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Improving Teachers' Knowledge of Designing Deep Learning Through an Ethnopedagogy-Based E-LKPD and Zep Quiz Program in Junior High School

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ABSTRACT

Competency in designing deep learning is essential for implementing the Merdeka Curriculum, yet teachers in 3T (frontier, outermost, underdeveloped) regions have limited access to sustained professional development. Preliminary interviews showed 16 of 20 teachers (80%) could not integrate local wisdom into lesson design. This study examined improvement in teachers' knowledge of designing deep learning after a programme using ethnopedagogy-based E-LKPD integrated with Zep Quiz. A pre-experimental one-group pretest-posttest design was applied to 20 teachers at SMP Negeri 2 Tiakur, Maluku Barat Daya, through total sampling. The programme comprised eight sessions in three stages totalling 420 minutes. Data from a 20-item knowledge test, observation sheet, response questionnaire, and Zep Quiz were analysed using the Wilcoxon signed-rank test (primary), paired t-test, effect sizes, and N-Gain. Mean knowledge scores rose from 7.00 to 14.45 ($Z = -3.94$, $p < 0.001$, $r = 0.88$) with large effects ($dz = 3.61$, $dav = 2.93$) and a moderate mean N-Gain of 0.59. Engagement reached 94.25% (high) and teacher responses 92.50% (very practical). The programme is associated with knowledge improvement within the group, but causal effectiveness cannot be established without a control group. Implications: this low-cost seven-hour programme offers a professional development alternative for 3T schools, pending tests with comparison designs.

Key Word *E-LKPD, Ethnopedagogy, Zep Quiz, Teacher Knowledge, Deep Learning.*
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INTRODUCTION

Designing deep learning is a key teacher competence in implementing the Merdeka Curriculum (Asyauqiya et al., 2025). Lesson planning in many schools remains administrative and content-driven rather than student-centred and locally grounded (Lawani et al., 2026). This is more pronounced in 3T regions (frontier, outermost, and underdeveloped), where access to sustained training and supervision is limited, including Maluku Barat Daya (Ahqaf & Ismail, 2025; Prima et al., 2025; Putri & Haifaturrahmah, 2025; Rumtutuly et al., 2024; Sugiarto et al., 2025). Preliminary interviews at SMP Negeri 2 Tiakur in March 2025

showed that 16 of 20 teachers (80%) could not design lessons integrating local culture and wisdom.

Deep learning is meaningful, mindful, and joyful (Elbashbishy, 2024; Haq & Prasetiyo, 2025). It emphasises reflective, contextual experiences and promotes higher-order thinking and problem solving (Rahman et al., 2026; Setiadini & Kurino, 2025). Teachers therefore need to link academic concepts authentically to students' lived realities (Rosidah et al., 2026). This competence has two layers: conceptual and procedural knowledge of design principles, and design performance in the form of concrete lesson plans. This study measured only the first layer.

Three research areas are relevant. First, E-LKPD (Electronic Student Worksheet) helps structure learning (Nurtanto & Suneki, 2024), but it is usually designed for students, not as a teacher learning tool. Second, ethnopedagogy integrates local cultural values into learning (Ariani, 2025). In mathematics, it is known as ethnomathematics, using cultural artefacts and practices as concept contexts (Habsyi et al., 2025; Rosa & Orey, 2021). Third, digital assessment platforms such as Zep Quiz give fast, interactive, data-based feedback (Hilmi & Jasiah, 2025; Raudoh & Kusumastuti, 2025; Sabillillah et al., 2025), consistent with formative assessment, which places feedback at the core of learning regulation (Black & Wiliam, 1998; Rahmat & Safitri, 2025; Sabir, 2026; Saidah & Muhid, 2025).

