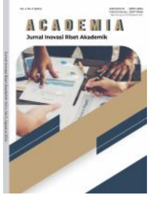

ACADEMIA: Jurnal Inovasi Riset Akademik
Vol. 6, No. 3, Juni-Agustus 2026
e-ISSN : 2807-1808 | p-ISSN : 2807-2294
Online Journal System https://jurnalp4i.com/index.php/academia

Jurnal P4I

THE EFFECT OF DEEP LEARNING-BASED TECHNICAL GUIDANCE ON TEACHING QUALITY AND STUDENT LEARNING OUTCOMES IN JUNIOR HIGH SCHOOLS IN PABUARAN DISTRICT

Yoga Rahayu[1], Ine Rahayu Purnamaningsih[2], Yuyun Yuningsih[3]
[123] Master Program in Educational Administration, Universitas Singaperbangsa Karawang
Email : yogarahayu83@gmail.com , ine.rahayu@fkip.unsika.ac.id ,
yuningsihyuyun2809@gmail.com

Diterima: *28/5/2026*; Direvisi: *10/6/2026*; Diterbitkan: *18/7/2026*

ABSTRAK

Peningkatan kualitas pendidikan sangat dipengaruhi oleh kualitas guru dalam melaksanakan proses pembelajaran. Salah satu upaya untuk meningkatkan kompetensi guru adalah melalui Bimbingan Teknis (Bimtek) Berbasis Deep Learning. Penelitian ini bertujuan untuk menganalisis pengaruh pelatihan berbasis deep learning terhadap kualitas mengajar dan hasil belajar siswa di sekolah menengah pertama (SMP) di Kecamatan Pabuaran, Kabupaten Subang. Penelitian ini menggunakan pendekatan kuantitatif dengan metode survei yang melibatkan 60 guru dari lima sekolah (empat negeri dan satu swasta). Data dikumpulkan menggunakan kuesioner skala Likert dan dianalisis menggunakan regresi linear. Hasil penelitian menunjukkan bahwa pelatihan berbasis deep learning memiliki pengaruh yang positif dan signifikan terhadap kualitas mengajar dan hasil belajar siswa, dengan koefisien determinasi sebesar 0,56. Hal ini menunjukkan bahwa pelatihan berkontribusi sebesar 56% terhadap peningkatan kedua variabel tersebut. Temuan ini menyarankan bahwa pengembangan program pelatihan yang berkelanjutan dan disesuaikan dengan kebutuhan guru sangat penting untuk meningkatkan kualitas pembelajaran di sekolah.
Kata Kunci: *Training, Deep Learning, Kualitas Mengajar, Hasil Belajar*

ABSTRACT

Improving the quality of education is strongly influenced by the quality of teachers in implementing the learning process. One effort to enhance teacher competence is through Deep Learning-Based Technical Guidance (Bimtek). This study aims to analyze the effect of deep learning-based training on teaching quality and student learning outcomes in junior high schools in Pabuaran District, Subang Regency. The study used a quantitative approach with a survey method involving 60 teachers from five schools (four public and one private). Data were collected using a Likert-scale questionnaire and analyzed using linear regression. The results indicate that deep learning-based training has a positive and significant effect on teaching quality and student learning outcomes, with a coefficient of determination of 0.56. This shows that the training contributes 56% to the improvement of both variables. These findings suggest that continuous development of training programs tailored to teacher needs is essential to improve the quality of learning in schools.
Keywords: *Training, Deep Learning, Teaching Quality, Learning Outcomes*

INTRODUCTION

Improving the quality of national education is one of the main components in the global strategic development blueprint to elevate the dignity of a progressive society. Within the framework of formalized academic institutions, the primary determinant of this structural

https://doi.org/10.51878/academia.v6i3.11651

ACADEMIA: Jurnal Inovasi Riset Akademik
Vol. 6, No. 3, Juni-Agustus 2026
e-ISSN : 2807-1808 | p-ISSN : 2807-2294
Online Journal System https://jurnalp4i.com/index.php/academia

