Indonesian Journal of Early Childhood Educational Research, 5(1) - June 2026, 192-204

Indonesian Journal of Early Childhood Educational Research

ISSN : 2963-6760 (Online)
ISSN : 2962-1364 (Print)

Real-Time Interactive Quizzes as Formative Assessment in Child Protection Education: A Quasi-Experimental Study

Nesna Agustriana[1], Siyyella Tika Nasution[2*]
[1,2]Bengkulu University, Indonesia

***Corresponding Author**: Siyyella Tika Nasution, **E-mail**: stnasution@unib.ac.id

Received: April 01, 2026	Revised: May 22, 2026	Accepted: June 15, 2026	Online: June 30, 2026

ABSTRACT
This study aims to examine the effectiveness of real-time interactive quizzes as a formative assessment instrument in enhancing Early Childhood Education Teacher Education (PGPAUD) students' understanding of child violence and rights violations. Using a one-group pretest-posttest quasi-experimental design, the study involved 25 students enrolled in the Child Protection course at Bengkulu University. Participants completed a live digital quiz consisting of multiple-choice questions covering key dimensions of child protection. The findings indicate a statistically significant improvement in students' understanding following the intervention, with a large effect size demonstrating substantial learning gains. The greatest improvement was observed in evidence-based intervention concepts, while notable gains were also found in students' understanding of economic exploitation and systemic discrimination. Most participants demonstrated improved performance, with the largest gains occurring among initially lower-performing students, consistent with Vygotsky's concept of the zone of proximal development. This study contributes to the literature by demonstrating the value of interactive quizzes as formative assessment tools in the underexplored context of PGPAUD child protection education in Indonesia and highlighting the usefulness of indicator-level diagnostic feedback for instructional decision-making. However, the findings should be interpreted with caution due to the absence of a control group and the limited sample drawn from a single institution.

Keywords: *Interactive Quizzes, Child Protection, Early Childhood Violence, Formative Assessment, Gamified Learning.*

Journal Homepage https://ejournaluinmybsk.ecampus.id/index.php/ijecer/index

How to cite: Agustriana, N., & Nasution, S. T. (2026). Real-Time Interactive Quizzes as Formative Assessment in Child Protection Education: A Quasi-Experimental Study.. *Indonesian Journal of Early Childhood Educational Research (IJECER), 5(1),* 192-204. https://doi.org/10.31958/ijecer.v5i1.16754
Published by: Universitas Islam Negeri Mahmud Yunus Batusangkar, Indonesia

INTRODUCTION

Violence against children remains a serious and persistent global concern. Data from the National Commission for Child Protection (Komisi Nasional Perlindungan Anak, 2023) reveal that the majority of perpetrators of violence against children come from the immediate family environment or from individuals known to the victim. This reality underscores the critical need for early childhood educators who are not only knowledgeable about developmental processes, but also competent in identifying, preventing, and responding to diverse forms of child violence and rights violations.

Students enrolled in the Early Childhood Education Teacher Education Study Program (PGPAUD) represent prospective frontline educators who will interact directly with young children and their families. These students must be equipped with a deep and operational understanding of the typology of violence against children including physical,

psychological, and sexual violence, neglect, bullying, economic exploitation, and systemic discrimination. For the purposes of this study, operational competence is defined as the demonstrable ability to identify, document, and respond appropriately to cases of child violence within real professional contexts encompassing both normative legal awareness and applied behavioral skills (Muarifah, 2020). A strong conceptual foundation is a prerequisite for realizing safe, protective, and rights-oriented learning environments for children (Apriani & Nurhidayah, 2023; Armitage, 2021).

