

Development of an Adaptive Coaching Model Integrating Deep Learning and the Seganti Setungguan Cultural Values to Improve the Creative Performance of Junior High School Teachers

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Abstract: Background: The rapid transformation of education in the digital and Society 5.0 era requires teachers to continuously improve their creative performance through innovative and culturally responsive professional development. However, existing coaching practices remain largely generic and have not optimally integrated artificial intelligence and local wisdom to address teachers' individual needs. Aims: This study aims to develop an Adaptive Coaching Model integrating deep learning and the local wisdom values of *Seganti Setungguan* to enhance the creative performance of junior high school teachers in South Sumatra. Methods: This study employed a Research and Development (R&D) approach with a design-based research orientation, including needs analysis, model design, expert validation, limited trials, revision, and effectiveness testing. The model was designed as an adaptive, personalized, reflective, collaborative, and sustainable professional development framework. Deep learning was utilized to identify teachers' professional needs and analyze patterns of creative performance, while the values of *Seganti Setungguan* provided a humanistic and cultural foundation for the coaching process. Result: The findings demonstrate that the proposed Adaptive Coaching Model is valid, practical, and effective in improving teachers' creative performance, particularly in planning, implementing, and evaluating innovative learning. The integration of deep learning technology enabled personalized coaching recommendations, while the incorporation of *Seganti Setungguan* values strengthened teachers' reflective practices, collaboration, and professional engagement. Conclusion: The Adaptive Coaching Model successfully integrates artificial intelligence and local wisdom to support sustainable teacher professional development. By enhancing teachers' creative performance and fostering reflective and collaborative learning cultures, the model offers an innovative framework for educational transformation in the Society 5.0 era, particularly in culturally diverse educational settings.

Keywords: *Adaptive coaching, deep learning, seganti setungguan, teacher creative performance, professional development*

A. Introduction

The rapid transformation of education in the digital era and Society 5.0 requires teachers to demonstrate high levels of creative performance in designing,

implementing, and evaluating adaptive, innovative, and student-centered learning. Junior high school teachers are increasingly challenged by diverse student characteristics, differentiated instruction, the integration of artificial intelligence (AI), and the need to strengthen character education while preserving local cultural values.

These demands require teacher professional development to move beyond conventional administrative training toward adaptive, personalized, and sustainable approaches (Jin et al., 2026). However, evidence from schools in South Sumatra indicates that teachers' creative performance remains inconsistent, while existing professional development programs are generally generic, one-directional, and insufficiently responsive to individual needs (Munafo, 2024).

Previous studies have examined teacher coaching, artificial intelligence in education, and culturally responsive professional development separately. However, limited attention has been given to the integration of AI-based adaptive coaching with local cultural values in teacher professional development. Existing coaching practices tend to provide standardized support and have not sufficiently addressed teachers' individual professional needs and cultural contexts. Therefore, this study develops an Adaptive Coaching Model that integrates Deep Learning technology with the values of Seganti Setungguan. The novelty of this study lies in combining data-driven personalized coaching with local cultural values to improve teachers' creative performance in junior high schools

Furthermore, the application of intelligent technologies in teacher coaching remains limited, reducing opportunities for providing data-driven and personalized feedback (Akindele, 2025). Previous studies conducted by the research team demonstrate that successful educational transformation depends largely on teachers' ability to adapt to curriculum changes, technological advancements, and evolving student needs (Amin, Razak, & Kamsin, 2025).

Research on the implementation of the emergency curriculum, Problem-Based Learning, the Merdeka Curriculum, and digital learning media consistently shows that teachers' creativity and professional competence are critical factors in translating educational policies into effective classroom practices (Fahd, Miah, Ahmed, Venkatraman, & Miao, 2021). Nevertheless, these studies also reveal that innovations in teaching and learning have not been accompanied by adaptive and sustainable teacher coaching systems (Hestiningtyas, Kesuma, & Kurniawan, 2025). Most professional development initiatives continue to rely on standardized short-term training that fails to identify teachers' individual needs based on actual performance data, resulting in limited and unsustainable improvements in creative performance (Yu, 2025).