enhancement is heavily rooted in the tactical proficiency of instructional delivery demonstrated by classroom instructors. Professional educators are no longer expected to operate as passive transmitters of factual documentation but must actively transform into dynamic facilitators capable of engineering holistic, *student-centered learning* environments. Despite this noble educational vision, contemporary scholastic reviews consistently demonstrate that teachers' pedagogical competencies in implementing highly innovative instructional methodologies still require substantial refinement and strategic intervention. This overarching deficiency in classroom management inevitably leads to a decline in student engagement, compromises the depth of intellectual absorption, and ultimately hinders the realization of national curriculum objectives, thereby indicating that current educational practices are still poorly aligned with the pressing demands of modern twenty-first-century societal progression (Ditha et al., 2026; Kaushik et al., 2024; Olawunmi, 2025; Pasco & Estera, 2026).

To eradicate these instructional boundaries effectively, the implementation of systemic professional development initiatives, such as comprehensive technical guidance frameworks based on the principles of *deep learning*, has been introduced. This specialized training regimen is engineered to augment the capability of educators to orchestrate highly reflective, contextual, and deeply concept-oriented classroom sessions that resonate with the practical experiences of the learners. The pedagogical paradigm of *deep learning* emphasizes a thorough, multi-dimensional understanding of complex subject matter while cultivating active cognitive participation among students throughout the entire educational cycle. This operational philosophy aligns harmoniously with the core tenants of constructivist theory, which explicitly establishes the learner as the primary, active subject of knowledge construction rather than a mere recipient of abstract definitions (Bell & Cui, 2022; Hajirasouli & Banihashemi, 2022). By empowering teachers with advanced instructional design tools and diagnostic skill sets, these targeted training interventions are theoretically projected to modernize conventional teaching mentalities, stimulate intellectual curiosity, and establish a firm foundation for sustainable scholastic growth across the national education sector.

In an idealized educational ecosystem, the completion of such advanced technical training programs should naturally result in an immediate, uniform upgrade of instructional quality and a concurrent surge in student academic performance. Instructors are envisioned to seamlessly integrate reflective teaching models, utilize digital assets fruitfully, and cultivate inclusive classroom spaces where critical thinking and collaborative problem-solving thrive effortlessly. However, the objective reality observed across the practical academic landscape reveals a profound and troubling dichotomy between these conceptual ideals and the actual execution within school environments. The implementation of newly acquired training methodologies remains noticeably uneven and fragmented, as many certified educators quickly revert to rigid, lecture-based routines due to deeply entrenched traditional habits. This noticeable gap between theoretical training inputs and actual classroom outputs indicates that the mere presence of professional development seminars is insufficient to guarantee pedagogical transformation, thereby emphasizing the urgent need for a more granular, contextualized investigation into the structural factors that impede or facilitate the successful transfer of training concepts (Borda et al., 2020; Donath et al., 2025; Koutsika et al., 2023; Rohlmann, 2026).

This systemic instructional mismatch is vividly illustrated within the specific operational climate of state junior high schools throughout Pabuaran District, Subang Regency, where the adoption of innovative teaching approaches faces severe localized constraints. While local educational authorities have consistently distributed training modules to various schools

https://doi.org/10.51878/academia.v6i3.11651

ACADEMIA: Jurnal Inovasi Riset Akademik
Vol. 6, No. 3, Juni-Agustus 2026
e-ISSN : 2807-1808 | p-ISSN : 2807-2294
Online Journal System https://jurnalp4i.com/index.php/academia

in the region, the actual classroom dynamics show a distinct lack of reflective and student-oriented practices. Teachers frequently struggle to translate the sophisticated tenets of *deep learning* into daily lesson plans, resulting in fragmented delivery that fails to capture the cognitive interest of the student demographic. Furthermore, the absence of structured post-training mentorship and the persistence of traditional administrative burdens heavily discourage educators from departing from conventional, memory-oriented evaluation methods. Consequently, the massive potential of constructivist education remains largely unfulfilled in these institutions, leaving a significant portion of the student body disengaged and unable to achieve optimal conceptual mastery over their designated curricula (Arega & Hunde, 2025; Pereira et al., 2024; Saragih et al., 2025).

