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MEDIATING ROLE OF COGNITIVE AFFECTIVE REGULATION ON THE INFLUENCE OF TRANSLANGUAGING STRATEGY AND DIGITAL READING LITERACY ON THE READING COMPREHENSION PROFICIENCY OF GRADE 10 STUDENTS

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ABSTRACT

Reading comprehension is essential to academic learning, yet difficulties persist among Filipino learners, and little research has examined how translanguaging and digital reading practices interact with cognitive-affective regulation. Anchored on García and Wei's (2014) Translanguaging Theory, with Gross's (1998) process model of emotion regulation and Pekrun's (2006) Control-Value Theory explaining the regulatory pathway, this study examined the mediating role of cognitive-affective regulation in the relationship of translanguaging strategy and digital reading literacy with reading comprehension among 184 Grade 10 learners in a public secondary school. A quantitative descriptive-correlational design with mediation analysis was used, and participants were selected through proportionate stratified random sampling. Data were analysed using descriptive statistics, multiple regression, and structural equation modelling. Results showed that translanguaging strategy was high, while digital reading literacy and cognitive-affective regulation were moderate. Overall reading comprehension was at the instructional level, with literal and critical comprehension showing greater difficulty. Translanguaging strategy and cognitive-affective regulation significantly predicted reading comprehension, whereas digital reading literacy did not predict it independently. Mediation analysis showed that cognitive-affective regulation fully mediated the effects of both translanguaging strategy and digital reading literacy on reading comprehension. The study concludes that linguistic flexibility and digital reading competence support comprehension largely when learners can regulate the cognitive and emotional demands of reading. Future studies should use longitudinal or intervention-based designs across diverse school contexts to examine how cognitive-affective regulation develops and mediates these effects.

Keywords: *translanguaging*; *digital reading literacy*; *cognitive affective regulation*; *reading comprehension*; *mediation analysis*

INTRODUCTION

Reading comprehension underpins learning in every subject, yet reading proficiency remains a serious concern for Filipino learners. In PISA 2025, the Philippines posted its highest reading score yet (367, a 20-point gain over 2022), but only 31% of Filipino 15-year-olds reached Level 2 or higher, the baseline proficiency level (OECD, 2026). Local evidence points the same way: a national commission report cited that 88% of Grade 7 learners are struggling readers (EDCOM 2, 2026), and in the school where this study was conducted, 96% of Grade 10 students were not yet grade-level ready in a start-of-year Group Screening Test. Many learners can read words but cannot yet derive literal, inferential, or critical meaning from them (Tomas et al., 2021; Albarico & Deiparine, 2025).

This comprehension gap is shaped by the linguistic, technological, and emotional conditions in which adolescents read. Filipino students routinely move among their first language (L1), Filipino, and English, a practice described as translanguaging (García & Wei, 2014). They also read increasingly on screens, where comprehension depends on locating, evaluating, and synthesizing online sources (Leu et al., 2017). Studies show that translanguaging is associated with better reading outcomes among Filipino learners (Ocampo, 2023) and that digital literacy is related to comprehension and academic performance (Zakir et al., 2025). However, the evidence on digital literacy is mixed, with some large syntheses reporting weak or even negative relationships between digital reading and comprehension in younger readers (Altamura et al., 2025; Salmerón et al., 2023).

What remains under-examined is how these resources translate into comprehension. Both translanguaging and digital reading impose cognitive and emotional demands: learners must switch languages to resolve confusion or stay composed while navigating overwhelming online text. Gross's (1998) process model and Garnefski et al.'s (2001) cognitive coping strategies suggest that how learners think about, and emotionally respond to, a difficult task may be the mechanism connecting their resources to performance. Pekrun's (2006) control-value theory similarly holds that achievement emotions such as frustration or confusion shape engagement and results. Evidence that cognitive emotion regulation can mediate academic outcomes exists in other fields (Ghattas & El-Ashry, 2024), but no identified study has tested it as a shared mediator of translanguaging and digital reading literacy in the Philippine secondary context.

This study therefore examined the mediating role of cognitive affective regulation in the relationship of translanguaging strategy and digital reading literacy with the reading comprehension proficiency of Grade 10 students. Specifically, it (a) described the learners' translanguaging strategy, digital reading literacy, cognitive affective regulation, and comprehension at the literal, inferential, critical, and online-evaluation levels; (b)

determined whether the three variables significantly predict comprehension; and (c) tested whether cognitive affective regulation significantly mediates the effects of translanguaging and digital reading literacy on comprehension.