The challenges are particularly evident in SMP Negeri 8 Palembang, SMP Negeri 23 Palembang, and SMP Negeri 26 Palembang, where teachers are expected to implement differentiated learning, integrate digital technologies, and strengthen students' character in accordance with the principles of Society 5.0 (Morgan, Sam, Suhrheinrich, & Chan, 2026). Despite these expectations, no coaching model has

been developed that integrates artificial intelligence-based needs analysis with coaching practices grounded in local socio-cultural values (Fahmi, Irhasyurna, Suryajaya, & Fajeriadi, 2025).

Recent advances in Deep Learning offer significant opportunities to improve teacher coaching through intelligent data analysis, prediction of professional development needs, and personalized recommendations (Asrifan et al., 2025). However, technology-driven approaches alone may overlook the humanistic and cultural dimensions of teacher development (Ummiasih, Lestari, & Syaflin, 2024). Therefore, integrating the local wisdom of Seganti Setungguan, which emphasizes solidarity, mutual cooperation, togetherness, and collective responsibility, provides an essential ethical and cultural foundation for creating a more contextual and meaningful coaching process (Riansyah, Lestari, & Rachmawati, 2023).

The novelty of this research lies in the development of an Adaptive Coaching Model integrating Deep Learning and the values of Seganti Setungguan to improve the creative performance of junior high school teachers (Lestari et al., 2022). Unlike previous studies that primarily focused on instructional innovation or digital learning media, this study proposes a holistic teacher professional development model that combines artificial intelligence, adaptive coaching, and local wisdom into a single integrated framework (Lestari & Yulaini, 2024).

Deep Learning functions as an intelligent analytical system capable of identifying teachers' competencies, mapping creative performance patterns, and generating personalized coaching recommendations, while Seganti Setungguan strengthens collaboration, reflective practice, and cultural identity throughout the coaching process (Nurlina, Widayatsih, & Lestari, 2023). This integration represents an innovative approach to balancing technological advancement with the preservation of local values in educational transformation (Okpatrioka, 2023).

The proposed model is expected to establish a sustainable professional development system that enhances teachers' creativity in planning, implementing, and evaluating innovative learning while fostering reflective practice and collaborative professional culture (Lafi & Kurniawan, 2025). In addition to contributing to the theoretical development of educational management and teacher professional development, this research offers practical implications for schools and policymakers seeking to integrate artificial intelligence and local wisdom into teacher coaching (Muthoharoh, 2025). Ultimately, the study supports Indonesia's Educational Transformation Agenda toward 2045 by promoting high-quality, innovative, and culturally grounded human resources capable of meeting the challenges of the digital era and Society 5.0 (Septiani, 2025).

B. Methods

Basically, This study employed a Research and Development (R&D) approach with a Design-Based Research (DBR) orientation to develop, validate, and evaluate an Adaptive Coaching Model integrating Deep Learning and the local wisdom values of Seganti

Setungguan for improving the creative performance of junior high school teachers (Fradani & Astuti, 2020). Design-Based Research was selected because it emphasizes the iterative interaction between theory and practice through continuous cycles of design, implementation, evaluation, and refinement in authentic educational settings (Ikbal, Erfina, Lawelai, Lubis, & Darlis, 2025). This approach enables researchers not only to produce an innovative educational model but also to ensure that the developed model is theoretically sound, practically applicable, and empirically effective within the context of junior high schools in South Sumatra (Storozhenko, Ignatenko, Yaroshovets, Antypenko, & Vlasenko, 2023).

The development process consisted of five main stages: needs analysis, model design, product development, limited implementation, and evaluation. At the needs analysis stage, information was collected regarding teachers' creative performance, professional development needs, technological readiness, and the potential integration of Seganti Setungguan values. The model was then designed based on the identified needs and developed into a coaching guide, assessment instruments, coaching modules, and supporting materials. Expert validation and limited implementation were conducted to evaluate the validity and practicality of the model. The model was subsequently revised based on expert feedback and field findings.

By integrating artificial intelligence technology with local cultural values, the proposed model is expected to address both technological and socio-cultural dimensions of teacher professional development while supporting sustainable educational transformation (Yang et al., 2021). The development process followed a systematic Research and Development framework consisting of several interconnected stages (García-Avilés, 2020).

