

Research Article

Public Knowledge, Trust, Attitude, and Behavioral Intention toward the Integration of *Jamu* into National Health Services

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Abstract

The integration of *jamu* into Indonesia's formal healthcare system remains an important policy issue, particularly in ensuring that regulatory development is matched by public acceptance and behavioral readiness. This study aimed to examine public perceptions of integrating *jamu* into national health services using a Theory of Planned Behavior (TPB)-informed framework. A quantitative cross-sectional survey was conducted among 300 webinar participants aged 18 years or older using purposive sampling. Data were collected through an anonymous online questionnaire comprising 12 items across four latent constructs: knowledge, trust, attitude, and behavioral intention. The relationships among constructs were analyzed using partial least squares structural equation modeling (PLS-SEM). The results showed that attitude was the strongest predictor of behavioral intention ($\beta = 0.837$, $p < 0.001$), while knowledge significantly influenced trust ($\beta = 0.651$) and attitude ($\beta = 0.248$), and trust also significantly influenced attitude ($\beta = 0.486$). The model explained 70% of the variance in behavioral intention, indicating substantial explanatory power. These findings suggest a coherent behavioral pathway in which knowledge and trust strengthen attitude, which in turn drives public intention to support the integration of *jamu* into formal healthcare services. The study concludes that successful integration depends not only on regulatory readiness but also on strengthening public knowledge, trust, and attitudes toward traditional medicine. However, the findings should be interpreted cautiously because the sample was non-random and relatively digitally literate. Future studies should include more diverse populations and use longitudinal or mixed-method approaches to support evidence-based integration policies.

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INTRODUCTION

Indonesia possesses an extensive biodiversity and a rich cultural heritage that have long supported the use of traditional medicine, particularly *jamu*, as an integral part of community healthcare. Amidst the ongoing shift in the national healthcare paradigm from curative toward preventive and promotive strategies, a window of opportunity has emerged for the formal integration of traditional medicine into mainstream health services. Legislative milestones, such as Law No. 17 of 2023 and Government Regulation No. 28 of 2024, have officially recognized *jamu* as a component of the national health system^{1,2}. This initiative is consistent with the World Health Organization's Traditional Medicine Strategy 2014–2023, which encourages the evidence-based incorporation of traditional medicine into national health policies across member countries³. The prevalence of *jamu* use is primarily attributed to favorable public perceptions of its efficacy, safety, and affordability⁴. Within

the context of achieving Universal Health Coverage (UHC), general practitioners in Indonesia have expressed considerable support for *jamu* as a complementary modality, particularly for chronic and palliative care. However, persistent barriers remain, including regulatory ambiguities, limited clinical training, and the exclusion of *jamu* from the National Health Insurance (*Jaminan Kesehatan Nasional* - JKN) scheme⁵. These systemic limitations stand in sharp contrast to strong public demand for traditional therapies, underscoring the need for healthcare models that are culturally responsive and structurally integrative⁶.

To better understand health-related behaviors in this domain, the Theory of Planned Behavior (TPB) has been widely applied. TPB posits that behavioral intentions are shaped by key psychological determinants, including attitudes and other contextual factors influencing decision-making. In the context of traditional medicine, the TPB framework has been adapted to incorporate relevant constructs such as knowledge and trust, which are considered essential in shaping perceptions and acceptance of herbal medicine. Empirical evidence has demonstrated that these constructs significantly influence individuals' intention to use traditional therapies^{7,8}. Nevertheless, critics argue that TPB may not fully capture the complex cultural and structural determinants of health behavior. System-level constraints, such as the limited engagement of healthcare providers in inquiring about alternative medicine use, often lead to underreporting and a lack of clinical communication^{9,10}. Moreover, integration efforts are frequently hindered by unresolved challenges involving regulatory standards, pharmacological validation, and safety assurance¹¹⁻¹³. Recent literature suggests that TPB remains adaptable; for instance, Widayati *et al.*¹⁴ applied the framework to evaluate behavioral factors driving traditional medicine usage among Indonesian youth. Nonetheless, the successful application of TPB in the context of traditional medicine requires careful adaptation, particularly in sociocultural environments where intergenerational knowledge and community practices are prominent. The conceptual framework of this study is illustrated in **Figure 1**.