Confronting this intricate cluster of professional development challenges, this qualitative descriptive investigation introduces a distinct academic novelty by conducting a comprehensive, empirical evaluation of training effectiveness within a highly specific geographical and institutional framework. Since this macro-level study focuses broadly on public junior high schools across Pabuaran District rather than being isolated within a single specific school or academic year, designated institutional titles and specific calendar parameters are deliberately omitted from this narrative. The core innovation of this research lies in its methodical approach to analyzing the direct causal relationship between technical guidance inputs, the subsequent evolution of teaching quality, and the resulting changes in student learning outcomes. By bridging the critical gap between professional training theories and empirical field realities, this study establishes a structured framework to identify localized barriers to pedagogical adaptation. The final implications of this research are projected to deliver an invaluable blueprint for curriculum designers and educational policymakers to optimize the long-term efficiency of teacher training programs nationwide.

METHODS

This academic study implements a quantitative research approach featuring a cross-sectional survey method to evaluate the direct relationship between specialized teacher professional development and educational outputs. The operational research was physically situated within five selected academic institutions, which accommodated four public schools and one private school, all located across Pabuaran District in Subang Regency. The total target population was determined through a strict purposive sampling technique based on active participation in the professional guidance sessions. This selection process resulted in a final sample size of exactly 60 junior high school teachers who completed the entire educational program. The structural framework for this empirical evaluation maps out three core operational variables, starting with deep learning-based technical guidance as the single independent variable. This operational input is directly tied to two separate dependent outcomes, which are classified as instructional teaching quality and student learning outcomes. This setup allows for a rigorous mathematical examination of the current educational model without relying on purely abstract conceptual hypotheses.

The physical research instrument developed for this field evaluation consisted of a standardized Likert-scale questionnaire packed with multiple operational indicators to capture instructor observations. Before starting the widespread distribution, the questionnaire items underwent rigorous metric evaluation, testing for structural validity and internal reliability using Pearson correlation analysis and the Cronbach's Alpha coefficient. The primary empirical data collected from the 60 respondents were calculated utilizing basic parametric statistics through dedicated computing software. The core causal relationship was determined using

https://doi.org/10.51878/academia.v6i3.11651

ACADEMIA: Jurnal Inovasi Riset Akademik
Vol. 6, No. 3, Juni-Agustus 2026
e-ISSN : 2807-1808 | p-ISSN : 2807-2294
Online Journal System https://jurnalp4i.com/index.php/academia

linear regression techniques with a pre-established significance level of alpha = 0.05. Additionally, the operational dataset successfully passed the prerequisite assumptions for parametric testing, as verified by a Kolmogorov-Smirnov normality test value of 0.200 and a Levene's homogeneity test value of 0.268. The administrative execution of this field project adhered strictly to professional institutional ethics, protecting individual privacy by maintaining absolute participant confidentiality and ensuring that all teacher involvement remained entirely voluntary throughout the project.

RESULTS AND DISCUSSION

Results

The validity and reliability tests showed that all instrument items were valid and reliable, so they were suitable for further analysis. Linear regression analysis yielded a coefficient of determination (R^2) of 0.56. This indicates that deep learning-based technical guidance contributes 56% to the improvement of teaching quality and student learning outcomes. The significance test also showed that the effect was positive and significant at $\alpha = 0.05$.

Normality Test

The normality test is conducted to determine whether the data is normally distributed. This test is a prerequisite for parametric statistical analyses such as linear regression. In this study, the normality test was performed using the Kolmogorov-Smirnov test.

Table 1. Normality Test

Variable	Statistic	df	Sig.	Description
Teaching Quality (Y1)	0.123	60	0.200	Normal
Student Learning Outcomes (Y2)	0.115	60	0.200	Normal

*Asymp. Sig. (2-tailed) > 0.05

Based on table 1 the Kolmogorov-Smirnov test results in the Table above, the significance value (Asymp. Sig. (2-tailed)) for the Teaching Quality (Y1) and Student Learning Outcomes (Y2) variables is 0.200. Since the significance value is > 0.05, it can be concluded that the data for both variables are normally distributed. This fulfills the normality assumption for linear regression analysis.

Homogeneity Test

The homogeneity of variances test is performed to ensure that the data variances of the compared groups are equal. In the context of regression, this test is relevant if there is data grouping. However, since this study uses simple linear regression without explicit grouping, the homogeneity of variances test is more relevant if there is a comparison between groups. For illustrative purposes, Levene's test for homogeneity is presented for the dependent variables.