Effective professional development focuses on content, engages participants actively, is collaborative, and is supported by modelling, coaching, feedback, and reflection over time (Darling-Hammond et al., 2017). Mentoring based on coaching is associated with better teaching practice (Gani et al., 2024). Programme mechanisms matter more than structural features (Bobby et al., 2025; Indrawati, 2025), and experiential learning theory holds that professional learning develops through direct experience and reflection (Kolb, 2014).

To the authors' knowledge, studies combining ethnopedagogy-based E-LKPD from Maluku Barat Daya with Zep Quiz to improve teachers' competence in designing deep learning remain scarce. This study assumes the three components are complementary: E-LKPD as a deep learning scaffold, ethnopedagogy as local cultural context, and Zep Quiz as formative feedback. It tests the improvement in teachers' knowledge of designing deep learning after the programme and analyses N-Gain, engagement, teacher responses, and Zep Quiz scores.

RESEARCH METHOD

The object of the study was teachers' knowledge of designing deep learning. The study ran for one semester in the 2025/2026 academic year at SMP Negeri 2 Tiakur, Maluku Barat Daya Regency, a 3T area. This quantitative study used a pre-experimental one-group pretest-posttest design (Creswell & Creswell, 2017). All data were primary. This design was chosen because a control group was not feasible, but it cannot separate programme effects from threats to internal validity such as maturation, testing effects, and history (Marsden & Torgerson, 2012).

Participants were all 20 teachers of SMP Negeri 2 Tiakur (total sampling), teaching various subjects with 1 to 15 years of experience. The preliminary interviews were not research data. The school and teachers consented to mentoring and publication, including photographs, after the study was explained. The programme had eight sessions in three stages: introduction to deep learning and ethnopedagogy (session 1, 60 minutes); training in developing locally contextualised E-LKPD with Canva (session 2, 180 minutes); and mentoring in implementing lesson tools (sessions 3 to 8, 30 minutes each). Zep Quiz served as formative assessment at the end of every session. Total duration was 420 minutes (seven hours), with the researchers as trainers and mentors.

E-LKPD ethnopedagogy content drew on Maluku Barat Daya local wisdom: lutur batu, waji jagung, gogos, and woven motifs (Mathematics); Benteng Den Haan and Gereja Tua Patti (Social Studies); shallots and the Moa buffalo (Science); and the legend of Gunung Kerbau and traditional pantun (Indonesian Language). Data came from four instruments (Table 1). The knowledge test was given before the first session (pretest) and after the last (posttest), 45 minutes each. To reduce testing effects, the tests were parallel forms built from the same blueprint with different wording, though their difficulty equivalence was not analysed. Correct answers scored 1 and incorrect 0; the questionnaire used a 1 to 4 scale. Zep Quiz items differed by session, so scores across sessions are not equivalent.

Table 1.
Research Instruments and Specifications

No.	Instrument	Items	Maximum Score	Function
1	Teacher knowledge test (multiple choice)	20	20	Measures knowledge of designing deep learning (pretest, posttest)

No.	Instrument	Items	Maximum Score	Function
2	Observation sheet	5 aspects	20 per meeting	Monitors participation, collaboration, E-LKPD implementation, Zep Quiz use, and reflection
3	Teacher response questionnaire (Likert)	10	40	Measures perception, ease of use, usefulness, and applicability
4	Zep Quiz (digital multiple choice)	10	10	Formative assessment after each session

Three validators (subject matter, pedagogy, and culture and ethnopedagogy) rated test content validity on a 1 to 4 scale, analysed with Aiken's V in Equation 1 (Aiken, 1985).

RESULT AND DISCUSSION

Results

All eight test indicators obtained Aiken's V = 1.000 and were valid without revision. The observation sheet showed ICC = 0.914, good reliability by the lower bound of the 95% CI (0.799). The questionnaire obtained α = 0.806, but seven of 10 items received maximum scores from all teachers, so alpha reflects only the three applicability items (Table 3).