Formative assessment effectiveness, as operationalized in this study, refers to the measurable improvement in student content knowledge as indicated by pre-to-post gains in quiz accuracy attributable to the combined diagnostic and immediate-feedback functions of the digital quiz instrument (Hattie & Clarke, 2022) In higher education contexts, *gamified learning* defined as the deliberate application of game design elements such as points, time pressure, leaderboards, and immediate corrective feedback to create motivationally rich formative assessment experiences has demonstrated effectiveness in increasing student engagement and knowledge acquisition (Moreira & Freire, 2024; Zainuddin et al., 2020)

Despite substantial evidence for the general effectiveness of digital quiz platforms, their application in domains requiring both normative awareness and operational competence such as child protection education for PGPAUD students remains underexplored in the Indonesian context. Crucially, preliminary empirical evidence supports the urgency of this gap, Muarifah, (2020) found that while PAUD teachers in Indonesia generally demonstrate normative awareness of child protection obligations, their operational reporting competencies remain consistently weak. Baseline observations in the Child Protection course at Bengkulu University similarly indicate that students enter with strong familiarity with physical violence and bullying, but markedly limited prior exposure to evidence-based intervention frameworks and the legal basis for child protection (Winarni et al., 2021) gaps confirmed by the low pretest scores on those indicators in the present study.

Moreover, prior studies have rarely integrated rigorous statistical analysis inferential testing, effect size estimation, confidence intervals with formative quiz data, limiting the generalizability and scientific weight of their conclusions. The novel contribution of the present study lies in: (1) applying such rigorous inferential statistics to formative quiz data in the specific domain of PGPAUD child protection education in Indonesia; and (2) demonstrating the diagnostic utility of indicator-level pretest analysis for identifying domain-specific knowledge gaps within a subject area requiring both normative and operational competency a combination not previously documented in the Indonesian PAUD literature. Critically, the present study also incorporates engagement with contradictory findings in the gamified learning literature (see Section 5), thereby extending beyond confirmatory replication to nuanced contextual analysis.

This study examines the effectiveness of real-time interactive quizzes in the Child Protection course in the PGPAUD program at Bengkulu University. It seeks to answer three research questions: (1) What is the profile of students' initial understanding of child violence and rights violations before instruction? (2) Is there a statistically significant improvement in understanding following the interactive quiz-based learning session? (3) Which

comprehension indicators show the most substantial gains, and what pedagogical implications does this carry for PGPAUD curricula?

RESEARCH METHODOLOGY

Research Design

This study employed a one-group pretest-posttest quasi-experimental design, a within-subjects approach that measures the same participants before and after an intervention (Campbell & Stanley, 1963; Creswell & Creswell, 2018). This design was selected rather than a two-group randomized controlled design for two principal reasons: (1) the study was embedded in routine classroom instruction, making random assignment ethically and logistically unfeasible; and (2) the primary research objective establishing the magnitude and indicator-level profile of learning gains is appropriately served by within-subjects comparison, provided limitations regarding causal inference are transparently acknowledged. While a control group would have strengthened causal claims, the within-session design is widely applied and accepted in classroom-based formative assessment research (Hattie & Clarke, 2022).

An important methodological caveat concerns potential *testing effects*: given that the pretest and posttest were conducted within the same session using the same items (with randomized order), improved posttest performance may partially reflect familiarity with the quiz format or item content rather than instructional impact alone. The significantly shorter mean response time at posttest (1 min 49 sec vs. 3 min 22 sec at pretest) is consistent with this interpretation. This limitation is discussed further in Section 4. Data were collected during a single lecture session (4th meeting, Monday, February 23, 2026) in the PGPAUD Study Program, FKIP, Bengkulu University.

Participants

Participants were 25 active PGPAUD students enrolled in the Child Protection course (N = 25; 100% female; mean age approximately 20 years). All participants completed both quiz sessions on the same day within a single lecture period. Participation was embedded in regular coursework, and all students consented to the use of their anonymized data for academic reporting purposes.

The entirely female composition of the sample reflects the demographic reality of PGPAUD programs in Indonesia, where male enrollment is consistently below 5% nationally (Kemendikbudristek, 2023). While this homogeneity accurately represents the target population of prospective PAUD educators, it limits generalizability to gender-diverse or co-educational contexts. Additionally, participants' prior academic achievement and digital literacy levels were not formally assessed; all were second-year students from the same cohort, suggesting comparable academic exposure, but differential digital literacy or motivation may have contributed to individual performance variability and constitutes a limitation (see Section 4).

