a 4-point Likert scale ranging from 1 ("not valid") to 4 ("highly valid").

Table 2 . Expert Judgment Results Using Aiken's V Coefficient

No.	Expert Validator	Assessment Aspect	Score
1	Media Expert	Usability	3
		Accuracy	3
		Feasibility	3
		Appropriateness	3
2	Content Expert	Usability	3
		Accuracy	3
		Feasibility	3
		Attractiveness	3
3	Practitioner Expert	Relevance	3
		Clarity	3
		Feasibility	3
		Accuracy	3

Table 3. Calculation of Aiken's V Coefficient

Parameter	Description	Value
lo	Lowest rating score	1
c	Number of rating categories	4
c − 1	Scale range	3
n	Number of experts	n
r	Mean expert score	3.00
s	r − lo	2.00
Aiken's V	s / (c − 1)	**0.67**

The expert judgments yielded a mean score of 3.00 across all evaluated aspects. Based on this assessment, the calculated Aiken's V coefficient was 0.67, indicating a high level of content validity.

2. User Trial (Small-Group Test)

Following expert validation, the application underwent a small-group feasibility test involving 20 students (10 male and 10 female) and 3 guidance and counseling teachers at *SMPN 3 Palangka Raya*. The purpose was to measure product practicality, ease of use, and user satisfaction.

The results showed a mean usability score of 88.7%, placing BURNTES in the *"very practical"* category. Students reported that the app was "easy to use," "visually clear," and "helpful for self-reflection." Teachers expressed that the digital output simplified data recording and reduced time spent on manual assessment.

A qualitative reflection revealed three key strengths:

1. The *self-assessment interface* facilitated quick responses.
2. The *automated scoring system* enhanced accuracy and eliminated manual error.
3. The *dashboard summary* enabled efficient counseling follow-up.

The Preliminary Effectiveness Test using the Wilcoxon Signed-Rank Test conducted in IBM SPSS version 25 yielded a significance value ($p < 0.001$), which is below the conventional alpha level of 0.05. This result indicates a statistically significant difference between pre-test and post-test scores, demonstrating that the use of the BURNTES application led to a measurable improvement in the ability to detect student burnout.

Furthermore, the obtained effect size ($r = 0.873$) falls within the "large effect" category based on Cohen's (2013) classification, where $r \geq 0.5$ denotes a strong effect. This suggests that the intervention had a substantial practical impact, confirming that BURNTES not only produced statistically significant outcomes but also meaningful real-world benefits in improving burnout detection accuracy among users.

To further examine consistency among raters, a Wilcoxon signed-rank test was applied to determine whether significant differences existed between expert evaluations. The results revealed p < 0,001 (p < 0.05), indicating no significant difference among raters' judgments—therefore, expert agreement was consistent.

To maintain conservative interpretation, the findings are presented as: "Preliminary evidence suggests that BURNTES improves burnout-detection accuracy among users."

Table 4. Interpretation of the Preliminary Effectiveness Test Using the Wilcoxon Signed-Rank Test

Statistical Aspect	Result / Value	Conservative Interpretation	Implication
Participants	20 students and 3 BK teachers	Small-scale sample used for initial testing.	Findings should be interpreted cautiously.
Type of Test	Wilcoxon Signed-Rank Test (IBM SPSS v25)	Non-parametric test suitable for paired data with limited sample size.	Appropriate for preliminary analysis.
Comparison	Pre-test vs. Post-test scores	Examines changes in burnout detection outcomes following BURNTES use.	Assesses short-term response to application exposure.
Significance Value (p)	p < 0.001 (< 0.05)	Indicates a statistically significant difference between paired measurements.	Suggests an observable change after application use.
Effect Size (r)	r = 0.873	Classified as a large effect (Cohen, 2013), indicating a strong magnitude of change.	Points to a potentially meaningful practical impact.
Category of Effect	Large Effect	Effect size reflects substantial change but does not confirm long-term effectiveness.	Supports further investigation at a larger scale.
Inter-rater Consistency	p < 0.001	No statistically significant differences among expert judgments.	Indicates consistency across evaluators.
Interpretive Summary	—	The Wilcoxon test provides preliminary evidence of improved burnout detection outcomes following BURNTES use.	BURNTES shows promise as a digital screening support tool rather than a fully established intervention.

Overall, the results demonstrate that BURNTES is both valid and practical as a burnout measurement tool for students. The combination of strong expert agreement and high user acceptance confirms its potential to enhance the quality of guidance and counseling services in schools.

Expert feedback indicated that BURNTES met the required criteria for content validity, usability, and practicality, though minor revisions were recommended—such as simplifying interface navigation, refining visual layout, and adjusting assessment items to better reflect students' emotional and behavioral indicators of burnout.

An Aiken's V coefficient of 0.67 indicates that the developed product meets acceptable content validity criteria. This finding suggests that the material is relevant, feasible, and appropriate for practical implementation, aligning with previous validation studies in educational and counseling research.

Figure 1 Home Page

Figure 2 Assessment Page

Figure 3 Information Corner

Figure 4 Evaluation and Developer Pages

4. Disseminate Stage

In the Disseminate stage, the finalized version of BURNTES and its user guide were distributed to BK teachers at SMPN 3 Palangka Raya. Feedback indicated strong interest in integrating the tool into routine counseling practices.