Table 2.
Instrument Validity and Reliability

Instrument	Index	Result	Decision
Knowledge test (3 validators, 8 indicators)	Aiken's V	1.000 for all indicators	Valid
Observation sheet (2 observers, 20 teachers)	ICC, two-way random effects, absolute agreement, single measures	0.914; 95% CI [0.799–0.965]	Good reliability
Teacher response questionnaire (10 items, N = 20)	Cronbach's alpha	0.806; 7 items without variation	Inconclusive

Changes in Teacher Knowledge

Table 4 gives individual results. Pretest scores averaged 7.00 (*SD* = 1.86; median 7.0) and posttest scores 14.45 (*SD* = 3.22; median 15.0). The mean difference was 7.45 points (*SD* = 2.06), and the pretest-posttest correlation was *r* = 0.80. Nineteen teachers gained five points or more, whereas G20 gained one point (6 to 7; N-Gain 0.07).

Table 3.
Teacher Pretest, Posttest, Difference, and N-Gain Scores (*n* = 20)

Teacher	Pretest	Posttest	Difference	N-Gain	Category
G1	4	12	8	0.50	Moderate
G2	3	9	6	0.35	Moderate
G3	5	14	9	0.60	Moderate
G4	6	16	10	0.71	High
G5	8	15	7	0.58	Moderate
G6	10	17	7	0.70	High
G7	7	13	6	0.46	Moderate
G8	8	16	8	0.67	Moderate
G9	6	14	8	0.57	Moderate
G10	10	20	10	1.00	High
G11	8	16	8	0.67	Moderate
G12	7	15	8	0.62	Moderate
G13	5	10	5	0.33	Moderate
G14	7	15	8	0.62	Moderate
G15	9	19	10	0.91	High
G16	7	14	7	0.54	Moderate
G17	8	16	8	0.67	Moderate
G18	9	18	9	0.82	High
G19	7	13	6	0.46	Moderate
G20	6	7	1	0.07	Low
Mean	**7.00**	**14.45**	**7.45**	**0.59**	**Moderate**
SD	1.86	3.22	2.06	-	-
Minimum	3	7	1	0.07	-
Maximum	10	20	10	1.00	-

Shapiro-Wilk tests showed normal pretest and posttest scores but non-normal differences ($W = 0.857$, $p = 0.007$). The Wilcoxon *signed-rank* test, the

primary analysis, showed a significant pretest-posttest difference ($Z = -3.94$, $p < 0.001$; $r = 0.88$). The complementary paired t-test was significant, $t(19) = 16.14$, $p < 0.001$, with a 95% CI for the mean difference of 6.48 to 8.42. Effect sizes were $d_z = 3.61$ and $d_{av} = 2.93$ (Table 5).

Table 4.
Assumption Tests, Difference Tests, and Effect Sizes for Knowledge Scores (n = 20)

Test	Data	Statistic	*p*	Remark
Shapiro-Wilk	Pretest	$W = 0.965$	0.637	Normal
Shapiro-Wilk	Posttest	$W = 0.960$	0.550	Normal
Shapiro-Wilk	Difference score	$W = 0.857$	0.007	Not normal
Wilcoxon *signed-rank*	Posttest and pretest	$Z = -3.94$, $r = 0.88$	< 0.001	Significant, large effect
Paired t-test	Posttest and pretest	$t(19) = 16.14$	< 0.001	Significant
95% CI	Mean difference	6.48 to 8.42		
Effect size	Posttest and pretest	$d_z = 3.61$, $d_{av} = 2.93$		Large

In the sensitivity analysis without G20, the mean difference was 7.79 points (standard deviation 1.44) and differences were normally distributed ($W = 0.932$, $p = 0.192$). Mean N-Gain was 0.59 (moderate), with 25.0% of teachers in the high category, 70.0% moderate, and 5.0% low (Table 6).