Instrument

Table 1. Instrument Dimensions, Item Coverage, and Theoretical Basis

No.	Conceptual Dimension	Items
1	Typology of violence (physical, psychological, neglect)	3
2	Bullying in early childhood	3
3	Economic exploitation and discrimination	2
4	Causal factors of violence	2
5	Legal basis for child protection (Law No. 23/2002; 35/2014)	3
6	Evidence-based intervention and prevention strategies	2

Note. Item construction was theoretically grounded in the conceptual frameworks applied in prior PGPAUD assessment studies. (Daryanes & Ririen, 2020; Kudri & Maisharoh, 2021). Each question carried equal weight; accuracy score = correct items / 15 × 100.

To establish content validity, the instrument was reviewed by two faculty members with expertise in child protection and early childhood education prior to administration. Each item was evaluated for conceptual alignment with the six dimensions, appropriate cognitive level (Bloom's knowledge and comprehension), and clarity of phrasing. Inter-rater agreement on item inclusion was 100%, with minor wording revisions incorporated before field administration. Internal consistency was assessed using the Kuder-Richardson Formula 20 (KR-20 = .71), indicating acceptable reliability for a 15-item diagnostic classroom instrument (Nunnally & Bernstein, 1994)(Zainuddin et al., 2020) Item difficulty indices (p-values) ranged from .28 (Evidence-Based Interventions) to 1.00 (Family Factors; Child Protection Responsibilities), with items at $p > .90$ exhibiting potential ceiling characteristics discussed in the Results section. Item discrimination indices (point-biserial correlations) ranged from $r_p^b = .18$ to $r_p^b = .64$, with the majority of items demonstrating adequate discrimination ($r_p^b > .20$), supporting the instrument's capacity to differentiate between higher- and lower-performing students (Nunnally & Bernstein, 1994).

Procedure

Quizzes were administered live through a digital platform with a time-limited format per question. The pretest session was conducted at 08:28 WIB before any in-depth instructional discussion of the session's content. Following a full lecture session covering all six conceptual dimensions, the posttest was administered at 09:24 WIB approximately one hour after the pretest using an equivalent but independently ordered quiz with the same 15 items. Item order was randomized across sessions to minimize item memory effects.

Data Analysis

Individual accuracy scores (as percentages) were extracted for all 25 participants. Normality of difference scores (posttest−pretest) was assessed via the Shapiro-Wilk test (recommended for $N < 50$). Because difference scores were normally distributed (see Results), a paired samples t-test was used as the primary inferential test. Effect size was calculated as Cohen's d; a 95% confidence interval for the mean difference was computed using the standard error of mean differences. A Wilcoxon signed-rank test was conducted as a

non-parametric confirmatory check. All analyses were computed in Python (SciPy 1.11); $\alpha = .05$.

Two analytical assumptions warrant explicit acknowledgment. First, *ceiling effects*: four indicators entered pretest at ≥96% accuracy, structurally constraining observable gains on those items regardless of instructional quality. Second, *repeated-testing assumptions*: because items were identical across sessions (randomized order), content-specific priming effects cannot be fully excluded. These considerations are addressed in Sections 1 and 4.

RESULTS AND DISCUSSION

Inferential Statistical Analysis

Prior to hypothesis testing, the Shapiro-Wilk test was applied to the distribution of difference scores. Results confirmed that the differences were approximately normally distributed ($W = 0.93$, $p = .10$), satisfying the parametric assumption for the paired t-test. Table 2 presents all inferential and descriptive statistics.

Table 2. Summary of Statistical Results: Pretest–Posttest Comparison (N = 25)

Statistical Measure	Value	Interpretation
Pretest: M (SD)	85.80 (9.41)	Before intervention
Posttest: M (SD)	96.52 (5.77)	After intervention
Mean Difference (95% CI)	10.72 [6.43, 15.01]	Improvement
Shapiro-Wilk W (differences)	0.93, p = .10	Normality confirmed
Paired t-test: t(24)	5.16, p < .001	Statistically significant
Cohen's d	1.03	Large effect size
Wilcoxon W (one-tailed)	186.0, p < .001	Confirms t-test result
Participants improved	18 (72%)	Majority gained
Participants stable	6 (24%)	No change
Participants declined	1 (4%)	*One participant*

Note. a Two-tailed p-values reported. Cohen's d = mean difference / SD of differences. 95% CI computed using standard error of mean differences.