In light of Indonesia's evolving health policy agenda, which emphasizes community-based preventive strategies rooted in local wisdom¹⁵, research into the public perception of *jamu* is both timely and imperative. Empirical findings indicate that integrating traditional medicine into national healthcare systems can improve access and efficiency, especially among underserved and culturally diverse populations¹⁶. The Ministry of Health's *jamu* scientification initiative (*Saintifikasi Jamu*) exemplifies a strategic alignment between indigenous medical traditions and contemporary scientific standards¹⁷. However, the long-term viability of integration policies hinges on multisectoral coordination, robust policy implementation, and the development of culturally competent healthcare professionals¹⁸. Nevertheless, the literature on herbal medicine integration is largely centered on clinical, pharmacological, and regulatory aspects, with limited attention to behavioral and perception-based dimensions, particularly in low- and middle-income settings^{13,16}. This reveals a critical gap in understanding how key behavioral factors (knowledge, trust, and attitude) influence public acceptance and intention to use traditional medicine in formal healthcare systems. This study addresses this gap by applying the TPB to empirically examine these constructs using a Partial Least Squares Structural Equation Modeling (PLS-SEM) approach in the Indonesian context. The study is timely given Indonesia's ongoing health policy transition toward preventive and promotive care, where successful implementation depends not only on regulatory readiness but also on public acceptance and behavioral intention. Accordingly, this study aims to investigate public perceptions regarding the integration of *jamu* into Indonesia's national healthcare system. Specifically, it seeks to identify both the perceived challenges and the potential opportunities associated with this initiative from users' perspectives. The central research question guiding this inquiry is: *How do individuals perceive the integration of jamu into Indonesia's national health system?* Answering this question will provide critical empirical insights to inform the development of more contextually grounded, culturally inclusive, and evidence-based integrative health policies.

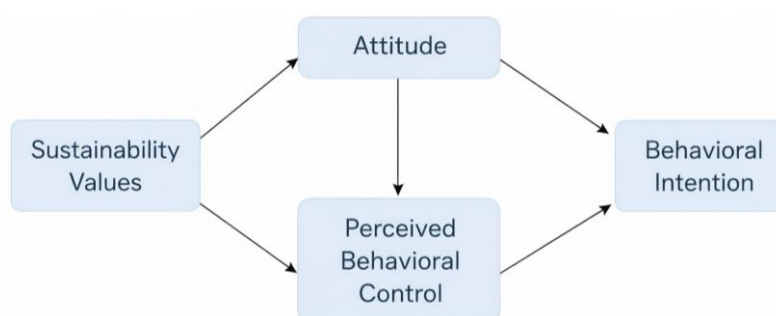


Figure 1. Conceptual framework of the study demonstrating the extended TPB path model.

MATERIALS AND METHODS

Materials

The study used a primary empirical dataset collected through a structured online survey administered to adult webinar attendees. The target sample comprised 300 completed respondent records selected through purposive sampling to ensure direct exposure to the *jamu* health service integration content. The survey instrument evaluated four distinct latent constructs derived from the TPB: Knowledge, Trust, Attitude, and Behavioral Intention. Each construct was operationalized using three specific measurement indicators, resulting in a total of 12-item questionnaire evaluated on a standard five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Methods

Study design and sampling strategy

This study utilized a quantitative, cross-sectional survey design to evaluate public perceptions and behavioral intentions regarding the integration of *jamu* into national health services. A non-probability purposive sampling technique was employed to recruit participants who had attended a dedicated educational webinar on *jamu* health service integration, ensuring that respondents possessed adequate conceptual exposure to provide informed evaluations. Eligible participants were adults aged 18 years or older residing in Indonesia who voluntarily completed the online questionnaire. Questionnaire submissions from individuals under 18 years of age or records with missing or incomplete responses were excluded from analysis. The final analytical sample comprised 300 valid respondents, exceeding the minimum threshold required for PLS-SEM and ensuring stable parameter estimates across complex latent path models¹⁹.