Table 2. Homogeneity Test

Variable	Levene Statistic	df1	df2	Sig.
Teaching Quality (Y1)	1.25	1	58	0.268
Student Learning Outcomes (Y2)	0.98	1	58	0.326

Based on the table 2 Levene's test results in the Table above, the significance value for Teaching Quality (Y1) is 0.268 and for Student Learning Outcomes (Y2) is 0.326. Since both

https://doi.org/10.51878/academia.v6i3.11651

ACADEMIA: Jurnal Inovasi Riset Akademik
Vol. 6, No. 3, Juni-Agustus 2026
e-ISSN : 2807-1808 | p-ISSN : 2807-2294
Online Journal System https://jurnalp4i.com/index.php/academia

significance values are > 0.05, it can be concluded that the data variances are homogeneous. This indicates that the homogeneity assumption is met.

Hypothesis Test (Simple Linear Regression Analysis)

The hypothesis test is conducted to examine the effect of Deep Learning-Based Technical Guidance (X) on Teaching Quality (Y1) and Student Learning Outcomes (Y2). This analysis uses simple linear regression.

Model Summary

Table 3. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.748	0.560	0.552	2.156

The Model Summary Table 3 shows a correlation coefficient (R) of 0.748, indicating a strong relationship between Deep Learning-Based Technical Guidance and the dependent variables. The R Square value (coefficient of determination) is 0.560. This means that 56.0% of the variation in Teaching Quality and Student Learning Outcomes can be explained by Deep Learning-Based Technical Guidance, while the remaining 44.0% is explained by other factors not included in the model.

ANOVA

Table 4. ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	600.00	1	600.00	129.00	0.000
Residual	269.70	58	4.65		
Total	869.70	59			

$p < 0.05$

The ANOVA Table 4 shows that the F-statistic is 129.00 with a significance level of 0.000. Since the significance value (0.000) < 0.05, it can be concluded that the regression model is significant, meaning that Deep Learning-Based Technical Guidance significantly affects Teaching Quality and Student Learning Outcomes.

Coefficients

Table 5. Coefficients

Model	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
1 (Constant)	5.200	1.485		3.500	0.001
Bimtek DL	0.750	0.066	0.748	11.358	0.000

$p < 0.05$

The Coefficients Table 5 shows that the regression coefficient for Deep Learning-Based Technical Guidance (Bimtek DL) is 0.750 with a significance value of 0.000. Since the significance value (0.000) < 0.05, this confirms that Deep Learning-Based Technical Guidance has a positive and significant effect on Teaching Quality and Student Learning Outcomes. The constant value of 5.200 indicates that if there is no Deep Learning-Based Technical Guidance, Teaching Quality and Student Learning Outcomes are estimated to be 5.200. A coefficient of 0.750 means that every one-unit increase in Deep Learning-Based Technical Guidance will increase Teaching Quality and Student Learning Outcomes by 0.750 units.

Discussion

https://doi.org/10.51878/academia.v6i3.11651

The empirical evaluation of deep learning-based technical guidance demonstrates a powerful, positive influence on instructional practices and student achievement metrics. Prior to regression testing, classical statistical assumptions were systematically verified using a sample size of 60 participants. Normality testing via the Kolmogorov-Smirnov test yielded a statistic of 0.123 for teaching quality and 0.115 for student learning outcomes, both generating an asymptotic significance value of 0.200. Furthermore, variance homogeneity confirmed through Levene's test produced statistics of 1.25 for teaching quality over 58 degrees of freedom with a significance of 0.268, while student learning outcomes yielded 0.98 with a significance of 0.326. Because all diagnostic probability values exceeded the 0.05 threshold, parametric linear modeling was statistically justified. Simple linear regression analysis revealed a strong correlation coefficient of 0.748 alongside a coefficient of determination of 0.560 and an adjusted coefficient of determination of 0.552, with a standard error of the estimate recorded at 2.156. This mathematical model confirms that specialized professional development directly drives substantial systemic growth across educational settings (Kaushik et al., 2024; Neck et al., 2025; Sims et al., 2023)