The paired t-test revealed a statistically significant improvement from pretest ($M = 85.80$) to posttest ($M = 96.52$), $t(24) = 5.16$, $p < .001$, with a large effect size (Cohen's $d = 1.03$), confirmed by the Wilcoxon test ($W = 186.0$, $p < .001$). The pedagogical mechanisms underlying this improvement include: (1) immediate corrective feedback after each item activating rapid conceptual correction; (2) time pressure simulating real-world decision-making demands, promoting cognitive engagement; and (3) the competitive leaderboard element enhancing intrinsic motivation to review and encode correct answers (Zainuddin et al., 2020).

However, the high pretest mean (M = 85.80%) warrants attention to *ceiling effects*. Four indicators (Neglect, Early Childhood Bullying, Long-Term Impact of Bullying, Discrimination Against Children) entered pretest at ≥96% accuracy, leaving only 4 percentage points of room for measurable improvement. The constrained improvement range on these indicators likely suppressed the overall mean gain, suggesting the true instructional effect on lower-scoring domains was larger than the aggregate d = 1.03 indicates.

Accuracy by Comprehension Indicator

Table 3. Pretest and Posttest Accuracy by Comprehension Indicator (N = 25)

No.	Comprehension Indicator	Pre (%)	Post (%)	Δ (%)	p (diff.)*	Note
1	Physical Violence	80	96	+16	.80	*Improved*
2	Impact of Psychological Violence	92	100	+8	.92	*Improved*
3	Neglect	96	100	+4	.96	*Ceiling*
4	Early Childhood Bullying	96	96	0	.96	*Ceiling*
5	Long-Term Impact of Bullying	96	96	0	.96	*Ceiling*
6	Economic Exploitation	80	100	+20	.80	*High gain*
7	Discrimination against Children	96	100	+4	.96	*Ceiling*
8	Family Factors That Trigger Violence	100	96	−4	1.00	*Speed–acc.*
9	Legal Basis for Child Protection	84	96	+12	.84	*Improved*
10	Majority of Violent Perpetrators	88	100	+12	.88	*Improved*
11	Bullying Prevention Methods (PAUD)	92	96	+4	.92	*Improved*
12	Impact of Systemic Discrimination	68	88	+20	.68	*High gain*
13	Individual Risk Factors of Offender	92	100	+8	.92	*Improved*
14	Evidence-Based Interventions	28	88	+60	.28	*High gain*
15	Child Protection Responsibilities	100	96	−4	1.00	*Speed–acc.*
Avg	Class Average	86	97	+11	.86	—

*Note. *p = item difficulty at pretest (proportion correct). □ = ceiling-constrained indicator (p ≥ .96; ≤4 pp gain possible). □ = highest-gain domain. Speed–acc. = marginal decline attributable to speed–accuracy trade-off. Source: PGPAUD FKIP Bengkulu University, February 23, 2026.*

The item difficulty column (p-values) reveals that items with p > .90 at pretest indicators 3, 4, 5, 7, 8, and 15 exhibited ceiling characteristics, meaning observed gains were structurally constrained regardless of instructional quality (Nunnally & Bernstein, 1994). Interpretation of non-gains on these indicators must account for this item-level ceiling constraint rather than attributing variance solely to instructional factors.

Evidence-Based Interventions: High-Gain Learning Domain

The indicator 'Evidence-Based Interventions' increased from 28% to 88% (+60 pp). The very low pretest score (p = .28) reflects limited prior exposure to this technically specific domain. This high-gain pattern large knowledge gap, rapid uptake following targeted input demonstrates the capacity of real-time quizzes to surface latent conceptual deficits and

immediately redirect instructional focus, a core formative assessment function (Firdiansyah & Pamungkas, 2021; Salas-Pilco et al., 2022).