Measurement instruments and operationalization

Data collection was conducted using an online questionnaire designed to capture psychological determinants of health behavior within an adapted TPB framework. The instrument comprised 12 measurement items evenly distributed across four latent constructs: Knowledge (evaluating public understanding of *jamu* standardization and safety regulations), Trust (assessing confidence in traditional medicine efficacy and clinical safety), Attitude (measuring favorable or unfavorable evaluations of integrative health services), and Behavioral Intention (capturing willingness to utilize *jamu* within formal healthcare settings). All item responses were recorded on a symmetrical five-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

Ethical considerations

The survey was administered anonymously using a web-based platform that did not collect personal identification data, IP addresses, or contact information. Electronic informed consent was obtained from all participants prior to survey initiation, explicitly outlining voluntary participation, data confidentiality, and research objectives. Because the study involved minimal-risk, anonymous survey data collected in a public educational context, formal approval from an institutional ethics review board was waived in accordance with applicable national ethics guidelines; nevertheless, all research procedures strictly adhered to standard ethical principles governing human subjects research and responsible data stewardship.

Data analysis

Statistical evaluation was conducted using PLS-SEM to assess both measurement and structural model parameters. The measurement (outer) model was evaluated for internal consistency reliability using Cronbach's α and Composite Reliability (CR), convergent validity using item outer loadings (threshold ≥ 0.70) and Average Variance Extracted (AVE, threshold ≥ 0.50), and discriminant validity using the Heterotrait-Monotrait (HTMT) ratio of correlations and Fornell-Larcker criteria. The structural (inner) model was subsequently evaluated to test hypothesized directional paths connecting Knowledge, Trust, and Attitude to Behavioral Intention. Path coefficients (β), bootstrap t-statistics, p-values (based on 5,000 resampling iterations), coefficient of determination (R^2), effect size (f^2), and the Standardized Root Mean Square Residual (SRMR) for overall model fit were calculated to determine the explanatory power of the integrated TPB model.

RESULTS AND DISCUSSION

A total of 300 valid respondents completed the survey, providing a sufficient dataset to examine public perceptions regarding the integration of *jamu* into Indonesia's formal national healthcare services. The demographic distribution revealed a predominance of female respondents (60.0%, $n = 180$) and individuals aged 20–30 years (65.0%, $n = 195$), representing a young, digitally literate, and health-conscious sample (Figures 2 and 3). Each latent construct within the adapted TPB model (Knowledge, Trust, Attitude, and Behavioral Intention) was operationalized with three distinct measurement indicators, resulting in a 12-item survey instrument. The Knowledge construct assessed public understanding of *jamu*'s health benefits, safety profiles, and therapeutic roles in healthcare. Trust assessed respondent confidence in product efficacy, manufacturing quality, and government regulatory oversight. Attitude captured evaluative judgments regarding *jamu* utilization in clinical settings, while Behavioral Intention reflected the public's willingness to endorse and use *jamu* in formal health facilities.

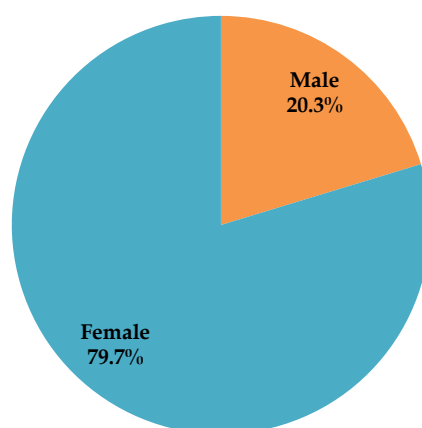


Figure 2. Gender distribution of survey respondents ($n = 300$).