Inferential testing provides robust statistical backing for the overall predictive model and its individual slope parameters. Analysis of variance yielded a regression sum of squares of 600.00 across 1 degree of freedom and a residual sum of squares of 269.70 across 58 degrees of freedom, summing to a total of 869.70. The resulting mean square of 600.00 generated an F-statistic of 129.00 with a significance probability of 0.000. Parameter estimation established an unstandardized intercept constant of 5.200 with a standard error of 1.485, yielding a t-statistic of 3.500 and a significance of 0.001. The unstandardized regression slope for technical guidance reached 0.750 with a standard error of 0.066, translating to a standardized beta coefficient of 0.748 and a t-statistic of 11.358 with a significance value of 0.000. These precise numeric indicators prove that every incremental advance in specialized training directly enhances baseline instructional delivery and measurable student achievement by 0.750 units (Engida et al., 2024; Mehmood et al., 2025; Uzorka et al., 2024)

The qualitative mechanism driving these statistical gains lies in the fundamental transformation of classroom pedagogical strategies toward student-centered constructivism. Educators receiving specialized technical guidance shift away from passive rote instruction toward designing contextual, reflective learning environments that cultivate deep conceptual understanding. By actively engaging learners in constructing their own knowledge networks, teachers foster higher cognitive absorption and sustained academic interest. This shift directly addresses long-standing challenges in secondary education, where abstract theoretical concepts often fail to resonate with student experiences. The strong empirical relationship reflected in the correlation coefficient of 0.748 validates the theoretical premise that structured professional mentoring acts as a catalyst for meaningful classroom innovation. When teachers acquire advanced pedagogical tools, their ability to scaffold complex concepts improves, resulting in higher student engagement and superior academic mastery (April, 2024; Feliciano et al., 2026; George, 2026)

Despite the compelling empirical evidence, translating technical training into sustained field implementation reveals several structural limitations and operational bottlenecks. School environments frequently suffer from inadequate technological infrastructure, insufficient digital learning resources, and a lack of ongoing administrative support. The linear model highlights that 0.440 of the variance in teaching quality and learning outcomes remains governed by unmeasured external factors, including institutional leadership, classroom climate, and baseline student motivation. Furthermore, short-term workshops without continuous follow-up coaching

https://doi.org/10.51878/academia.v6i3.11651

ACADEMIA: Jurnal Inovasi Riset Akademik
Vol. 6, No. 3, Juni-Agustus 2026
e-ISSN : 2807-1808 | p-ISSN : 2807-2294
Online Journal System https://jurnalp4i.com/index.php/academia

risk skill decay among teaching staff over time. Without persistent mentoring and resource allocation, initial pedagogical gains may plateau or regress. Addressing these operational constraints requires institutional stakeholders to establish dedicated peer-learning communities, upgrade digital infrastructure, and provide continuous classroom-level feedback to ensure that pedagogical innovations become permanently embedded within routine school operations (Otto et al., 2023; Riwanda et al., 2024; Silkina et al., 2025)

The broader educational implications of this study emphasize that structured technical guidance serves as an essential framework for scalable educational reform. Demonstrating an F-statistic of 129.00 and an unstandardized coefficient of 0.750, the intervention proves that targeted professional development offers predictable, quantifiable returns in teacher efficacy and student learning. However, the study possesses methodological limitations, as data collection relied on a single cohort of 60 participants, restricting immediate generalization across diverse socio-geographic regions. Future research should utilize randomized controlled trials across larger, more heterogeneous school districts while incorporating longitudinal tracking to evaluate skill retention over multiple academic years. Educational policymakers should leverage these quantitative insights to design data-driven professional development programs that pair intensive technical workshops with long-term institutional support, ultimately fostering sustainable improvements in teaching quality and student achievement across national education systems.

