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How Does Empowering Leadership Influence Deep Learning? A Case Study on Teacher Performance in Elementary Schools

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ABSTRACT

Deep learning is a new learning approach that enables students to develop higher-order thinking skills. This study aims to examine the role of principals' empowering leadership in enhancing teacher performance in the implementation of deep learning in primary education. The study offers novelty through the integration of empowering leadership, deep learning pedagogy, and collaborative school culture in explaining improvements in teacher performance. Using a qualitative case study design at SD Labschool UPI Purwakarta, this research involved one principal, two teachers, and four students. Data were collected over two months through interviews, classroom observations, and Likert-scale questionnaires measuring teachers' and students' perceptions of deep learning implementation, and were analyzed using an interactive thematic approach involving data condensation, data display, and conclusion drawing. The findings reveal that principals' empowering leadership is manifested through three main practices: building professional trust, encouraging participative decision-making, and facilitating continuous professional learning and instructional innovation. These practices strengthen teachers' capacity to implement deep learning effectively through reflective practice, pedagogical autonomy, and meaningful student engagement. In addition, a collaborative and reflective school culture emerged as an important enabling factor that mediates and reinforces the influence of empowering leadership on teacher performance. This study highlights that empowering leadership functions not only as a managerial practice but also as a transformative force in building collective professional capacity and sustaining instructional quality improvement in primary education.

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1. INTRODUCTION

The transformation of 21st-century education requires a fundamental shift in learning paradigms, moving from mere knowledge transmission toward the development of higher-

order thinking skills, creativity, collaboration, and reflective capacity [1], [2]. In this context, primary education plays a strategic role as the foundation for shaping students' cognitive abilities and character development in a sustainable manner [3]. However, various empirical findings indicate that classroom practices in primary schools remain largely procedural and content-oriented, thereby limiting students' opportunities to experience meaningful and deep learning [4], [5]. In line with current educational policy directions, deep learning has emerged as a transformative pedagogical approach that emphasizes conceptual understanding, the connection between knowledge and real-life contexts, meaningful learning engagement, and the development of critical, creative, collaborative, and reflective thinking skills [6], [7]. The implementation of deep learning requires teachers to transform their roles from knowledge transmitters into facilitators capable of designing meaningful and student-centered learning experiences.

Despite receiving increasing attention, the implementation of deep learning still faces numerous challenges [7]. Previous studies have shown that limited professional autonomy, low confidence in instructional innovation, and weak collaborative school cultures hinder teachers in implementing meaningful learning practices [8]. These findings are supported by research conducted by Alfiyana [9], which revealed that teachers tend to experience difficulties in developing reflective and student-centered learning when the school environment does not adequately support professional collaboration and pedagogical innovation. Furthermore, another study by Prihantini found that the lack of leadership support causes teachers to focus more on content delivery rather than on developing meaningful and deep learning experiences [10]. These conditions indicate that improving instructional quality depends not only on teachers' individual competencies, but also on leadership practices and the organizational climate within schools.

From the perspective of educational leadership, principals play a strategic role in creating conditions that support instructional improvement [7], [11], [12]. Various leadership models, such as transformational leadership and instructional leadership, have been widely discussed in educational literature [13], [14]. Transformational leadership focuses on inspiring organizational change and motivating members through shared vision and collective commitment, whereas instructional leadership emphasizes the supervision and improvement of teaching and learning processes [15], [16]. However, these approaches often position teachers as implementers of leadership directives rather than active agents of innovation. In contrast, empowering leadership emphasizes trust-building, delegation of authority, professional autonomy, participation in decision-making, and collaborative professional development [17]. This approach is considered increasingly relevant in supporting the implementation of deep learning, which requires teachers to be adaptive, reflective, and innovative in designing learning experiences [18].