Economic Exploitation and Systemic Discrimination

Economic Exploitation of Children improved from 80% to 100% (+20 pp), and Impact of Systemic Discrimination' from 68% to 88% (+20 pp). These domains are frequently underrepresented in conventional PAUD curricula (UNICEF, 2023). The persistence of the lowest posttest score on systemic discrimination (88%) indicates that structural mechanisms of inequality require sustained contextual pedagogy beyond single-session quiz formats integrating local case studies and critical social analysis (Mattawang & Syarif, 2023).

Physical Violence and Legal Basis

Physical Violence improved +16 pp (80%→96%) and Legal Basis for Child Protection +12 pp (84%→96%), reflecting successful consolidation of foundational knowledge. Mastery of the legal basis (Law No. 23/2002; Law No. 35/2014) is a professionally distinguishing competency, as inadequate legal knowledge impedes violence reporting in school environments (Winarni et al., 2021).

Bullying: Stable Prior Knowledge and Ceiling Constraints

Early Childhood Bullying and Long-Term Impact of Bullying remained stable at 96% across both sessions. Ceiling-adjacent stability ($p = .96$ at pretest) indicates strong prior knowledge, consistent with the widespread incorporation of anti-bullying content in PGPAUD curricula (Ayuni, 2021). The absence of measurable gain on these indicators reflects item-level ceiling constraints, not an absence of instructional value with only 4 pp of room for improvement, any incremental learning was statistically undetectable. Future sessions should shift from conceptual transmission to procedural application: how educators detect early bullying indicators and implement structured, trauma-sensitive responses.

Marginal Declines: Speed–Accuracy Trade-Off

Family Factors That Trigger Violence and Child Protection Responsibilities declined marginally from 100% to 96% (−4 pp each). Starting at $p = 1.00$ and with average posttest response time (1 min 49 sec) significantly shorter than pretest (3 min 22 sec), these drops most plausibly reflect speed–accuracy trade-off in the timed format rather than genuine conceptual regression (Darmawan & Astuti, 2022; Maraza-Quispe et al., 2024).

Individual Learning Trajectories

Table 4. Individual Participant Accuracy Scores: Pretest, Posttest, and Gain (N = 25)

No.	Participant	Pretest (%)	Posttest (%)	Gain (%)	Profile
1	A F S	87	100	+13	Improver
2	A & C	67	100	+33	High Gain
3	A P H	93	93	0	Stable
4	A M	93	100	+7	Improver

5	A D F	87	100	+13	Improver
6	A W	73	87	+14	Improver
7	A P S	73	100	+27	High Gain
8	A R A	93	93	0	Stable
9	D S	87	100	+13	Improver
10	D A	93	93	0	Stable
11	D F	93	100	+7	Improver
12	G M S	93	100	+7	Improver
13	Mt	93	100	+7	Improver
14	N P	93	93	0	Stable
15	N M	93	100	+7	Improver
16	N F	87	87	0	Stable
17	R CA	67	87	+20	High Gain
18	R A P	80	100	+20	High Gain
19	R E	100	100	0	Ceiling
20	S F	87	100	+13	Improver
21	T V V	87	100	+13	Improver
22	T P	73	100	+27	High Gain
23	Fri	87	80	−7	Decliner
24	Wr	73	100	+27	High Gain
25	W P A	93	100	+7	Improver
Mean	Mean ± SD	85.80±9.41	96.52±5.77	+10.72±10.38	—

Note. Names abbreviated for anonymity. High Gain = pretest < 75%; Ceiling = pretest = 100%; Decliner = posttest < pretest.

Table 4, indicates of 25 participants, 18 (72%) improved, 6 (24%) were stable, and 1 (4%) declined. The inverse relationship between initial score and gain participants entering at 67% reaching 100% (+33 pp); those at 73% reaching 100% (+27 pp) is consistent with Vygotsky's (1978) zone of proximal development: learners with the greatest knowledge gaps benefit most from structured instructional scaffolding.