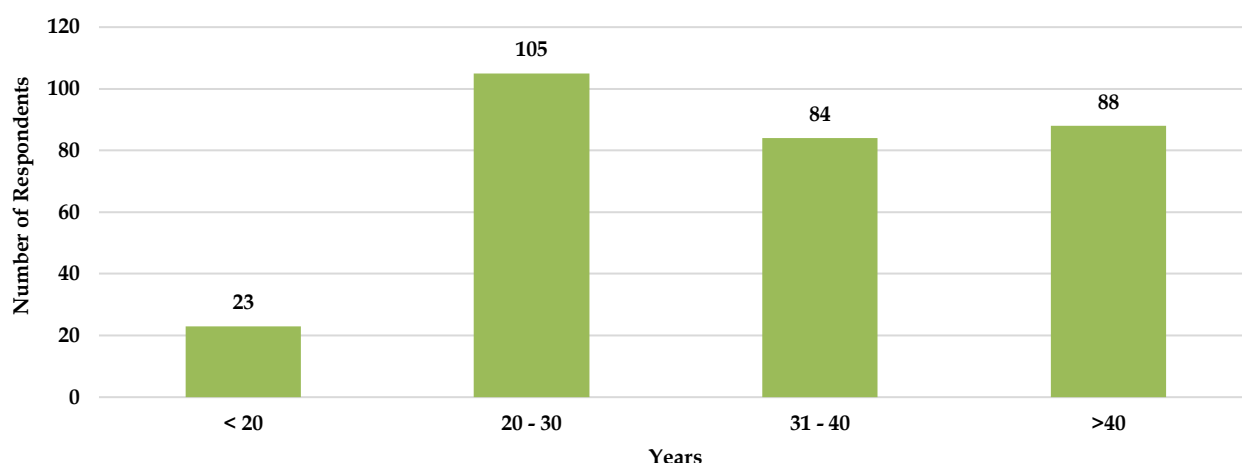


Figure 3. Age cohort distribution of survey respondents ($n = 300$).

Descriptive analysis of item responses indicated that the majority of respondents selected “Agree” or “Strongly Agree” across most indicators, particularly for Attitude and Behavioral Intention items, demonstrating an overwhelmingly positive public orientation toward *jamu* health service integration. Conversely, item responses for Knowledge and Trust exhibited greater variance, indicating heterogeneous levels of factual understanding and regulatory confidence across the sample. This pattern demonstrates that while positive attitudes and usage intentions are already well established, cognitive knowledge and trust dimensions remain variable, highlighting a need for targeted public health communication and evidence-based education.

The measurement (outer) model was evaluated to verify construct reliability and validity prior to structural testing. Reliability and convergent validity metrics are summarized in **Table I**. All latent constructs demonstrated satisfactory internal consistency and convergent validity. CR values ranged from 0.67 to 0.94, and AVE scores all exceeded the standard 0.50 threshold, confirming convergent validity. Although Cronbach's α for Knowledge (0.54) was below the standard 0.70 threshold, it remains acceptable for exploratory research involving adapted psychological constructs, provided that CR and AVE parameters meet established benchmarks. These findings confirm that the measurement instrument reliably captures the target latent constructs.

Table I. Measurement model reliability and convergent validity results.

Latent Construct	Cronbach's α	CR	AVE
Knowledge	0.54	0.67	0.53
Trust	0.83	0.84	0.75
Attitude	0.88	0.89	0.82
Behavioral Intention	0.94	0.94	0.89

The structural (inner) model was evaluated using PLS-SEM to test the hypothesized directional relationships among constructs. The structural path diagram is illustrated in **Figure 4**. As detailed in **Table II**, all proposed structural paths were statistically significant ($p < 0.001$), supporting the conceptual framework derived from TPB. Knowledge exerted a strong direct effect on Trust ($\beta = 0.651$, $t = 13.216$, $p < 0.001$) and a moderate direct effect on Attitude ($\beta = 0.248$, $t = 4.556$, $p < 0.001$). Trust also significantly influenced Attitude ($\beta = 0.486$, $t = 6.948$, $p < 0.001$). Attitude emerged as the primary direct driver of Behavioral Intention ($\beta = 0.837$, $t = 31.683$, $p < 0.001$), indicating that favorable attitudes are the strongest predictor of the public's willingness to support *jamu* integration.

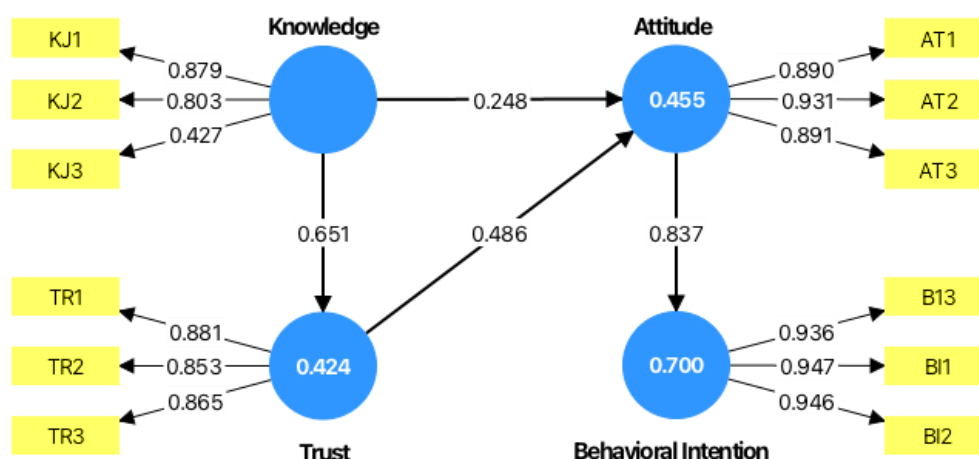


Figure 4. Structural model path diagram displaying estimated standardized β and significance levels.