The research began with a comprehensive needs assessment to identify teachers' creative performance, professional development needs, and contextual challenges encountered in implementing innovative learning practices (Kim & Park, 2020). Findings from this preliminary investigation served as the foundation for designing the conceptual and operational framework of the Adaptive Coaching Model. Subsequently, supporting components were developed, including coaching guidelines, creative performance assessment instruments, coaching modules, and a Deep Learning-based analytical system capable of identifying teachers' competency profiles and generating personalized coaching recommendations (Mirhosseini, 2020).

The model then underwent expert validation and limited field trials before being revised and finalized. This iterative development process ensured that every component of the model was continuously refined based on empirical evidence and stakeholder feedback until an optimal version was achieved. This study adopted a mixed-methods approach, combining qualitative and quantitative methods to obtain a comprehensive

understanding of both the development process and the effectiveness of the proposed model (Putri, 2023).

Qualitative methods were employed during the preliminary study, needs assessment, exploration of the cultural values of Seganti Setungguan, and evaluation of model implementation. Data were collected through interviews, classroom observations, document analysis, and reflective discussions involving teachers, principals, and educational stakeholders (Horoub, 2023).

Meanwhile, quantitative methods were applied to evaluate teachers' creative performance before and after the implementation of the Adaptive Coaching Model using a pretest-posttest design. Questionnaires, rating scales, and structured assessment instruments were administered to measure changes in teachers' creativity, innovation, collaboration, and professional competence. The combination of qualitative and quantitative evidence enabled comprehensive validation of both the implementation process and the outcomes of the developed model (Suherlan, 2023).

The research was conducted in three public junior high schools in Palembang, namely SMP Negeri 8 Palembang, SMP Negeri 23 Palembang, and SMP Negeri 26 Palembang, involving a total of 50 teachers as research participants. These schools were selected purposively because they represent institutions actively implementing curriculum transformation, differentiated learning, and digital technology integration while facing challenges in strengthening teachers' creative performance (Alojail & Khan, 2023).

Throughout the research process, participants were involved in various stages, including needs assessment, model implementation, coaching activities, evaluation, and reflective discussions. Their active participation provided valuable insights into the practicality, feasibility, and contextual relevance of the Adaptive Coaching Model within real educational environments, ensuring that the final model reflected authentic school needs rather than purely theoretical assumptions.

To ensure the quality of the developed model, comprehensive validation, evaluation, and revision procedures were conducted throughout the research. Expert validation involved specialists in educational management, teacher professional development, educational technology and artificial intelligence, local cultural studies, and educational practitioners such as principals and school supervisors. They evaluated the conceptual framework, coaching syntax, integration of Deep Learning technology, incorporation of Seganti Setungguan values, usability of the coaching procedures, and the appropriateness of supporting instruments.

The results of expert validation were analyzed descriptively to determine the validity level of each component and were subsequently used as the basis for revising the model. Limited field implementation was then carried out to examine the practicality and effectiveness of the model by evaluating coaching implementation, teacher responses, coaching interactions, creative performance improvement, functionality of the Deep Learning analytical system, and the development of collaborative school culture grounded in local wisdom.

Continuous revisions were undertaken based on expert recommendations and empirical findings until the final model fulfilled the criteria of validity, practicality, and effectiveness. Several research instruments were developed to support data collection throughout the development process. A needs assessment instrument was designed to identify teachers' coaching requirements, technological readiness, cultural integration, and implementation support. Expert validation instruments were developed to evaluate the relevance, clarity, validity, and feasibility of the proposed model and its supporting components.

Interview protocols were prepared to explore participants' perceptions regarding the implementation of the Adaptive Coaching Model, the effectiveness of coaching practices, the integration of Deep Learning technology, and the internalization of Seganti Setungguan values within professional practice. Furthermore, an effectiveness questionnaire was constructed to assess the quality of the coaching handbook, ease of implementation, coaching effectiveness, utilization of artificial intelligence technology, integration of local cultural values, improvement of teachers' creative performance, and the overall impact on teaching quality and student learning outcomes.