Empowering leadership enables teachers to develop professional autonomy, strengthen reflective practices, and engage more actively in instructional innovation [19], [20]. Teachers who experience empowerment tend to demonstrate higher intrinsic motivation, stronger professional commitment, and greater readiness to implement meaningful and student-centered learning. Although previous studies have identified positive relationships between empowering leadership and teacher performance, most

studies have examined these variables separately and have not comprehensively linked them to the implementation of deep learning [21]. In addition, research exploring the role of school culture as a mediating factor in the relationship between empowering leadership and teacher performance, particularly in primary education and laboratory school contexts, remains limited. Addressing these gaps, this study aims to examine how empowering leadership influences teacher performance in the implementation of deep learning in primary schools. Specifically, this study seeks to answer the following research question: "How does empowering leadership influence teacher performance in deep learning implementation?" The study also considers collaborative school culture as a contextual factor influencing this relationship. This research contributes to the development of educational leadership theory by integrating empowering leadership, deep learning pedagogy, teacher performance, and school culture into a unified analytical framework, while also providing practical implications for strengthening empowerment-based leadership practices to improve the quality of teaching and learning in primary education.

2. METHOD

2.1 Research Design

This study employed a qualitative research approach. A case study framework was used to explore and analyze the role of principals' empowering leadership in enhancing teacher performance in the implementation of deep learning. This framework enabled the researchers to investigate complex social phenomena within real-life contexts and to capture the dynamics of leadership practices, school culture, and instructional processes holistically. Conducted over a two-month period at SD Labschool UPI Purwakarta, the study specifically focused on how empowering leadership practices influence teachers' capacity to implement deep learning in primary education settings.

2.2 Participants

We involved one principal, two teachers, and four students as research participants. The principal was selected because of his central role in school leadership and management, while the teachers were chosen based on their active involvement in implementing deep learning practices in the classroom. In addition, four students were included to provide complementary perspectives regarding learning experiences and student engagement during the learning process. The participants involved in this study were selected based on specific considerations, and informed consent was obtained prior to their participation. For example, the teachers involved were those who had obtained teaching certification and had previously participated in government-sponsored deep learning training programs. The students involved in this study were approximately 11 years old on average. In addition to obtaining consent from teachers, notification letters were also sent to students' parents before involving their children as research participants.

2.3 Instruments

The research instruments in this study consisted of interview guidelines for the principal, teachers, and students, a classroom observation sheet, and a Likert-scale

questionnaire measuring students' perceptions of the implementation of deep learning conducted by the teachers. First, in-depth interviews were conducted with the principal and teachers to explore perceptions, experiences, and practices related to empowering leadership and the implementation of deep learning. Second, participant observation was carried out to examine classroom instructional practices, teacher–student interactions, collaborative activities, and leadership processes within the school environment. In addition, the researchers conducted document analysis by reviewing school policies, instructional materials, meeting notes, and other relevant documents to support and validate the research findings.

The teacher observation instrument was used to examine the implementation of instructional activities during the application of deep learning in the classroom. The instrument consisted of 12 observation aspects covering the introduction, main activities, and closing stages of instruction, including the delivery of learning objectives, student engagement, the use of instructional media, reflective activities, and lesson summarization. Meanwhile, the student activity observation instrument was used to examine students' engagement and participation during the instructional process. This instrument consisted of eight observation aspects, including listening to explanations, analyzing contextual problems, collecting information, participating in discussions, delivering presentations, reflecting on problem-solving processes, and drawing conclusions. Each aspect in both observation instruments was assessed using a four-point scale: (1) not implemented, (2) poorly implemented, (3) well implemented, and (4) very well implemented.

Before being implemented, all research instruments were reviewed by experts. This review process included content validity and face validity assessments of all instrument items. To compare expert judgments, the researchers employed the Q-Cochran statistical test to examine the consistency of the experts' evaluations.

Table 1. Results of the Instrument Uniformity Test

Type of Validity	Significance Value	
	Classroom Observation	Students' activities
Content	0,22	0.09
Face	0,08	0.12

The results of the expert validity analysis showed that the significance values of the Q-Cochran test for the classroom observation instrument were 0.22 for content validity and 0.08 for face validity. Meanwhile, for the students' perception instrument, the content validity value was 0.09 and the face validity value was 0.12. All of these values were higher than the significance level of 0.05. These findings indicate that there were no significant differences among the experts' evaluations, suggesting that the assessments regarding the appropriateness of the instrument content and appearance were consistent and that the instruments were suitable for use in the study.