Research Questions

The study sought to answer the following questions:

1. What is the participants' self-report of their translanguaging strategy inside the classroom?
2. What is the participants' self-report of their digital reading literacy?
3. What is the participants' assessment of their cognitive affective regulation?
4. What is the participants' level of reading comprehension proficiency in terms of:
    4.1. Literal Level of Comprehension;
    4.2. Inferential Level of Comprehension;
    4.3. Critical Level of Comprehension; and
    4.4 Evaluating Online Texts?
5. Do the participants' assessment of their translanguaging strategy, digital reading literacy and cognitive affective regulation significantly predict their reading comprehension proficiency?
6. Does the participants' cognitive affective regulation in reading significantly mediate the relationship of translanguaging strategy and digital reading literacy on their reading comprehension proficiency?

METHODOLOGY

Research Design

A quantitative, descriptive-correlational design with mediation analysis was used (Hayes, 2022).

Respondents and Sampling Method

The population comprised 337 Grade 10 learners of a public secondary school in the Division of Misamis Oriental during school year 2026–2027. Using Yamane's (1967) formula at a 5% margin of error, a sample of 184 learners was drawn through proportionate stratified random sampling, with the eight sections serving as strata, the number drawn from each being proportional to its share of the population, and participants chosen by simple random sampling within each stratum. Learners were eligible if they were officially enrolled in Grade 10 and provided assent (with parental consent where required). Learners with a diagnosed reading or learning disability, those absent during data collection, and those who submitted incomplete responses were excluded.

Research Instruments

Four instruments were used. Translanguaging strategy was measured with the 22-item Learners' Translanguaging Strategy Disposition Questionnaire–Perceptions and

Attitudes (LTSDQ-PA; Zhang et al., 2026) on a 4-point agreement scale. Digital reading literacy was measured with the 32-item Self-Efficacy for Online Reading Questionnaire (SEORQ; Kim et al., 2026) on a 5-point confidence scale; it covers task-oriented reading, locating, source evaluation, integrative comprehension, and metacognitive regulation. Cognitive affective regulation was measured with the 36-item Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski et al., 2001), which taps nine cognitive strategies, on a 5-point agreement scale, with respondents answering in reference to difficult or frustrating reading tasks. Reading comprehension was measured with a Phil-IRI-based group screening test (literal: 6 items; inferential: 13; critical: 10) and a researcher-constructed online source evaluation test (17 items) anchored on the ORCA framework (Leu et al., 2014), for a maximum of 46 points. Items were scored dichotomously, and sub-scores were classified as Independent (80–100%), Instructional (59–79%), or Frustration (≤58%) following Phil-IRI criteria (Department of Education, 2018).

Validity and Reliability

All instruments underwent expert content and face validation and were pilot-tested with 30 non-participating Grade 10 learners. McDonald's omega indicated acceptable reliability (≥ .70) for every scale and subscale (ω = .706 to .907).

Data Analysis

Descriptive statistics (frequency, percentage, mean, standard deviation) addressed the first four research questions. Multiple regression, after verification of its assumptions (linearity, independence of observations, normality of residuals, homoscedasticity, absence of multicollinearity, and influential outliers), tested the prediction of comprehension. The mediation model was analyzed through structural equation modeling with bias-corrected bootstrapped indirect effects (5,000 resamples; an indirect effect was significant when its 95% confidence interval excluded zero). All tests used the .05 level of significance.

RESULTS

Levels of the study variables

Table 1 summarizes the descriptive results. Learners rated their translanguaging strategy as High (M = 3.03, SD = 0.33); 88.04% (n = 162) were in the High category and none in the Very Low category. All 22 indicators were rated Agree, with the highest for the statement that translanguaging is more helpful than confusing (M = 3.20) and the lowest for reflecting more deeply on AI-generated content through L1 (M = 2.65). Digital reading literacy was Moderate (M = 3.15, SD = 0.73); 45.11% of learners were in the Moderate category and 19.57% were Low or Very Low. Confidence was highest in using search engines (M = 3.61) and weakest in staying focused (M = 2.83) and in drawing inferences from online text (M = 2.88). Cognitive affective regulation was also Moderate (M = 3.25, SD = 0.74); 46.74% of learners were in the Moderate category and 32.61% in

the High category. Learners were most inclined to plan their next steps or view difficulties positively and least inclined to blame others.