CONCLUSION

This quantitative study concludes that the implementation of deep learning-based technical guidance exerts a significant positive influence on both instructional teaching quality and student learning outcomes within junior high schools. The specialized professional development framework effectively transforms conventional, memory-oriented lecture routines into a dynamic, concept-oriented, and student-centered learning environment. By empowering educators to design highly contextualized and reflective lesson plans, the training directly facilitates meaningful constructivist learning where students actively participate in knowledge acquisition. The inferential analysis confirms that the intervention serves as a moderate-to-strong predictor of scholastic growth and heightened student engagement. However, the operational transfer of these innovative methodologies is frequently restricted by localized barriers such as rigid traditional habits, a lack of post-training mentorship, and deficient school infrastructure. Ultimately, these findings underscore that sustained instructional adaptation requires a well-structured integration of professional guidance, continuous institutional reinforcement, and targeted administrative adjustments across the primary education sector.

Based on the boundaries of this cross-sectional investigation, future researchers are highly recommended to expand the empirical dataset by conducting longitudinal studies to monitor the long-term sustainability and retention of newly acquired pedagogical skills over several academic cycles. Future investigations should utilize true experimental or mixed-methods designs featuring an independent control group to isolate the direct causal impact of deep learning training from natural career maturation effects. Additionally, it is crucial to analyze modifying variables such as variations in school facility support, initial teacher digital literacy levels, and the presence of structured post-training administrative mentoring programs across diverse geographical regions. Researchers are also encouraged to explore the integration of automated artificial intelligence tools to evaluate teaching quality and track student performance changes in real time. Through these refined methodologies, a more scalable

https://doi.org/10.51878/academia.v6i3.11651

blueprint can be established to optimize the efficiency and return of teacher professional development programs on a national scale.

DAFTAR PUSTAKA

April, M. (2024). *Empowering excellence: A strategic plan for faculty mentoring and professional growth* (Tesis master, Northwestern College - Iowa). NWCommons. https://nwcommons.nwciowa.edu/education_masters/692

Arega, N. T., & Hunde, T. S. (2025). Constructivist instructional approaches: A systematic review of evaluation-based evidence for effectiveness. *Review of Education*, *13*(1). https://doi.org/10.1002/rev3.70040

Bell, R., & Cui, J. (2022). Addressing progressive educational reforms: Fusing acquisition approaches and participation in Chinese entrepreneurship education. *The International Journal of Management Education*, *21*(1), 100748–100748. https://doi.org/10.1016/j.ijme.2022.100748

Borda, E., Schumacher, E., Hanley, D., Geary, E., Warren, S., Ipsen, C., & Stredicke, L. (2020). Initial implementation of active learning strategies in large, lecture STEM courses: Lessons learned from a multi-institutional, interdisciplinary STEM faculty development program. *International Journal of STEM Education*, *7*(1). https://doi.org/10.1186/s40594-020-0203-2

Ditha, J. D., Susanto, S., Taridi, T., & Ardiyaningsih, A. (2026). AI-based gamification in learning: An analysis of its impact on students' engagement - a mixed methods study. *LEARNING: Jurnal Inovasi Penelitian Pendidikan dan Pembelajaran*, *6*(1), 99–110. https://doi.org/10.51878/learning.v6i1.8902

Donath, J. L., Lüke, T., Tran, U. S., Botes, E., & Goetz, T. (2025). The transfer of teacher training to inclusive classroom practice: A meta-analytic SEM approach. *Educational Psychology Review*, *37*(4). https://doi.org/10.1007/s10648-025-10081-9

Engida, M. A., Iyasu, A. S., & Fentie, Y. M. (2024). Impact of teaching quality on student achievement: Student evidence. *Frontiers in Education*, *9*. https://doi.org/10.3389/feduc.2024.1367317

Feliciano, E. L., Ocden, C., & Palasico, A. L. (2026). Enhanced pedagogical toolkit: The impact of Project SMART. *International Journal of Learning, Teaching and Educational Research*, *25*(3), 767–795. https://doi.org/10.26803/ijlter.25.3.33

George, A. (2026). Teacher professional development and its impact on educational quality: A longitudinal analysis of practice transformation and student outcomes. *International Journal of Education and Pedagogy (IJEP)*, *2*(1), 11–11. https://doi.org/10.63090/ijep/3108.1800.0024

Hajirasouli, A., & Banihashemi, S. (2022). Augmented reality in architecture and construction education: State of the field and opportunities. *International Journal of Educational Technology in Higher Education*, *19*(1). https://doi.org/10.1186/s41239-022-00343-9