Six participants showed no improvement despite the intervention. Three possible explanations apply: (1) near-ceiling pretest scores (93%) left minimal room for measurable gain a ceiling effect rather than absence of learning; (2) one participant (R E, 100% pretest) was already at mastery; (3) one participant (N F, 87%→87%) may reflect motivational disengagement or format fatigue. The single decliner (Fri, 87%→80%, −7 pp) most plausibly reflects situational disruption time anxiety or attentional lapse rather than genuine regression (Risma & Satria, 2020).

Several confounding variables may have moderated individual trajectories: differential familiarity with digital quiz platforms, pre-existing content motivation, and within-session attention levels were not controlled. Future studies should incorporate brief baseline surveys of digital literacy and motivation to disentangle these influences from content-specific learning gains.

Discussion

The findings are broadly consistent with a substantial body of research documenting positive effects of digital interactive quiz platforms. Özdemir, (2025) comprehensive meta-

analysis confirms consistent positive effects on engagement, motivation, and conceptual learning across diverse contexts. Wang & Tahir, (2020) similarly concluded that Kahoot-based learning reliably increases knowledge acquisition. The large effect size (d = 1.03) exceeds the average d = 0.30–0.60 reported in prior platform-specific studies.

However, a balanced reading of the literature is essential. Several studies report null or mixed results. (Licorish et al., 2018) found that Kahoot-based instruction, while improving engagement and perceived enjoyment, did not consistently produce statistically significant performance gains compared to conventional instruction across all subject areas. Pede, (2017) similarly found no significant difference in academic achievement between Kahoot users and non-users in secondary education. Özdemir, (2025) meta-analysis noted substantial heterogeneity in effect sizes, indicating that gamified learning effects are moderated by factors including subject-matter domain, instructional integration quality, and student baseline characteristics. The exceptionally large effect in the present study likely reflects a confluence of genuinely effective instructional design and the specific characteristics of the sample notably the presence of low-prior-knowledge students in a conceptually demanding new domain rather than the quiz platform alone.

The high gain on evidence-based interventions supports Zainuddin et al., (2020) argument that gamified quizzes with immediate feedback are especially effective for internalizing technically dense content students have not previously encountered. The persistence of lower scores on systemic discrimination (posttest: 88%) aligns with arguments that structural child rights violations require deeply contextual, experience-based pedagogy that single-session quiz formats cannot fully address (Mattawang & Syarif, 2023; Permana et al., 2023; Pinquart, 2021).

Limitation

Several limitations should be acknowledged when interpreting the findings. First, the absence of a control group in the one-group pretest-posttest design limits causal attribution, as improvements in scores may have been influenced not only by the quiz intervention but also by factors such as instructor-led discussion, test familiarity, or novelty effects. Consequently, the observed effect size should be interpreted as an estimate of overall within-session change rather than the independent effect of the intervention. Second, the small and homogeneous sample, consisting of 25 female students from a single institution, restricts the generalizability of the findings to other PGPAUD programs, institutions, regions, or more diverse populations. Third, several indicators showed very high pretest accuracy, creating ceiling effects that limited the potential for measurable improvement, while the use of identical items across testing sessions may have introduced testing effects associated with increased familiarity with the assessment format. Finally, the multiple-choice instrument assessed cognitive understanding only and did not capture practical competencies related to identifying, documenting, or reporting cases of child violence. Previous research has shown that such operational competencies may remain limited despite adequate conceptual knowledge, highlighting the need for future studies to incorporate performance-based assessments. Future research should therefore employ controlled experimental designs, larger

and more diverse samples, parallel test forms, and broader measures of professional competence to strengthen the validity and applicability of the findings.

Pedagogical Implications

Four actionable implications emerge. First, real-time interactive quizzes serve as effective formative diagnostic tools: pretest data should function as an indicator-level map for same-session instructional adaptation, directing additional time and concrete examples to low-scoring domains (Mansir, 2022). Second, the inverse initial score–gain relationship supports differentiated instruction: identifying students with lower baseline understanding early and providing targeted supplementary resources would maximize pedagogical equity (Kudri & Maisharoh, 2021). Third, stable bullying scores indicate that content coverage for well-known topics should shift from conceptual transmission to procedural skill development how educators recognize early behavioral signals and implement structured, trauma-sensitive intervention protocols. Fourth, quiz item design should progressively move toward higher-order objectives including case application, analysis, and policy synthesis (Daryanes & Ririen, 2020). Vignette-based items assessing applied professional judgment would serve this purpose.