Table 1. Descriptive Statistics of the Study Variables (N = 184)

Variable	Scale	M	SD	Interpretation
Translanguaging strategy	1–4	3.03	0.33	High
Digital reading literacy	1–5	3.15	0.73	Moderate
Cognitive affective regulation	1–5	3.25	0.74	Moderate
Reading comprehension (overall)	0–46	29.82	6.88	Instructional

Note. Interpretations follow the score ranges used in the study.

Reading comprehension proficiency was uneven (Table 2). Overall comprehension was at the Instructional level (M = 29.82, SD = 6.88), with 48.91% of learners at that level, 35.87% at the Frustration level, and 15.22% at the Independent level. Literal comprehension was the weakest dimension: two-thirds of learners (67.39%) were at the Frustration level. Critical comprehension was also at the Frustration level on the basis of its mean, although 42.93% of learners were individually at the Frustration level and 44.57% at the Instructional level; inferential comprehension and the evaluation of online sources reached the Instructional level, with most learners (58.70%) reaching the Independent level in the latter. This ordering departs from the conventional expectation that literal comprehension, as the least demanding skill, should be strongest.

Table 2. Reading Comprehension Proficiency by Dimension (N = 184)

Dimension	Max	M	SD	% at Frustration	Level
Literal	6	2.92	1.35	67.39	Frustration
Inferential	13	8.08	2.03	34.78	Instructional
Critical	10	5.53	1.89	42.93	Frustration
Evaluating online sources	17	13.29	3.30	23.37	Instructional
Overall	46	29.82	6.88	35.87	Instructional

Note. Level classification follows Phil-IRI cut-offs applied to each dimension mean; percentages show the share of learners individually at the Frustration level.

Prediction of reading comprehension

Table 3 presents the multiple regression results. The model was significant, $F(3, 180) = 9.31$, $p < .001$, and explained 13.4% of the variance in comprehension (adjusted $R^2 = .120$). Translanguaging strategy (β = .199, $p = .009$) and cognitive affective regulation (β = .251, $p = .009$) were significant positive predictors, with standardized coefficients of similar size; each additional point of translanguaging strategy corresponded to a 4.19-point increase in predicted comprehension, holding the other predictors constant. Digital

reading literacy was not a significant unique predictor (β = −.011, *p* = .910). Accordingly, the null hypotheses for the combined model, translanguaging, and regulation were rejected, whereas the null hypothesis for digital reading literacy was not.

Table 3. Multiple Regression of Translanguaging Strategy, Digital Reading Literacy, and Cognitive Affective Regulation on Reading Comprehension

Predictor	B	SE	β	95% CI	T	p
Constant	9.85	5.02	—	[0.09, 19.89]	2.198	0.029
Translanguaging strategy	4.19*	1.91	0.199	[0.47, 7.99]	2.633	0.009
Digital reading literacy	−0.10	0.73	−0.011	[−1.55, 1.32]	−0.113	0.910
Cognitive affective regulation	2.33*	0.85	0.251	[0.64, 3.93]	2.650	0.009

Note. R = .367, R^2 = .134, adjusted R^2 = .120, F(3, 180) = 9.310, p < .001. *Significant at the .05 level (two-tailed).

Mediating role of cognitive affective regulation

The structural model showed excellent fit: χ^2/df = 0.951, CFI = 1.000, SRMR = 0.025, RMSEA = 0.000, and PClose = 0.800, all within the recommended thresholds (Hu & Bentler, 1999). As shown in Figure 1, digital reading literacy had a strong positive effect on cognitive affective regulation (β = .62), while translanguaging strategy had a weak one (β = .14). Regulation, in turn, had a moderate positive effect on comprehension (β = .27). Translanguaging retained a weak direct effect on comprehension (β = .21), and the direct effect of digital reading literacy was essentially zero (β = .00). The two exogenous variables were moderately correlated (*r* = .36). Comprehension was well represented by its four indicators (loadings: literal = .53, inferential = .82, critical = .67, online source evaluation = .76). The model accounted for 46% of the variance in cognitive affective regulation and 16% of the variance in comprehension.