2.4 Data Analysis

Data were analyzed using an interactive analysis model consisting of data condensation, data display, and conclusion drawing. The analysis process was conducted

iteratively throughout the study. To develop themes systematically, this study applied a multi-stage coding process consisting of open coding, axial coding, and thematic categorization. In the open coding stage, the researchers identified initial concepts and meaningful statements from interview transcripts, observation notes, and research documents. Subsequently, axial coding was conducted to connect related categories and identify relationships among concepts. The final stage involved the development of thematic categories to generate broader patterns and interpret the influence of empowering leadership on teacher performance in the implementation of deep learning. This iterative process enabled the emergence of comprehensive and contextualized findings.

To ensure the credibility and trustworthiness of the research findings, this study applied several validation strategies, including data triangulation, member checking, and prolonged researcher engagement in the research setting. Triangulation was conducted by comparing data obtained from interviews, observations, questionnaires, and document analysis. Member checking was carried out by confirming the findings with participants to ensure the accuracy and consistency of data interpretation. In addition, the researchers' involvement during the two-month fieldwork enhanced the depth and reliability of the data collected.

3. RESULTS AND DISCUSSION

3.1 Results

The interview findings with Teacher 1 and Teacher 2 indicate that the principal's empowering leadership was implemented through the provision of trust, autonomy, and teacher involvement in instructional decision-making processes. Both teachers explained that the principal provided opportunities for teachers to develop instructional innovations according to students' needs and classroom characteristics. Teacher 1 stated that *"the principal is able to provide clear direction while also opening opportunities for dialogue with teachers,"* whereas Teacher 2 explained that "the principal provides flexibility in designing and implementing instruction according to students' characteristics." These findings demonstrate that empowering leadership practices strengthened teachers' confidence and professional responsibility in developing meaningful learning experiences. In addition, the principal supported teachers through academic supervision, professional training, and appreciation for instructional innovation.

Regarding the implementation of deep learning, both teachers emphasized that instruction was not merely focused on memorization, but rather on meaningful conceptual understanding, critical thinking, collaboration, and reflection. Teacher 1 highlighted the use of triggering questions, group discussions, and reflective activities, while Teacher 2 emphasized problem-based learning and project-based learning approaches. The interview findings with the principal further reinforced these results. The principal stated that *"teachers are given full freedom to choose instructional methods as long as they remain aligned with the curriculum,"* while also emphasizing that deep learning is essential for developing students' critical thinking and problem-solving skills. The findings indicate that empowering leadership contributed significantly to improving teacher performance in

implementing deep learning, resulting in more active, innovative, and student-centered learning practices.

Table 2. Observation of Teacher Activities in Deep Learning Instruction

No.	Observation Aspects	Implementation	
		Teacher 1	Teacher 2
	Introduction		
1	The teacher connects the learning material with students' prior knowledge.	Implemented	Implemented
2	The teacher communicates the learning objectives	Implemented	Implemented
3	The teacher presents a problem		
	Main Activities		
4	The teacher uses instructional media and other learning resources	Implemented	Implemented
5	The teacher actively engages students in every learning activity	Implemented	Implemented
6	The teacher facilitates students through assignments and discussions, both orally and in writing	Implemented	Implemented
7	The teacher facilitates students in cooperative and collaborative learning	Implemented	Implemented
8	The teacher provides confirmation and feedback on students' exploration and elaboration results	Implemented	Implemented
9	The teacher facilitates students in reflecting on the learning experiences they have undergone	Implemented	Implemented
	Closing	Implemented	Implemented
10	The teacher asks students to restate the conclusions of the material that has been learned	Implemented	Implemented
11	The teacher assigns homework to each student	Implemented	Implemented
12	The teacher asks students to study the next topic/material	Implemented	Implemented

The observation results indicate that both Teacher 1 and Teacher 2 implemented all observed aspects of the instructional process. In the introduction stage, both teachers connected the learning material with students' prior knowledge, communicated the learning objectives, and presented problems to the students. In the main activities stage, both teachers utilized instructional media and other learning resources, actively engaged students in learning activities, facilitated students through assignments and discussions, and implemented cooperative and collaborative learning activities. In addition, both teachers provided confirmation and feedback on students' exploration results and facilitated reflective learning activities. In the closing stage, both teachers asked students to restate the conclusions of the learning material, assigned homework, and encouraged students to study the next topic. Overall, all observation aspects were categorized as "Implemented" for both Teacher 1 and Teacher 2.