Table 5.
Teacher Knowledge N-Gain Distribution by Category

N-Gain Category	Number of Teachers	Percentage	Range in the Data
High (≥ 0.70)	5	25.0%	0.70 to 1.00
Moderate (0.30 to < 0.70)	14	70.0%	0.33 to 0.67
Low (< 0.30)	1	5.0%	0.07
Total	**20**	**100.0%**	**Mean 0.59 (moderate)**

Engagement and Teacher Responses

Observed engagement averaged 18.85 (SD = 1.09) of 20, or 94.25% (high). The questionnaire scored 37 of 40, or 92.50% (very practical). Perception, ease of

use, and usefulness each reached 100.00%, whereas applicability reached 75.00% (practical; Table 7).

Table 6.
Engagement Observation and Teacher Response Questionnaire Results (*n* = 20)

Component	Items	Score	Max.	Percent	Category
Engagement observation	5	18.85	20	94.25	High
Questionnaire, perception	2	8	8	100.00	Very practical
Questionnaire, ease of use	2	8	8	100.00	Very practical
Questionnaire, usefulness	3	12	12	100.00	Very practical
Questionnaire, applicability	3	9	12	75.00	Practical
Questionnaire, overall	**10**	**37**	**40**	**92.50**	**Very practical**

The programme ran in eight sessions (Figure 1).



Figure 1a. E-LKPD and Zep Quiz introduction session





Figure 1b. Mentoring in designing locally contextualised E-LKPD

Figure 1.
Implementation of Ethnopedagogy-Based E-LKPD and Zep Quiz

Zep Quiz Formative Scores

Mean Zep Quiz scores (0 to 10) rose from 4.95 in Session 1 to 8.95 in Session 8 after dipping to 4.70 in Session 2. Teachers scoring 8 or more rose from none to 19 (95.0%) in Session 8 (Table 8).

Table 7.
Zep Quiz Formative Scores by Session (n = 20)

Session	Mean	*SD*	Teachers Scoring 8 or More
1	4.95	1.15	0
2	4.70	1.03	0
3	6.00	1.38	3
4	6.40	1.50	6
5	6.75	1.68	8
6	7.55	1.73	11
7	8.75	1.02	17
8	8.95	0.89	19

Discussion

Knowledge scores rose significantly from 7.00 to 14.45, but the effect size should be read as an upper bound. The d_z of 3.61 is high mainly because gains were consistent across individuals and the pretest-posttest correlation was strong; the more conservative d_{av} (2.93) is still large. Single-group designs commonly yield large effects through maturation, testing effects, and the lack of a comparison group (Marsden & Torgerson, 2012). The low, homogeneous baseline (35% of the maximum score) left ample room for improvement, consistent with limited training access in 3T regions (Ahqaf & Ismail, 2025; Putri & Haifaturrahmah, 2025). The posttest reached 72.25% of the maximum, so mastery was incomplete. The findings support within-group improvement, not causal effectiveness.

The moderate mean N-Gain (0.59) came from a seven-hour programme, shorter than effective professional development programmes (Darling-Hammond et al., 2017; Kennedy, 2016; Sims & Fletcher-Wood, 2021). N-Gain categories were designed for class means in physics (Hake, 1998), so applying them to individuals is a convention that limits comparison across programmes.

G20 gained only one point (N-Gain = 0.07). Possible causes include digital literacy, workload, or attendance (Manullang, 2025), but these were not measured and remain hypotheses. Such variation in response is common in professional development (Afandi, 2024; Fitri et al., 2025; Zaenuri & Aimah, 2026). These teachers may need additional coaching (Kraft et al., 2018) or stronger digital literacy.