These instruments were designed systematically to ensure comprehensive measurement of both process and outcome variables within the study. The effectiveness of the Adaptive Coaching Model was examined through a pretest-posttest research design by comparing teachers' creative performance before and after the implementation of the model. Quantitative data were analyzed using descriptive statistics and gain score analysis to determine the magnitude of improvement achieved following participation in the coaching program.

Qualitative data obtained from interviews, observations, reflective journals, and documentation were analyzed through thematic analysis to identify changes in teachers' professional practices, collaborative culture, and reflective learning behaviors. The integration of qualitative and quantitative findings provided comprehensive evidence regarding the validity, practicality, and effectiveness of the proposed Adaptive Coaching Model. Ultimately, the study produced an innovative teacher professional development model that integrates artificial intelligence and local wisdom to promote sustainable

improvements in teachers' creative performance while supporting Indonesia's educational transformation in the era of Society 5.0.

C. Results and Discussion

Provide The data presented in this study are the results of the development process of the Adaptive Coaching Model, which integrates deep learning technology with the local wisdom values of Seganti Setungguan. The development process followed five main stages: needs analysis, model design, product development, limited implementation, and model evaluation. At the needs analysis stage, empirical evidence was collected to identify the initial condition of junior high school teachers' creative performance and to determine the necessity for a more adaptive professional development model. The findings revealed that teachers' creative performance remained at a moderate level, particularly in designing innovative learning activities, integrating technology creatively, and implementing authentic assessment. Existing professional development programs were generally characterized by generalized training, limited follow-up mentoring, and a lack of objective data-driven feedback. Teachers expressed a strong need for individualized coaching, continuous professional support, and technology-assisted feedback systems.

Furthermore, the local wisdom values of Seganti Setungguan, including collaboration, solidarity, and mutual support, had not yet been optimally incorporated into teacher professional development despite their relevance to collaborative learning cultures. These findings indicate the urgent need for a professional development model that is adaptive, evidence-based, and culturally contextual. Based on the results of the needs analysis, the Adaptive Coaching Model was designed as a comprehensive framework that combines data-driven decision-making, personalized coaching, reflective practice, collaborative learning, and local cultural values.

The model employs deep learning as an analytical mechanism to objectively identify teachers' professional needs and map their creative performance profiles. Coaching strategies are then tailored to individual teacher characteristics to ensure that professional development activities correspond to actual performance gaps. Reflective dialogue and collaborative communities of practice are incorporated to encourage continuous learning, while the values of Seganti Setungguan—including togetherness, mutual cooperation, and mutual empowerment—serve as the ethical and cultural foundation of the coaching process.

Structurally, the model consists of four interconnected stages: data-based diagnosis, adaptive coaching planning, reflective coaching implementation, and continuous monitoring and evaluation. The development stage resulted in a complete set of products designed to operationalize the Adaptive Coaching Model. These products include a

comprehensive coaching guide outlining the implementation procedures, the respective roles of coaches and teachers, and the operational workflow of the model.

The needs analysis showed that teachers required more personalized and continuous professional development. The main challenges were related to designing innovative learning activities, integrating digital technology creatively, implementing authentic assessment, and conducting reflective practices. Teachers also indicated the need for coaching that provides continuous feedback based on their individual performance. These findings became the basis for developing the Adaptive Coaching Model.

The developed model consists of four main stages: data-based diagnosis, adaptive coaching planning, reflective coaching implementation, and continuous monitoring and evaluation. The model integrates Deep Learning as an analytical component and Seganti Setungguan as the cultural foundation of the coaching process. The integration of these components is intended to provide personalized professional support while strengthening collaboration, solidarity, and mutual assistance among teachers.

In addition, several assessment instruments were developed to evaluate teachers' creative performance, coaching implementation, and reflective practice. A conceptual deep learning analytical system was also designed to generate teacher performance profiles and provide personalized coaching recommendations based on empirical data. Supporting implementation materials, including training modules, coaching journals, and action plan templates, were developed to facilitate systematic implementation. All components of the model were subsequently validated by experts to evaluate content validity, theoretical consistency, and practical usability before field implementation. The limited implementation phase demonstrated encouraging results regarding the practicality of the developed model.