The observation results indicate that the learning activities in both Class A and Class B were generally implemented very well across most observed components. A score of 4 indicates that the activity was implemented very well, while a score of 3 indicates that the activity was implemented well. Most observed activities in both classes obtained a score of 4, including listening to explanations from teachers and peers, examining contextual problems, collecting and analyzing information, reflecting on the problem-solving process, and performing other task-related activities related to learning engagement.

Table 3. Student Activities in Deep Learning Instruction

No.	Components	Implementation Scores	
		Class A	Class B
1	Listening to/paying attention to the explanations of the teacher and peers	4	4
2	Reading/examining contextual problems in the textbook and worksheet	4	4
3	Collecting information by analyzing obtained data and completing the worksheet	4	4
4	Discussing with group members to determine appropriate problem-solving strategies	3	4
5.	Presenting/responding to presentation results	3	4
6.	Reviewing/reflecting on the presented problem-solving process	4	4
7.	Drawing conclusions about the material that has been learned	4	3
8.	Performing other task-related activities, such as showing thinking gestures, paying attention to peers' work, and similar activities	4	4

Several differences were identified between the two classes. In Class A, the activities of discussing problem-solving strategies and presenting/responding to presentation results obtained a score of 3, indicating that these activities were implemented well. In contrast, Class B obtained a score of 4 on both activities, indicating very good implementation. Meanwhile, in the activity of drawing conclusions about the learning material, Class A obtained a score of 4, whereas Class B obtained a score of 3. Overall, the observation results demonstrate that the implementation of learning activities in both classes was categorized as good to very good across all observed components.

3.2 Discussion

Previous studies have demonstrated that the quality of 21st-century learning is strongly influenced by school leadership practices that promote pedagogical innovation, professional collaboration, and teacher autonomy in instructional processes [21], [22]. In the context of deep learning implementation, teachers are expected not only to deliver instructional content but also to design learning experiences that foster critical, reflective, collaborative, and contextual thinking [23], [24]. However, previous studies have also indicated that the implementation of deep learning still faces several challenges, including limited teacher professional autonomy, insufficient leadership support, and weak collaborative school culture [25]. Based on these conditions, this study sought to examine how empowering leadership influences teacher performance in the implementation of deep learning in primary education.

The findings indicate that empowering leadership contributes to improving teacher performance through the provision of professional trust, teacher autonomy, participative decision-making, and continuous professional support. These practices enable teachers to become more actively engaged in developing instructional innovation, implementing reflective learning strategies, and creating more meaningful learning experiences for students. In addition, collaborative school culture emerged as an important factor

strengthening the relationship between empowering leadership and the implementation of deep learning. An open and supportive school environment enables teachers to engage in reflection, share professional experiences, and continuously develop instructional innovation.

Another important finding suggests that the successful implementation of deep learning is not determined solely by teachers' individual competencies, but is also influenced by leadership practices and school organizational culture. This finding is particularly noteworthy because several previous studies emphasized teachers' technical competence and the availability of instructional facilities as the primary determinants of innovative learning success [26], [27]. In contrast, this study demonstrates that empowering leadership and collaborative school culture play equally significant roles in supporting deep learning implementation. Therefore, instructional transformation cannot be achieved merely through improving teachers' technical competencies, but also requires organizational environments that support empowerment and professional collaboration.

The findings of this study support previous research indicating that empowering leadership enhances teachers' intrinsic motivation, professional commitment, and instructional creativity [26], [28], [29]. This study also reinforces the argument proposed by Nugroho [30], who emphasized that teacher participation in decision-making strengthens teachers' sense of ownership toward school programs and improves the quality of instructional implementation. Furthermore, the findings are consistent with Demirbelek [31], who highlighted the importance of teacher independence in designing innovative and meaningful instructional practices. In addition to supporting previous studies, this study extends the existing literature by directly connecting empowering leadership with the implementation of deep learning in primary education, an area that has received relatively limited scholarly attention [32], [33].