Three programme features contributed. First, direct experience designing E-LKPD is consistent with experiential learning theory (Kolb, 2014). Second, materials drew on artefacts familiar to teachers, such as lutur batu, gogos, and

woven cloth, narrowing the gap between abstract principles and classroom reality, in line with arguments that ethnopedagogy makes learning more meaningful and transferable (Ariani, 2025; Habsyi et al., 2025; Rosa & Orey, 2021). Third, the introduction, training, and mentoring supplied modelling, practice, and repeated feedback, mechanisms emphasised in professional development research (Darling-Hammond et al., 2017; Kennedy, 2016; Sims & Fletcher-Wood, 2021), and in coaching studies (Gouëdard, 2023; Kraft et al., 2018). Because the features were delivered together, their individual contributions cannot be separated.

High engagement and very practical responses show that teachers accepted the programme but do not evidence improved knowledge. Applicability (75.00%) most needs strengthening, but its determinants were not measured. The researchers' role as trainers may introduce social desirability bias.

The rise in Zep Quiz scores reflects quiz performance, not learning progress, because items differed by session. This pattern may be consistent with the principle of assessment for learning (Black & Wiliam, 1998; Wiliam, 2018) and with reports on game-based digital quizzes (Sabillillah et al., 2025; Saidah & Muhid, 2025). The Session 2 drop, the first session requiring teachers to produce E-LKPD, may reflect a heavier learning demand. The later rise may reflect growing familiarity with the quiz format.

Aiken's V of 1.000 meets the critical value (Aiken, 1985), but it involved only three validators and did not assess construct validity. The internal consistency of the 20-item test was not analysed. Cronbach's alpha of 0.806 exceeds the minimum (Nunnally & Bernstein, 1994), but it cannot be interpreted because of the ceiling effect.

This study differs from earlier work that positioned E-LKPD as a student tool (Nurtanto & Suneki, 2024), discussed ethnopedagogy conceptually (Ariani, 2025; Habsyi et al., 2025), or examined digital assessment (Gembong et al., 2025; Raudoh & Kusumastuti, 2025; Sabillillah et al., 2025; Saidah & Muhid, 2025). It positions E-LKPD as a teacher learning tool grounded in local wisdom and combined with Zep Quiz.

CONCLUSION

After the ethnopedagogy-based E-LKPD and Zep Quiz programme, the knowledge of 20 SMP Negeri 2 Tiakur teachers in designing deep learning rose from a mean of 7.00 to 14.45 (Wilcoxon $Z = -3.94$, $p < 0.001$), a mean difference of 7.45 points and a moderate N-Gain of 0.59. The gain came with high engagement (94.25%) and very practical responses (92.50%) but was uneven, as one teacher gained one point (N-Gain 0.07). The added value is a locally grounded E-LKPD

scaffold for teachers in a low-cost seven-hour model for 3T schools. The single-group design, single-school sample, and unanalysed test consistency support only a knowledge gain, not causal effectiveness or design performance. Future research should add a comparison group, rubric-based lesson plan assessment, and tracing of transfer to classroom practice.

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REFERENCES

Afandi, S. H. (2024). *Peningkatan kualitas pembelajaran melalui kompetensi literasi digital dan continuing professional development (CPD)(Analisis Sequential Explanatory pada Guru MTs. Negeri 5 Tangerang)*. Institut PTIQ Jakarta. https://repository.ptiq.ac.id/id/eprint/1614/

Ahqaf, N. A., & Ismail, I. (2025). Relevansi Filsafat Realisme dalam Pembelajaran Abad Ke-21 Melalui Pendekatan Contextual Teaching and Learning (CTL). *Jurnal Ilmiah Profesi Pendidikan*, *10*(4b), 494–500. https://doi.org/10.29303/jipp.v10i4b.4292

Aiken, L. R. (1985). Three coefficients for analyzing the reliability and validity of ratings. *Educational and Psychological Measurement*, *45*(1), 131–142.