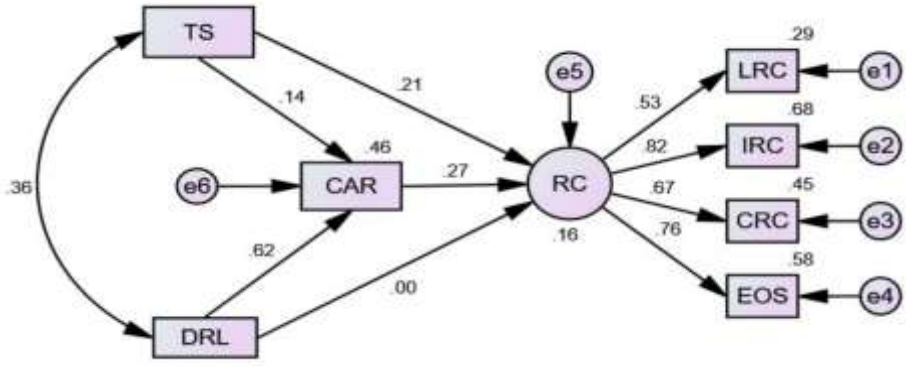


Figure 1. *Mediation Analysis Best-fit Model on Translanguaging Strategy, Digital Reading Literacy, Cognitive Affective Regulation, and Reading Comprehension*

Legend: TS = Translanguaging Strategy, DRL = Digital Reading Literacy, CAR = Cognitive Affective Regulation, RC = Reading Comprehension, LRC = Literal Reading Comprehension, IRC = Inferential Reading Comprehension, CRC = Critical Reading Comprehension, EOS = Evaluating Online Sources.

Table 4 reports the effect decomposition. For translanguaging strategy, the total effect was significant (0.554, p = .012), the direct effect was not (0.468, p = .053), and the indirect effect through regulation was significant (0.085, p = .010). For digital reading literacy, the total effect was significant (0.170, p = .042), the direct effect was negligible (0.004, p = .990), and the indirect effect was significant (0.166, p = .007). The null hypothesis of no mediation was therefore rejected for both predictors, and both paths were classified as full statistical mediation. For translanguaging, however, the direct path only narrowly missed significance and translanguaging remained a significant unique predictor in the regression, so "full" is a statistical label and should not be read as showing that translanguaging has no direct effect on comprehension.

Table 4. Mediation Analysis of Translanguaging Strategy and Digital Reading Literacy on Reading Comprehension through Cognitive Affective Regulation

Path	Total effect	Direct effect	Indirect effect	Mediation
TS → CAR → RC	0.554*	0.468	0.085*	Full
DRL → CAR → RC	0.170*	0.004	0.166*	Full

*Note. TS = translanguaging strategy; DRL = digital reading literacy; CAR = cognitive affective regulation; RC = reading comprehension. *Significant at the .05 level (two-tailed). For TS, the direct effect narrowly missed significance (p = .053), so full mediation is borderline.*

DISCUSSION

Learner's profile

Learners' favorable view of translanguaging mirrors earlier findings that using the full linguistic repertoire eases anxiety and supports participation in English reading lessons (Dilrahman et al., 2025; Leonet & Saragueta, 2023; Ocampo, 2023). Their comparatively lower rating of using L1 to reflect on AI-generated content, alongside strong endorsement of encouraging English while allowing L1 when needed, suggests that acceptance of translanguaging is conditional and task-dependent rather than unqualified. This fits teachers' view that translanguaging is beneficial for confidence and comprehension yet may be misaligned with ESL goals, which calls for regulated and strategic use (Deniega & Neri, 2024). Deliberate, reflective use of L1 is evidently less established than casual switching, a point teachers can address. The moderate digital reading literacy, with confidence concentrated in the technical skill of searching, fits Ng's (2012) view that digital literacy develops unevenly across technical, cognitive, and social-emotional dimensions.