Teachers became more actively engaged in reflective discussions, collaborative professional activities increased significantly, and participants began developing more innovative learning strategies aligned with student-centered education. The coaching process became increasingly focused on individual teacher needs through the utilization of analytical information generated by the model.

Moreover, integrating the cultural values of Seganti Setungguan strengthened teachers' sense of collegiality, reduced resistance to educational change, and fostered a more supportive and humanistic coaching environment. These findings suggest that combining advanced analytical technology with local cultural values creates a professional development environment that is both technically effective and socially meaningful. The evaluation stage confirmed that the Adaptive Coaching Model possesses high levels of validity, practicality, and effectiveness. Expert reviewers concluded that the model is

theoretically sound, systematically organized, and sufficiently practical for implementation in school settings. Teachers reported that the model was easy to use, did not impose excessive workloads, and could be effectively integrated into existing professional development programs.

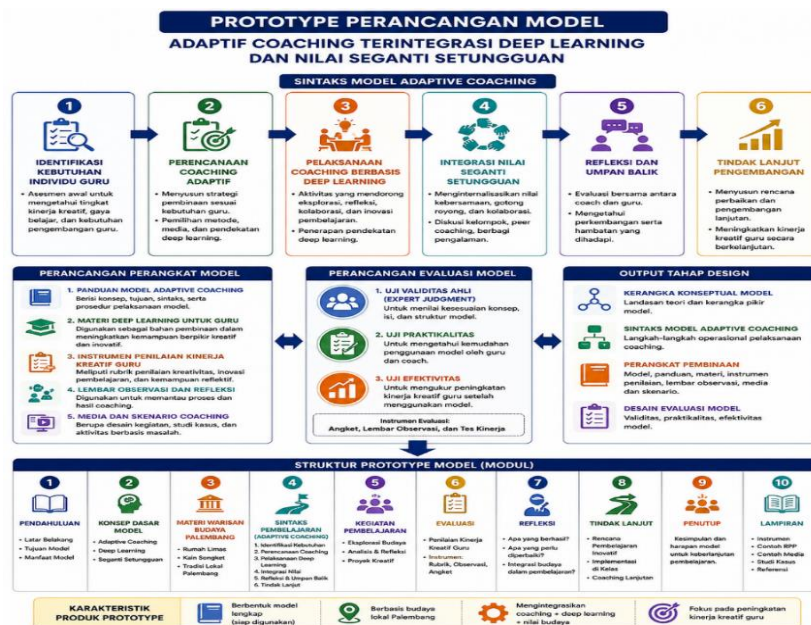


Figure 1. Prototype Design of the Adaptive Coaching Model

Evaluation results further indicated improvements in teachers' creative performance, instructional planning, innovative classroom practices, and reflective competencies. Overall, the findings demonstrate that integrating deep learning technology with the cultural philosophy of Seganti Setungguan provides substantial added value for teacher professional development by creating a sustainable coaching model that is adaptive, data-driven, culturally responsive, and capable of enhancing teachers' creative performance in junior high schools.



Figure 2. QR Code of the Adaptive Coaching Model Guidebook

https://drive.google.com/file/d/12rf9M_G1C5mu10Rln1VJDnHvpX0oSj5E/view

D. Conclusions

This study developed an Adaptive Coaching Model integrating Deep Learning technology and the local wisdom values of Seganti Setungguan to support the creative performance of junior high school teachers. The model consists of data-based diagnosis, adaptive coaching planning, reflective coaching implementation, and continuous monitoring and evaluation. The evaluation results showed that the model was positively received and obtained an average score of 91.36%, categorized as “Very Good.” The model provides a contextual approach to teacher professional development by combining personalized coaching, technology-assisted analysis, reflective practice, collaboration, and local cultural values. Further research is recommended to test the model with a larger number of teachers and across different educational contexts.

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that the Adaptive Coaching Model integrating Deep Learning and the local wisdom values of *Seganti Setungguan* will contribute to sustainable teacher professional development and support educational transformation in Indonesia in the era of Society 5.0.

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