A critical practical consideration is implementation feasibility. The implications above assume institutional access to stable internet connectivity, compatible devices, and student familiarity with digital platforms conditions that cannot be uniformly assumed across Indonesian PGPAUD programs, particularly in rural or underfunded institutions. Practitioners in resource-constrained settings may consider hybrid adaptations paper-based structured quiz instruments replicating the timed, diagnostic format of digital quizzes while preserving the formative assessment function. Future implementation studies should assess minimum digital infrastructure requirements and develop context-specific adaptation protocols across diverse Indonesian PGPAUD contexts.

CONCLUSION

This study concludes that real-time interactive quizzes are a promising formative assessment strategy for strengthening PGPAUD students' understanding of child violence and rights violations. Beyond supporting knowledge acquisition, the approach provides immediate diagnostic information that enables instructors to identify learning gaps and adjust instruction in real time, thereby enhancing the effectiveness of child protection education. The findings highlight the particular value of interactive quizzes in addressing complex and practice-oriented topics, while also revealing areas that require deeper pedagogical attention, especially those related to systemic and contextual dimensions of child protection. These results contribute to the growing evidence on the educational benefits of gamified formative assessment in higher education and underscore its relevance for preparing future early childhood educators to respond to child protection issues. Future studies should strengthen the evidence base through more rigorous experimental designs, larger and more diverse samples, validated instruments, and assessments that capture both knowledge retention and professional competencies.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to the students of the Early Childhood Education Teacher Education Study Program (PGPAUD), Faculty of Teacher Training and Education, Bengkulu University, who participated as subjects in this study during the Child Protection course on February 23, 2026. Their enthusiastic engagement in both the pretest and posttest sessions made this research possible.

REFERENCES

Apriani, D., & Nurhidayah, S. (2023). Kesiapan guru PAUD dalam mengajarkan materi pencegahan kekerasan seksual. *Jurnal Pendidikan Anak Usia Dini*, *12*(2), 105–117.

Ayuni, D. (2021). Pencegahan bullying dalam pendidikan anak usia dini. *Journal of Education Research*, *2*(3), 93–100. https://doi.org/10.37985/jer.v2i3.55

Campbell, D. T., & Stanley, J. C. (1963). *Experimental and quasi-experimental designs for research*. Houghton Mifflin.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.)*. SAGE Publications.

Darmawan, A., & Astuti, B. (2022). Pengembangan model edukasi pencegahan kekerasan seksual berbasis kearifan lokal untuk anak PAUD. *Jurnal Pendidikan Usia Dini*, *16*(2), 212–228.

Daryanes, F., & Ririen, D. (2020). Efektivitas penggunaan aplikasi Kahoot sebagai alat evaluasi pada mahasiswa. *Jurnal Natural Science: Jurnal Penelitian Bidang IPA Dan Pendidikan IPA*, *3*(2), 172–181. https://doi.org/10.24014/jnsi.v3i2.9283

Firdiansyah, Y., & Pamungkas, H. P. (2021). Analisis persepsi mahasiswa terhadap penggunaan Kahoot sebagai media evaluasi pembelajaran pada mata kuliah Teori Ekonomi Moneter. *JEKPEND: Jurnal Ekonomi Dan Pendidikan*, *4*(1). https://doi.org/10.26858/jekpend.v4i1.15549

Hattie, J., & Clarke, S. (2022). *Visible learning: Feedback*. Routledge. https://doi.org/10.4324/9780429485480

Kemendikbudristek. (2023). *Statistik pendidikan tinggi Indonesia 2022/2023*.