The comprehension profile is the most striking result. Literal and critical comprehension were at the Frustration level, while inferential comprehension and online source evaluation fared better. The high proportion of Frustration-level literal readers is

consistent with national evidence of weak foundational reading skills (Tomas et al., 2021) and with research showing that inferential and critical skills are especially hard for Filipino adolescents after pandemic disruptions (Albarico & Deiparine, 2025). The relative strength in online evaluation resonates with work showing that adolescents can draw on their comprehension skills and prior knowledge to judge online credibility (Kiili et al., 2024). One plausible, though untested, explanation is that immersion in digital media cultivates skimming, searching, and credibility-judging at some cost to careful print-based recall; meta-analytic evidence that digital reading habits can be weaker or even negative for younger readers is consistent with this view (Altamura et al., 2025; Salmerón et al., 2023). The unusual ordering, however, may also reflect differences in test construction across dimensions and warrants replication. The ordering also only partly supports Barrett's (1976) taxonomy: its four-dimension structure held, but literal comprehension was not the strongest skill.

Predictors of comprehension

Translanguaging strategy and cognitive affective regulation each independently predicted comprehension, in line with experimental and correlational research on translanguaging pedagogy (Wangdi & Rai, 2024; Ocampo, 2023) and with evidence that self-regulatory strategies and affective factors predict reading performance (Li & Gan, 2022). The finding that digital reading literacy did not uniquely predict comprehension agrees with research showing that digital reading performance rests largely on general reading ability and that frequent device use in language classes can be unrelated or negatively related to comprehension (Salmerón et al., 2023; Altamura et al., 2025). Because the three predictors overlap, the null unique effect should be read as an absence of detectable independent contribution in this sample, not as proof that digital skills are irrelevant. Notably, the model explained only 13.4% of the variance, so most of the variation in comprehension is attributable to factors not measured here, such as vocabulary, prior knowledge, and reading habits.

Cognitive affective regulation as the connecting mechanism

The central contribution of this study is the evidence that regulation carries a significant share of the influence of both resources on comprehension. The strong path from digital reading literacy to regulation ($\beta = .62$) suggests that confidence in digital reading is bound up with the ability to manage frustration, sustain focus, and reappraise setbacks while searching and evaluating online material. This is consistent with studies reporting that self-regulated learning mediates the link between digital literacy and academic achievement (Chen, 2025) and between motivation and reading benefits among EFL adolescents (Yang et al., 2026), and with evidence that how students cognitively and emotionally process a stressful reading task, more than their skills alone, shapes their reading engagement (David et al., 2024). It also fits learners' weakest self-rated digital reading skill, staying focused, which is a regulation process rather than a technical one. It also explains why digital reading literacy showed no unique effect in the regression: its relation to comprehension operated through regulation.

For translanguaging, the pattern is more nuanced. The indirect effect was significant, but the path from translanguaging to regulation was weak (β = .14), and the direct effect remained borderline and was significant in the regression. Translanguaging therefore appears to influence comprehension both through the linguistic access it provides and, to a smaller degree, through the emotional relief it offers, which matches learners' reports that it reduces pressure and anxiety, and theoretical accounts that translanguaging lightens the cognitive and affective load of monolingual instruction and so frees regulatory resources for meaning-making (Ossa Parra & Proctor, 2021). This supports Pekrun's (2006) argument that appraisals and achievement emotions bridge classroom resources and performance, and Gross's (1998) emphasis on cognitive change as an effective regulation point. The result contrasts with Cattaneo Ahumada's (2022) null relationship between emotional regulation and comprehension among Argentine secondary students; differences in measurement (situation-specific regulation in this study versus general regulation) and analysis (a multivariate structural model versus bivariate correlation) may account for the discrepancy.

Implications

Teachers may build a brief regulation checkpoint into reading lessons (a planning step before reading, monitoring and reappraisal when learners get stuck, and a short reflection afterward) and use translanguaging as a regulation tool as well as a language aid, for instance through short "reset" moments in which stuck or anxious learners name the difficulty, reframe it, and decide on their next step in L1 before returning to the English text. Digital reading tasks should be short, single-purpose, and teacher-paced, with focus checkpoints and explicit practice in returning to the text after a distraction, since digital skill appears to help comprehension mainly when learners can regulate their attention and emotions. Teachers may also monitor regulation alongside comprehension (for example, through exit tickets or brief self-rating checklists) to identify learners whose gains in language or digital skills are unlikely to translate into better comprehension. Because literal and critical comprehension were at the Frustration level, school-based reading recovery programs should explicitly target these skills.