Table II. Structural β , t-statistics, and significance levels.

Structural Path Relationship	Path Coefficient (β)	t-Statistic	p-Value
Knowledge $\rightarrow$ Trust	0.651	13.216	<0.001
Knowledge $\rightarrow$ Attitude	0.248	4.556	<0.001
Trust $\rightarrow$ Attitude	0.486	6.948	<0.001
Attitude $\rightarrow$ Behavioral Intention	0.837	31.683	<0.001

The explanatory power and overall fit of the structural model are presented in **Table III**. The model accounted for 42.4% of the variance in Trust ($R^2 = 0.424$), 45.5% of the variance in Attitude ($R^2 = 0.455$), and 70.0% of the variance in Behavioral Intention ($R^2 = 0.700$), demonstrating substantial predictive accuracy. The calculated SRMR value of 0.066 was below the standard 0.080 cutoff, confirming a good overall fit of the structural model. These empirical results validate the theoretical framework, establishing a sequential behavioral pathway in which Knowledge enhances Trust and Attitude; Trust further reinforces Attitude; and Attitude directly drives Behavioral Intention regarding *jamu* integration into formal healthcare services.

Table III. Coefficients of determination and model fit indices.

Endogenous Latent Variable	R ²	Explanatory Variance (%)
Trust	0.424	42.4
Attitude	0.455	45.5
Behavioral Intention	0.700	70.0
Model Fit Index	Calculated Sample Value	Recommended Threshold Criteria
Standardized Root Mean Square Residual (SRMR)	0.066	<0.080

The demographic profile of the study sample, characterized by a predominance of female participants (60.0%) and young adults aged 20–30 years (65.0%), aligns with existing health behavior literature. Women and young adults frequently exhibit proactive health-seeking behaviors, higher health literacy, and greater openness toward preventive, holistic, and complementary health modalities²⁰. Younger cohorts are also active consumers of digital health information, which may contribute to the favorable attitudes and strong behavioral intentions observed in this study.

The structural analysis confirmed a sequential behavioral pathway connecting cognitive knowledge, relational trust, affective attitude, and behavioral intention. The strong influence of Attitude on Behavioral Intention ($\beta = 0.837$) demonstrates that public acceptance of *jamu* integration is primarily driven by favorable evaluative judgments regarding its efficacy, safety, and compatibility with healthcare needs. This finding aligns with prior studies reporting that positive beliefs about herbal medicine significantly increase the public's willingness to use complementary therapies within formal healthcare systems^{21–23}. In this context, Attitude serves as the primary proximal determinant converting general perceptions into actionable support.

Furthermore, the robust path from Knowledge to Trust ($\beta = 0.651$) underscores the role of objective understanding of health in fostering public confidence. Individuals who understand the therapeutic role, safety standards, and scientific rationale of *jamu* are more likely to trust its use in formal clinical settings. This finding corroborates evidence that accessible, evidence-based communication builds consumer trust in herbal therapies²⁴. Trust, in turn, significantly influences Attitude ($\beta = 0.486$), confirming that confidence in product quality, efficacy, and regulatory oversight reinforces favorable public evaluations. Together, Knowledge and Trust act as foundational drivers that indirectly strengthen Behavioral Intention through Attitude.

While the structural model demonstrates strong public intent to endorse *jamu* integration, translating that intent into routine clinical practice faces system-level challenges. Institutional adoption of traditional medicine is often constrained by regulatory ambiguities, insufficient clinical standardization, variable product quality, and hesitation among biomedical practitioners^{25,26}. In Indonesia, despite strong public interest and supportive legislation^{1,2}, successful integration requires clear clinical protocols, practitioner training, and institutional readiness within the National Health Insurance framework.