These findings can be explained through the perspective of psychological empowerment theory, which emphasizes that trust, autonomy, and participation in decision-making strengthen teachers' sense of competence, work meaning, and professional independence. When teachers feel trusted and supported, they are more likely to experiment with new instructional strategies and become more reflective in their teaching practices. In this context, empowering leadership functions as a mechanism that transforms teachers from passive policy implementers into agents of instructional change [18], [34]. Furthermore, collaborative school culture serves as a social environment that reinforces teachers' motivation, engagement, and instructional innovation in implementing deep learning.

However, this study differs from several previous studies that emphasized teachers' individual competencies and the availability of instructional facilities as the primary determinants of innovative learning success [29], [35]. This study instead found that empowering leadership practices and collaborative school culture play equally important roles in supporting the implementation of deep learning [36], [37]. Therefore, instructional transformation does not solely depend on teachers' technical competencies, but also on organizational environments that continuously promote empowerment, participation, and professional collaboration [17], [38].

The findings of this study should be interpreted cautiously because the research was conducted in only one laboratory school with a limited number of participants. In addition, as a qualitative study, data interpretation may still involve subjectivity despite the implementation of triangulation and member checking procedures. Therefore, the generalizability of the findings to other educational contexts remains limited. However, this study still provides an important contribution to explaining the relationship between empowering leadership, collaborative school culture, and the implementation of deep learning in primary education contexts.

Based on the findings, it can be assumed that the stronger the implementation of empowering leadership and collaborative school culture, the greater the teachers' capacity to implement deep learning effectively. Leadership practices emphasizing empowerment, participation, and professional support enable teachers to develop more active, reflective, and innovative instructional practices [39], [40]. The implications of this study suggest that strengthening deep learning implementation cannot rely solely on teacher training programs, but also requires empowering school leadership and organizational cultures that support professional collaboration. Consequently, deep learning can develop not only as a pedagogical approach, but also as a sustainable learning culture within schools.

This study confirms that empowering leadership is a relevant leadership approach for supporting the transformation of 21st-century learning. Leadership practices emphasizing trust, participation, and collaboration have been proven to strengthen teachers' professional capacity and create more meaningful learning environments. Therefore, future studies are recommended to involve more schools with different characteristics and employ mixed-method approaches in order to examine the relationships among empowering leadership, school culture, teacher performance, and deep learning implementation more comprehensively and deeply.

4. CONCLUSION

This study aimed to examine how principals' empowering leadership influences teacher performance in the implementation of deep learning in primary education. The findings reveal that empowering leadership contributes to improving teacher performance through the development of professional trust, teacher autonomy, participative decision-making, and continuous professional support. These leadership practices encourage teachers to become more reflective, innovative, and actively engaged in designing learning experiences aligned with deep learning principles. In addition, collaborative school culture was found to strengthen the influence of empowering leadership by creating a supportive and reflective environment that enhances teachers' motivation, engagement, and instructional innovation.

The findings contribute to the field of educational leadership by demonstrating that the successful implementation of deep learning is not solely determined by teachers' competencies, but also by empowering leadership practices and collaborative school culture. This study extends previous research by integrating empowering leadership, teacher performance, school culture, and deep learning within a unified analytical framework, particularly in the context of primary education.

Although this study was limited to a single-site qualitative case study, the findings provide important contextual insights into how empowering leadership can support sustainable instructional improvement. Future studies are recommended to involve broader educational contexts and employ mixed-method approaches to strengthen the transferability and comprehensiveness of the findings. From a practical perspective, school principals are encouraged to create participative and collaborative school environments by providing professional trust, autonomy, and continuous support for teachers. Policymakers and educational institutions should also strengthen leadership development programs that emphasize teacher empowerment and collaborative professional learning to support the sustainable implementation of deep learning in primary education.

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