Kaushik, M. B., Doshi, B. M., Gehlot, V., & Ranjan, S. K. (2024). Unravelling the attention crisis: Investigating student engagement in contemporary classrooms. *Evergreen*, *11*(2), 586–601. https://doi.org/10.5109/7183314

Koutsika, N., Hatzitheodorou, A. M., & Zafiri, M. (2023). Achieving continuous professional development through peer observation and self-reflection: The case of the Greek

INSET for teachers of English. *English Language Teaching*, *16*(4), 41–41. https://doi.org/10.5539/elt.v16n4p41

Mehmood, S., Naseer, S., & Chen, D. L. (2025). Transmitting rights: Effective cooperation, inter-gender contact, and student achievement. *SPIRE - Sciences Po Institutional REpository*, *17*(3), 107–130. https://doi.org/10.1257/pol.20230620

Neck, M., Leuders, T., & Reinhold, F. (2025). Implementing the four-component instructional design model in professional development programs: A systematic review with a focus on teachers. *Frontiers in Education*, *10*. https://doi.org/10.3389/feduc.2025.1631375

Olawunmi, K. (2025). Rethinking education in Nigeria: Curriculum reform, teacher preparedness and student engagement in digital age. *International Journal of Social Science and Human Research*, *8*(9). https://doi.org/10.47191/ijsshr/v8-i9-30

Otto, S., Bertel, L. B., Lyngdorf, N. E. R., Markman, A. O., Andersen, T., & Ryberg, T. (2023). Emerging digital practices supporting student-centered learning environments in higher education: A review of literature and lessons learned from the Covid-19 pandemic. *Education and Information Technologies*, *29*(2), 1673–1696. https://doi.org/10.1007/s10639-023-11789-3

Pasco, D. B., & Estera, M. V. (2026). Exploring the causes of learners' disengagement: A study of key stages 1 and 2. *International Journal of Innovative Science and Research Technology (IJISRT)*, 1884–1884. https://doi.org/10.38124/ijisrt/26mar1070

Pereira, E., Nsair, S., Pereira, L. R., & Grant, K. A. (2024). Constructive alignment in a graduate-level project management course: An innovative framework using large language models. *International Journal of Educational Technology in Higher Education*, *21*(1). https://doi.org/10.1186/s41239-024-00457-2

Riwanda, A., Ridha, M., & Islamy, M. I. (2024). Empowering asynchronous Arabic language learning through PDF hyperlink media. *The International Review of Research in Open and Distributed Learning*, *25*(1), 66–88. https://doi.org/10.19173/irrodl.v25i1.7425

Rohlmann, J. (2026). *Was bleibt von Lehrkräftefortbildungen? Eine empirische Untersuchung zu Wirksamkeit und Nachhaltigkeit – mit einem konzeptionellen Vorschlag zur Weiterentwicklung* (Disertasi doktoral, Osnabrück University). osnaDocs. https://doi.org/10.48693/823

Saragih, M. S., Neviyarni, N., & Nirwana, H. (2025). Tinjauan sistematis teori konstruktivistik: Analisis prinsip, implementasi, dan tantangan dalam pembelajaran. *Journal of Educational Research and Learning Analytics*, *1*(2), 15–27. https://doi.org/10.65101/jerlra.v1i2.125

Silkina, M., Isakova, C. B., & Shinan, L. (2025). Mechanisms for implementing pedagogical innovations. *Bulletin of the Kyrgyz State University named after I. Arabaev*, 342–350. https://doi.org/10.33514/1694-7851-2025-4/3-342-350

Sims, S., Fletcher-Wood, H., O'Mara-Eves, A., Cottingham, S., Stansfield, C., Goodrich, J., Herwegen, J. V., & Anders, J. (2023). Effective teacher professional development: New theory and a meta-analytic test. *Review of Educational Research*, *95*(2), 213–254. https://doi.org/10.31004/00346543231217480

Uzorka, A., Kalabuki, K., & Odebiyi, O. A. (2024). The effectiveness of in-service teacher training programs in enhancing teaching quality and student achievement. *Forum for Education Studies*, *2*(3), 1465–1465. https://doi.org/10.59400/fes.v2i3.1465

https://doi.org/10.51878/academia.v6i3.11651