Ariani, D. (2025). Integrasi Nilai Etnopedagogik dalam Pendidikan Multikultural di Indonesia: Systematic Literature Review. *JTPPm (Jurnal Teknologi Pendidikan Dan Pembelajaran): Edutech and Intructional Research Journal*, *12*(1). https://dx.doi.org/10.62870/jtppm.v12i1.34469

Asyauqiya, A. W. H., Roifah, Z., Maunah, B., & Trisnantari, H. E. (2025). Optimalisasi Supervisi Akademik Kepala Sekolah Untuk Meningkatkan Kompetensi Pedagogik Guru Dalam Implementasi Kurikulum Merdeka Berbasis Deep Learning. *Jurnal Manajemen Pendidikan*, *10*(4), 2184–2196. https://doi.org/10.34125/jmp.v10i4.986

Azwar, S. (2020). A. Jenis penelitian. *Metode Penelitian Psikologi*, 5–6.

Black, P., & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in Education: Principles, Policy & Practice*, *5*(1), 7–74. https://doi.org/10.1080/0969595980050102

Bobby, A., Dedi, A., & Yahya, M. (2025). Paradigma Baru Supervisi Akademik: Antara Evaluasi, Pendampingan, Dan Pemberdayaan Guru–Sebuah Tinjauan Literatur. *Jurnal Media Akademik (Jma)*, *3*(8). https://doi.org/10.62281/v3i8.2674

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.).*

Lawrence Erlbaum Associates.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). Effective teacher professional development. *Learning Policy Institute*. https://doi.org/10.54300/122.311

Elbashbishy, E. (2024). *Deep Learning in Education*. *Volume 2,*. https://doi.org/10.21608/seg.2024.269380.1000

Fitri, R. D., Supriadi, S., Ilmi, D., & Zakir, S. (2025). Evaluasi Interaktif dalam Pembelajaran Informatika: Studi Penggunaan Zep Quiz untuk Evaluasi Berbasis Game. *Intellect: Indonesian Journal of Learning and Technological Innovation*, *4*(02), 313–328. https://doi.org/10.57255/intellect.v4i02.1509

Gani, R. H. A., Supratmi, N., Ernawati, T., & Wijaya, H. (2024). Pembinaan guru inspiratif: Pelatihan supervisi akademik berorientasi coaching dalam program pendidikan guru penggerak di Lombok Timur. *Jurnal Pengabdian Masyarakat Sultan Indonesia*, *1*(1), 45–56.

Gembong, S., Yunianto, T. H. E., & Yuhanna, W. L. (2025). Pelatihan Digital Asesmen Berbantuan Artificial Intelligence Quizizz pada Guru SMP di Kabupaten Ngawi. *Jurnal Masyarakat Madani Indonesia*, *4*(4), 1627–1633. https://doi.org/10.59025/1v3sza96

Gouëdard, R. (2023). Transforming Education in Indonesia: Examining the landscape of current reforms. *Directorate for Education and Skills*, *88*, 5. https://gpseducation.oecd.org/Content/ProjectsMaterial/EPP-2023_Indonesia.pdf

Habsyi, R., Suradi, S., & Rosidah, R. (2025). Integrasi Konteks Budaya Nusantara dalam Pembelajaran Matematika: Suatu Kajian Literatur tentang Pendekatan Etnopedagogi dan Etnomatematika. *JURNAL PENDIDIKAN MIPA*, *15*(4), 1695–1707. https://doi.org/10.37630/jpm.v15i4.3657

Hake, R. R. (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. *American Journal of Physics*, *66*(1), 64–74.

Haq, M. D., & Prasetiyo, N. T. (2025). *Deep Learning sebagai Pendekatan Transformasional dalam Pendidikan : Sebuah Tinjauan Literatur*. *8*(3), 1826–1842.

Hilmi, I. N., & Jasiah, J. (2025). Revolusi Penilaian Pembelajaran: Implementasi Zep Quiz sebagai Solusi Digital Interaktif di Era Pendidikan 4.0. *At-Tarbiyah: Jurnal Penelitian Dan Pendidikan Agama Islam*, *3*(1), 608–614. https://www.journal.staittd.ac.id/index.php/at/article/view/649

Indrawati, N. (2025). *Pengaruh Supervisi Klinis Metode Coaching Dan Teknik*

Individu Terhadap Kinerja Guru Di SMPS 2 Al-Muhajirin Purwakarta Jawa Barat. *2*(2), 355–366.