Discussion

The development and validation of BURNTES (Burnout Test for Students) address the growing need for practical and contextually appropriate tools to assess academic burnout among Indonesian secondary school students. The findings of this study provide preliminary empirical support for the potential utility of BURNTES as a digital instrument to support burnout detection within school counseling contexts. Consistent with prior studies, the use of mobile-based assessment tools appears to enhance accessibility, engagement, and efficiency in psychological screening and data-driven intervention planning (Shania et al., 2023; Sholihah et al., 2023).

The Wilcoxon Signed-Rank Test results indicate a statistically significant pre–post difference, suggesting that BURNTES may contribute to improved clarity and consistency in identifying burnout-related indicators. The observed large effect size implies that the magnitude of change between paired measurements is not merely statistical and may have practical relevance in short-term screening contexts. However, this effect size should be interpreted cautiously. Given the small sample size, within-subject design, single-school setting, and absence of longitudinal measurement, the findings do not constitute evidence of sustained effectiveness. In exploratory conditions such as this, effect size estimates may be influenced by contextual sensitivity, short-term exposure, or novelty effects. Accordingly, the results indicate promise rather than confirm full effectiveness, positioning BURNTES as an initial digital screening support tool.

From a methodological perspective, the structured development pathway applied in this study strengthens the internal coherence between theoretical constructs, instrument design, and digital implementation. The use of a staged development framework enabled iterative refinement based on expert judgment and user feedback, which is widely recommended in digital assessment and educational technology design research. Nevertheless, expert validation and small-group testing represent early phases of instrument establishment. Broader psychometric evaluation—including construct validity testing, reliability stability, and measurement invariance across student groups—remains necessary before BURNTES can be considered a fully established assessment instrument.

The effectiveness of digital counseling instruments is also shaped by users' digital competence and pedagogical context. Kumpikaitė-Valiūnienė et al., (2021)demonstrated that higher digital literacy is associated with lower perceived stress and burnout, implying that successful implementation of BURNTES requires adequate teacher and student orientation to ensure technological readiness. Conversely, excessive or poorly coordinated digital instruction may exacerbate academic burnout due to cognitive overload (Song et al., 2022). In response, BURNTES was deliberately designed with minimalistic navigation, automated analytics, and concise interfaces to reduce cognitive demands during assessment. These interface decisions are theoretically aligned with cognitive load management principles, although cognitive load was not directly measured in this study and therefore no causal claims can be made regarding load reduction effects.

Beyond detection, burnout is closely linked to anxiety, resilience, and problematic smartphone use (Hao et al., 2021)suggesting that future iterations of BURNTES could be expanded to include resilience-building or anxiety-management features. Such integration would shift the application from a pure screening utility toward a screening-plus-support ecosystem. However, any expansion toward intervention features would require separate validation and outcome testing to avoid conflating screening sensitivity with therapeutic effectiveness. Local evidence further underscores the urgency of burnout assessment in Indonesia (Supriyanto et al., 2022) and highlights the importance of embedding assessment tools within supportive school environments and follow-up interventions, such as group counseling (Alifia Julia Agatha & Purwa Pamungkas, 2024; Wulandari, E. E. S., Mutakim, F., & Karamoy, 2024). In this regard, BURNTES should be interpreted as a decision-support entry point within a broader counseling workflow rather than a standalone solution.

Implementation implications should also be considered carefully. Digital screening tools may improve efficiency and standardization, but their practical value depends on counselor engagement, institutional support, data governance safeguards, and ethical handling of student psychological information. Without structured follow-up procedures, screening data alone have limited impact on student outcomes. Therefore, integration with counseling action plans, referral mechanisms, and periodic monitoring protocols is recommended for applied use.

Despite its contributions, this study is limited by its restricted sample size, reliance on self-report data, and short-term evaluation. Future research should employ larger, multi-site samples and longitudinal designs to examine the stability, durability, and cross-context applicability of BURNTES. Such efforts are necessary to establish whether the preliminary improvements observed can be sustained over time and translated into meaningful long-term benefits for student well-being. Overall, BURNTES represents a promising integration of digital technology and psychological assessment, with potential to strengthen evidence-based school counseling practices when supported by continued validation and contextual adaptation.

4. CONCLUSION

The development of BURNTES aligns with recent educational technology trends that emphasize digital mental health tools as essential components of school well-being ecosystems. The integration of automated scoring, interactive design, and self-reflection components in BURNTES enhances the objectivity and continuity of burnout assessment, reducing teachers' administrative burden while improving intervention planning accuracy.

By leveraging this tool, teachers can monitor students' emotional well-being more systematically, reducing reliance on manual data collection and enhancing follow-up accuracy.

Future researchers and practitioners should extend the use of BURNTES to larger and more diverse populations, including senior high school and vocational students, to test its scalability and generalizability. Integration with institutional counseling management systems or Learning Management Systems (LMS) can enhance data tracking and longitudinal monitoring of student well-being.

The development of BURNTES aligns with recent trends in educational technology that highlight the growing importance of digital mental-health tools within school well-being systems. By incorporating automated scoring, a clear and interactive interface, and guided self-reflection features, BURNTES provides a more efficient and consistent approach to assessing student burnout. These features help reduce teachers' administrative workload and support more accurate planning for counseling follow-up.

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