Beyond the classroom, school administrators may support practice-based teacher training in translanguaging pedagogy and structured digital-literacy instruction, allocate guided rather than unrestricted access to digital reading tools, and coordinate with guidance offices to integrate socio-emotional and affective-regulation components into reading support. Parents may welcome home-language talk about school readings, check in on how children judge the trustworthiness of online sources, and model constructive responses to frustration. Future researchers may test regulation-based or translanguaging-based reading interventions experimentally and compare print and digital comprehension tasks to clarify why literal and critical skills lagged behind inferential and online-evaluation skills.

Limitations

The cross-sectional, non-experimental design supports statistical, not causal, mediation claims, and the temporal ordering of the variables is assumed rather than

demonstrated. Translanguaging, digital reading literacy, and regulation were self-reported and may be affected by response bias; because the three came from the same source and method, shared-method variance may also have strengthened their relationships, even though comprehension was measured by a test. The translanguaging scale referred largely to teacher-supported and AI-assisted classroom practice. The near-perfect fit indices (CFI = 1.000, RMSEA = 0.000) can also occur in models with few degrees of freedom or modest samples and are best read together with the path estimates. The sample came from a single public school and excluded learners with a diagnosed reading or learning disability, the texts were in English only, and the online evaluation test was researcher-constructed. The mediating role of regulation should therefore not be generalized beyond comparable classroom contexts. Future work should use experimental or longitudinal designs, replicate the model across schools and grade levels, and add qualitative methods to capture learners' lived experiences.

Conclusions

Grade 10 learners in this study reported high translanguaging use and moderate digital reading literacy and regulation, but their comprehension was uneven, with literal and critical skills at the Frustration level. Translanguaging strategy and cognitive affective regulation uniquely predicted comprehension, while digital reading literacy did not. Cognitive affective regulation showed full statistical mediation of the effects of both translanguaging strategy and digital reading literacy, although the translanguaging pathway was borderline, indicating that linguistic flexibility and digital competence translate into stronger comprehension largely through learners' ability to regulate the cognitive and emotional demands of reading. The findings partly support Barrett's (1976) taxonomy, since literal comprehension was not the strongest skill, and extend it with an online-evaluation dimension. Instruction that combines language and digital supports with explicit regulation strategies is therefore a promising direction for improving adolescent reading comprehension.

Recommendations

1. English teachers may build a regulation checkpoint into every reading lesson, with a planning step before reading, a monitoring and reappraisal step when learners get stuck, and a brief reflection on what helped afterward, since cognitive affective regulation was the pathway through which learners' language and digital reading skills were linked to comprehension.

2. Teachers may use translanguaging as a regulation tool and not only as a language aid, through short, structured "reset" moments.

3. Teachers may monitor learners' regulation alongside their comprehension, using brief tools such as exit tickets, reading logs, or short self-rating checklists on planning and positive reappraisal.

4. School leaders may use the findings to integrate a socio-emotional or affective-regulation component into existing reading and guidance programs.

5. Future studies may incorporate qualitative or mixed-methods approaches, such as interviews or classroom observations, to explore learners' lived experiences of translanguaging, digital reading, and emotional regulation during reading tasks, complementing the purely quantitative, self-report approach used in this study.

Compliance with Ethical Standards

This study complied with established research ethics, including the principles of respect for persons, beneficence, and justice in the Belmont Report (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979), and the Data Privacy Act of 2012 (Republic Act No. 10173, 2012). Ethical clearance was obtained from the graduate school's Research Ethics Committee, and approval to conduct the study was secured from the school principal. Informed consent was obtained from the participants, and assent was obtained from the minor Grade 10 learners, after the purpose, procedures, benefits, and possible risks of the study were explained to them. Participation was voluntary, and the participants were free to decline or withdraw at any time without penalty, grade deduction, or need to justify their decision. Their well-being, privacy, and dignity were safeguarded, and the data gathering posed only minimal risk. Anonymity was maintained by assigning numerical codes instead of names, and all records, physical and digital, were stored securely, accessible only to the researcher and the statistician, and disposed of safely at the end of the study. The same procedures and conditions were applied to all participants to ensure fairness, and the findings were interpreted objectively and without bias. The collected data were used solely for research purposes. The researcher declares that no conflict of interest exists in the conduct of this study and that plagiarism was strictly avoided. For full disclosure, AI tools were used only to assist in searching, drafting, and checking the manuscript for inconsistencies; they were not used in data collection or analysis. All outputs were reviewed and revised by the researcher, who remains fully responsible for the accuracy and originality of the work.

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