Kennedy, M. M. (2016). How does professional development improve teaching? *Review of Educational Research*, *86*(4), 945–980.

Kolb, D. A. (2014). *Experiential learning: Experience as the source of learning and development*. FT press.

Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, *15*(2), 155–163.

Kraft, M. A., Blazar, D., & Hogan, D. (2018). The effect of teacher coaching on instruction and achievement: A meta-analysis of the causal evidence. *Review of Educational Research*, *88*(4), 547–588.

Lawani, H. I., Simanjorang, W., & Dewi, A. C. (2026). Analisis Implementasi Perencanaan Pembelajaran Berbasis Pembelajaran Mendalam dalam Meningkatkan Hasil Belajar Siswa pada Kurikulum Merdeka. *Didaktik: Jurnal Ilmiah PGSD STKIP Subang*, *12*(02), 287–313. https://doi.org/10.36989/didaktik.v12i02.13807

Manullang, S. G. (2025). Analisis risiko kinerja tenaga pendidik dalam era transformasi digital di sekolah. *Jurnal Ilmu Manajemen Dan Pendidikan | E-ISSN: 3062-7788*, *2*(3), 1061–1065. http://jurnal.kopusindo.com/index.php/jimp/article/view/1431

Marsden, E., & Torgerson, C. J. (2012). Single group, pre-and post-test research designs: Some methodological concerns. *Oxford Review of Education*, *38*(5), 583–616.

Nunnally, J., & Bernstein, I. (1994). *Psychometric Theory 3rd edition (MacGraw-Hill, New York)*.

Nurtanto, Y., & Suneki, S. (2024). Penggunaan Lembar Kerja Peserta Didik (Lkpd) Berbasis Software Liveworksheet Untuk Meningkatkan Hasil Belajar Peserta Didik. *Didaktik: Jurnal Ilmiah PGSD STKIP Subang*, *10*(2), 1479–1493. https://doi.org/10.36989/didaktik.v10i2.2955

Prima, A., Komariyah, L., Subagiyo, L., & Warman, W. (2025). Menata ulang manajemen sekolah menengah kejuruan di tengah kesenjangan mutu dan akses antara SMK kota dan desa. *Journal of Instructional and Development Researches*, *5*(3), 277–291. https://doi.org/10.53621/jider.v5i3.533

Putri, L. R., & Haifaturrahmah, H. (2025). Tantangan dan kesulitan pendidik pada masa kini. *Action Research Journal Indonesia (ARJI)*, *7*(4), 3049–3067. https://doi.org/10.61227/arji.v7i4.596

Rahman, N. A. A., Djollong, A. F., Kharis, M., Rondhiyah, S., & Wahyuni, M. (2026). Pengembangan strategi pembelajaran kognitif berbasis HOTS

(higher order thinking skills) pada mata pelajaran Pendidikan Agama Islam. *Jurnal Manajemen Pendidikan*, *11*(1), 1174–1182. https://doi.org/10.34125/jmp.v11i1.1816

Rahmat, A., & Safitri, A. (2025). URGENSI ASESMEN FORMATIF DALAM MENINGKATKAN KUALITAS PEMBELAJARAN ABAD 21. *Didaktik: Jurnal Ilmiah PGSD STKIP Subang*, *11*(02), 221–229. https://doi.org/10.36989/didaktik.v11i02.6005

Raudoh, S., & Kusumastuti, F. A. (2025). Pengaruh pelatihan guru terhadap profesionalisme guru sekolah dasar. *Social, Humanities, and Educational Studies (SHES): Conference Series*, *8*(3), 1847–1855. https://jurnal.uns.ac.id/SHES/article/view/107449

Riduwan, M. B. A. (2003). Dasar-dasar statistika. *Bandung: Alfabeta*.