Komisi Nasional Perlindungan Anak. (2023). *Laporan tahunan kasus kekerasan terhadap anak di Indonesia. Komnas PA.*

Kudri, A., & Maisharoh, M. (2021). Pengaruh media pembelajaran Kahoot berbasis game based learning terhadap hasil belajar mahasiswa. *Edukatif: Jurnal Ilmu Pendidikan*, *3*(6), 4628–4636. https://doi.org/10.31004/edukatif.v3i6.1452

Licorish, S. A., Owen, H. E., Daniel, B., & George, J. L. (2018). Students' perception of Kahoot!'s influence on teaching and learning. *Research and Practice in Technology Enhanced Learning*, *13*(9). https://doi.org/10.1186/s41039-018-0078-8

Mansir, F. (2022). Tantangan dan ancaman anak Indonesia: Potret pendidikan nasional era digital. . *PAUDIA: Jurnal Penelitian Dalam Bidang Pendidikan Anak Usia Dini*, *11*(1). https://doi.org/10.26877/paudia.v11i1.9990

Maraza-Quispe, B., Alejandro-Oviedo, O. M., Fernandez-Gambarini, W. C., Cuadros-Paz, L., & Choquehuanca-Quispe, W. (2024). Impact of the use of gamified online tools: A study with Kahoot and Quizizz in the educational context. *International Journal of Information and Education Technology*, *14*(1), 132–140. https://doi.org/10.18178/ijiet.2024.14.1.2033

Mattawang, M. R., & Syarif, E. (2023). Dampak penggunaan Kahoot sebagai platform gamifikasi dalam proses pembelajaran. *Journal of Learning Technology*, *2*(1), 33–42. https://doi.org/10.33830/jlt.v2i1.5843

Moreira, H., & Freire, M. L. L. (2024). Promoting formative assessment with Quizizz: A classroom action research study. *Ciencia Latina Revista Científica Multidisciplinar*, *8*(2), 590–604. https://doi.org/10.37811/cl_rcm.v8i2.10511

Muarifah, A. (2020). Identifikasi bentuk dan dampak kekerasan pada anak usia dini di Kota Yogyakarta. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, *4*(2), 757–765. https://doi.org/10.31004/obsesi.v4i2.451

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory (3rd ed.)*. McGraw-Hill. https://doi.org/doi/10.1177/014662169501900308

Özdemir, E. (2025). Kahoot! game-based digital learning platform: A comprehensive meta-analysis. *Journal of Computer Assisted Learning*, *41*(1), 1–22. https://doi.org/10.1111/jcal.13084

Pede, J. (2017). *The effects of the online game Kahoot on science vocabulary acquisition*. Theses and Dissertations. 2405. https://rdw.rowan.edu/etd/2405

Permana, P., Permatawati, I., & Khoerudin, E. (2023). Foreign language learning gamification using Quizizz: A systematic review based on students' perception. *Eralingua: Jurnal Pendidikan Bahasa Asing Dan Sastra*, *7*(2), 233. https://doi.org/10.26858/eralingua.v7i2.23969

Risma, D. , S., & Satria, D. (2020). Pengembangan media edukasi perlindungan anak untuk mengurangi kekerasan pada anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, *4*(1), 448–462. https://doi.org/10.31004/obsesi.v4i1.322

Salas-Pilco, S. Z., Yang, Y., & Zhang, Z. (2022). Student engagement in online learning in Latin American higher education during the COVID-19 pandemic: A systematic review. *British Journal of Educational Technology*, *53*(3), 593–619. https://doi.org/10.1111/bjet.13190

UNICEF. (2023). *Ending violence against children*. https://www.unicef.org/eca/reports/focus-ending-violence-against-children-2024

Wang, A. I., & Tahir, R. (2020). The effect of using Kahoot! for learning – A literature review. *Computers & Education*, *149*. https://doi.org/10.1016/j.compedu.2020.103818

Winarni, S., Waluyo, A., & Primastuti, E. (2021). Model kolaborasi multipihak dalam pencegahan dan penanganan kekerasan seksual pada anak. *Jurnal Kebijakan Sosial Dan Perlindungan Anak*, *10*(1), 45–60.

Zainuddin, Z., Shujahat, M., Haruna, H., & Chu, S. K. W. (2020). The role of gamified e-quizzes on student learning and engagement: An interactive gamification solution for a formative assessment system. *Computers & Education*, *145*. https://doi.org/10.1016/j.compedu.2019.103729