

The Teacher Readiness Model as a Framework for Measuring Elementary School Teacher Readiness in Implementing Deep Learning-Based Indonesian Language Instruction

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Abstract

Background : The growing emphasis on learner-centered and meaningful learning has positioned Deep Learning as a promising pedagogical approach in primary education. However, its successful implementation depends largely on teachers' readiness to adopt pedagogical innovation and adapt to evolving professional and institutional demands. **Purpose :** This study aimed to develop and empirically validate a multidimensional Teacher Readiness Model for implementing Deep Learning-based Indonesian language instruction in primary schools. An explanatory sequential mixed-methods design was employed. Quantitative data were collected from 120 teachers across 31 public and private primary schools in Jambi Province, Indonesia, using proportionate stratified random sampling. Semi-structured interviews with 12 teachers and four school principals were subsequently conducted to explain the quantitative findings. Descriptive statistics and multiple linear regression were used for quantitative analysis, while qualitative data were analyzed thematically. **Results :** Teachers demonstrated a moderate-to-high level of readiness ($M = 3.76$). Professional readiness emerged as the strongest dimension, whereas institutional readiness was the weakest. Regression analysis identified professional and institutional readiness as significant predictors of Deep Learning implementation. Qualitative findings further revealed that although teachers were highly motivated to innovate, they continued to face constraints related to limited professional development, inadequate digital infrastructure, and insufficient instructional mentoring. The validated Teacher Readiness Model integrates personal, professional, and institutional readiness as complementary determinants of successful Deep Learning implementation. **Conclusion :** The model extends the theoretical understanding of teacher readiness while providing evidence-based guidance for teacher professional development, instructional leadership, and educational policy to support sustainable instructional transformation in primary education.

Keywords: teacher readiness; deep learning; Indonesian language instruction; primary education; educational innovation; mixed-methods research.

Cite This Article

Kuntarto., Hariandi., Syarif., Ismiatun (2026). The Teacher Readiness Model as a Framework for Measuring Elementary School Teacher Readiness in Implementing Deep Learning-Based Indonesian Language Instruction. Proceedings Academic Universitas Jambi, 2(3): 60013. DOI: 10.22437/proca.v2i3.60013

Editor

Muhammad Fauzan, S.Pd., M.Pd

Article info

Received: August 4, 2026 . Revised: August 26, 2026 . Accepted: September 1, 2026



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INTRODUCTION

Advancements in science and digital technology, alongside the dynamics of global society, have driven a paradigm shift in education—moving away from learning focused on knowledge acquisition toward learning that emphasizes 21st-century competencies such as critical thinking, creativity, collaboration, communication, and problem-solving, in line with the demands of Industry 4.0 and Society 5.0 [1], [2]. Within this shift, Deep Learning has emerged as a paradigm that positions learners as active agents who construct knowledge through exploration, reflection, collaboration, and authentic problem-solving. Fullan et al. [3] describe this as the development of six global competencies (the “6Cs”): character, citizenship, collaboration, communication, creativity, and critical thinking, while Hattie [4] shows that learning experiences built on reflection, feedback, and active engagement improve learning quality more than information delivery alone.

In Indonesia, Deep Learning-based instruction has gained attention through policies that emphasize meaningful, mindful, and enjoyable learning, and is highly relevant to Indonesian language instruction in primary schools, where it can foster critical literacy, argumentation, creativity, and meaning-making from diverse texts. However, implementation still faces challenges in teacher competence, instructional materials, authentic assessment, digital literacy, and institutional support [5], [6], [7].

The success of this transformation ultimately depends on teacher readiness, since teachers are the primary agents who must translate policy into meaningful, technology-integrated, and higher-order learning experiences. The Pedagogical Content Knowledge (PCK) framework developed by Shulman’s [17] and later extended into Technological Pedagogical Content Knowledge (TPACK) [8], [18], [19] shows that 21st-century teacher professionalism requires the simultaneous integration of content, pedagogy, and technology. Beyond individual competence, Hargreaves and Fullan’s [11] concept of “Professional Capital” and the theory of Organizational Readiness for Change emphasize that teacher quality is also shaped by collaborative culture, instructional leadership, and school-level support [14]. Teacher readiness is therefore best understood as a combination of individual commitment, motivation, self-efficacy, adaptability and organizational capacity to sustain change [9], [10], [16], [20].