Rosa, M., & Orey, D. C. (2021). An Ethnomathematical Perspective of STEM Education in a Glocalized World. *Bolema*, *35*(70), 840–876. https://doi.org/10.1590/1980-4415V35N70A14

Rosidah, A., Nurhayati, D., Setiawan, R., Rodiah, R., & Mawarni, E. (2026). Implementasi Asesmen Autentik Berbasis Kompetensi dalam Pembelajaran MIPA pada Kurikulum Merdeka. *Wilangan: Jurnal Inovasi Dan Riset Pendidikan Matematika*, *7*(1), 8–23. https://dx.doi.org/10.62870/wjirpm.v7i1.37444

Rumtutuly, F., Watimury, I., Studi, P., Kampus, D., Pattimura, U., Artikel, I., Sekolah, M., Guru, P., & Education, J. (2024). *Pengaruh Profesionalisme Guru dan Manajemen Pendidikan Terhadap Kualitas Pendidikan DI SD*. *12*(2), 518–523.

Sabillillah, N., Junita, S., Desilla, T., & Sesmiarni, Z. (2025). Evaluasi Pembelajaran Informatika Di Era Digital: Analisis Efektivitas Asesmen Berbasis Teknologi. *KOLONI*, *4*(4), 51–62. https://doi.org/10.31004/koloni.v4i4.777

Sabir, A. (2026). INTEGRASI ARTIFICIAL INTELLIGENCE DALAM ASESMEN PEMBELAJARAN BAHASA INDONESIA: PELUANG DAN TANTANGAN: INTEGRATION OF ARTIFICIAL INTELLIGENCE IN INDONESIAN LANGUAGE LEARNING ASSESSMENT: OPPORTUNITIES AND CHALLENGES. *AUFKLARUNG: Jurnal Kajian Bahasa, Sastra Indonesia, Dan Pembelajarannya*, *5*(3), 10–20. https://doi.org/10.51574/aufklarung.v5i3.4956

Saidah, A., & Muhid, A. (2025). Transformasi evaluasi pendidikan di era digital: integrasi asesmen autentik dan learning analytics. *Action Research Journal Indonesia (ARJI)*, *7*(4), 3142–3155. https://doi.org/10.61227/arji.v7i4.608

Setiadini, R., & Kurino, Y. D. (2025). Analisis Hubungan Kemampuan Tingkat Tinggi dan Pendekatan Deep Learning pada Pembelajaran IPA Sekolah

Dasar. *Journal of Innovation in Primary Education*, *4*(2), 1–13. https://www.ejournal.unma.ac.id/index.php/jipe/article/view/16891

Sims, S., & Fletcher-Wood, H. (2021). Identifying the characteristics of effective teacher professional development: A critical review. *School Effectiveness and School Improvement*, *32*(1), 47–63.

Sugiarto, S., Souhoka, R., Wattimury, I., Kilikily, C. C., Umarella, M. I. S., Sairiltiata, S., Rumtutuly, F., & Johansz, D. (2025). *Pelatihan Pemanfaatan Quizizz dan Kahoot ! dalam Rangka Peningkatan Literasi Digital Guru pada Evaluasi Pembelajaran Interaktif*. *4*(4), 900–905.

Wiliam, D. (2018). *Assessment for learning: meeting the challenge of implementation*. Taylor & Francis.

Zaenuri, A. L., & Aimah, S. (2026). Faktor-Faktor Prediktor Pengembangan Sumber Daya Manusia yang Efektif dalam Pendidikan Islam: Bukti Empiris dari Guru Madrasah Menggunakan Analisis Regresi. *An Najah (Jurnal Pendidikan Islam Dan Sosial Keagamaan)*, *5*(1), 601–612. https://journal.nabest.id/index.php/annajah/article/view/892/547