These findings highlight the importance of targeted public education and policy communication. Because Knowledge and Trust indirectly drive Behavioral Intention, initiatives to improve public health literacy regarding standardized *jamu* (such as Standardized Herbal Medicines and Phytopharmaceuticals) can strengthen public readiness for integration^{27,28}. In Indonesia, health communication should combine cultural respect for traditional medicine with evidence-based information on safety, standardized dosing, and appropriate clinical use. Beyond individual psychology, the use of *jamu* is embedded in local cultural heritage, intergenerational practices, and community knowledge systems²⁹. Legal frameworks governing the integration of traditional medicine must provide institutional safeguards, legal clarity, and intellectual property protections to prevent unethical exploitation and ensure benefit-sharing for indigenous knowledge holders^{30,31}.

From a broader health policy perspective, integrating *jamu* into formal health services aligns with international initiatives to advance UHC, particularly in culturally diverse and resource-constrained settings. Global evidence indicates that structured integration of traditional medicine, supported by clinical guidelines, practitioner training, and formal reimbursement, can improve healthcare access, service efficiency, and health equity¹⁶. Experiences from African health systems similarly demonstrate that integrating traditional medicine enhances community engagement when aligned with national health priorities³². These international models offer valuable lessons for Indonesia, emphasizing the necessity of multisectoral coordination, clinical research, and policy alignment. Ultimately, successful integration depends on both regulatory readiness and population-level behavioral factors, particularly through building public knowledge, trust, and positive attitudes.

This study has several limitations. First, using a purposive sample of webinar participants may introduce selection bias, as respondents were likely more digitally literate and health-focused than the general population. Second, reliance on self-

reported survey data carries the risk of social desirability bias. Third, the cross-sectional design precludes definitive causal inferences. Finally, while the adapted TPB framework effectively explained behavioral intention ($R^2 = 0.700$), it did not incorporate structural determinants such as financial coverage, access to facilities, or healthcare providers' attitudes. Future research should use stratified, representative sampling, longitudinal designs, and mixed-methods approaches to examine both public perceptions and health system readiness.

CONCLUSION

This study demonstrates that public support for integrating *jamu* into Indonesia's national healthcare system is strongly driven by behavioral determinants within an extended TPB framework, with attitude emerging as the primary direct predictor of behavioral intention and the structural model accounting for a substantial proportion of variance ($R^2 = 0.70$). These findings highlight that successful policy execution depends not only on regulatory frameworks and administrative readiness but also on the systematic building of public knowledge, trust, and positive attitudes toward traditional medicine. However, these conclusions should be interpreted with methodological limitations in mind, including a non-random, digitally literate sample and a cross-sectional survey design, which may limit population generalizability and causal inference. Future research should evaluate broader, geographically diverse cohorts and incorporate longitudinal or mixed-method designs to capture system-level health service dynamics and support contextually grounded, evidence-based integration policies.

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AUTHORS' CONTRIBUTION

Conceptualization: Mohamad Kashuri, Taruna Ikrar

Data curation: Mohamad Kashuri

Formal analysis: Mohamad Kashuri

Funding acquisition: -

Investigation: Mohamad Kashuri

Methodology: Taruna Ikrar

Project administration: Mohamad Kashuri

Resources: Mohamad Kashuri

Software: Mohamad Kashuri

Supervision: Taruna Ikrar

Validation: Taruna Ikrar

Visualization: Mohamad Kashuri

Writing - original draft: Mohamad Kashuri

Writing - review & editing: Mohamad Kashuri, Taruna Ikrar

DATA AVAILABILITY

None.

CONFLICT OF INTEREST

The authors declare no competing financial, personal, or professional conflicts of interest that could inappropriately influence or bias the research presented in this article. Regarding ethical compliance, this study was conducted in accordance with established institutional standards governing human subject research involving minimal risk. The research relied exclusively on voluntary and anonymous survey responses collected within a public educational context, ensuring that no personally identifiable information or electronic tracing data were collected. In accordance with applicable research ethics guidelines for minimal-risk, non-invasive educational surveys, formal institutional ethics committee review was waived; nevertheless, explicit electronic informed consent was obtained from all participants prior to questionnaire administration, guaranteeing voluntary participation, confidentiality, and responsible data management throughout the study.

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