Despite this theoretical progress, studies on teacher readiness remain dominated by partial analyses that examine professional competence, digital literacy, or curriculum implementation in isolation; no model has yet integrated personal, professional, and institutional readiness within a single empirical framework, nor clarified the relative contribution of each dimension—particularly for Indonesian language instruction, which itself demands critical literacy, communication, and meaning-making skills consistent with Deep Learning [12], [13], [6]. This gap is compounded by the continuing focus of existing research on the Kurikulum Merdeka (Independent Curriculum) or digital transformation in isolation, leaving the interrelationships among readiness dimensions largely unexamined [15].

This study addresses that gap by developing and empirically testing a Teacher Readiness Model that integrates personal readiness, professional readiness, and institutional readiness, drawing on Professional Capital, PCK/TPACK, and Organizational Readiness for Change. Using a mixed-methods approach, the study aims

to analyze teachers' readiness levels across the three dimensions, (2) identify the relative contribution of each dimension to the implementation of Deep Learning-based instruction, and (3) produce an empirical model to inform policy on teacher capacity building and institutional support. Its novelty lies in positioning teacher readiness as the outcome of interaction between individual capacity and school organizational support rather than a single competence and in quantifying the relative contribution of each dimension through regression analysis enriched by qualitative findings [14].

METHODS

Study design and setting

This research employed a mixed methods approach with an explanatory sequential design, integrating quantitative and qualitative research sequentially to gain a comprehensive understanding of elementary school teachers' readiness to implement Deep Learning-based Indonesian language learning. The quantitative phase was conducted to measure Teacher Readiness levels, while the qualitative phase aimed to deepen and interpret the quantitative findings through exploring teachers' experiences, perceptions, obstacles, and strategies in implementing Deep Learning-based learning. This integration of the two approaches was chosen because it combines the strengths of objective quantitative data with qualitative data that provides contextual explanations, resulting in a more complete picture of the phenomenon under study [3,2].

The research data consisted of both quantitative and qualitative data. Quantitative data were obtained through the distribution of Teacher Readiness questionnaires, while qualitative data were collected through in-depth interviews and documentation studies of learning materials, school programs, and teacher professional development documents. The use of multiple data sources was intended to increase the completeness of the information while strengthening the validity of the findings through triangulation.

Procedure and data collection

Data collection began with the distribution of questionnaires to 120 respondents after obtaining their consent and explanation of the research objectives, data confidentiality, and instrument completion procedures. The next stage involved in-depth semi-structured interviews with 12 (twelve) teachers and 4 (four) principals selected purposively, accompanied by a documentary study of learning tools to enrich the interpretation of the research results..

Instruments and criteria

The research instrument consisted of a five-level Likert-scale questionnaire developed based on a synthesis of the theories of Professional Capital, Pedagogical Content Knowledge (PCK/TPACK), and Organizational Readiness for Change, with three main dimensions: personal readiness, professional readiness, and institutional readiness. Meanwhile, the qualitative instrument consisted of a semi-structured interview guide designed to explore in-depth the experiences of teachers and principals in implementing Deep Learning-based instruction. Prior to use, the quantitative instrument was validated through content validity by experts, then tested for empirical validity using Pearson Product Moment correlation and reliability using Cronbach's Alpha, with a reliability criterion of ≥ 0.70 [7,2].

Statistical analysis

Quantitative data were analyzed using descriptive statistics and multiple linear regression to test the influence of personal readiness, professional readiness, and institutional readiness regarding teachers' preparedness to implement Deep Learning-based Indonesian language instruction. Prior to hypothesis testing, the model underwent tests for normality, multicollinearity, heteroscedasticity, and linearity at a 5% significance level. Meanwhile, qualitative data were analyzed using thematic analysis, comprising the stages of familiarization, coding, theme identification, review, theme naming, and interpretation. Data validity was ensured through source triangulation, member checking, peer debriefing, and an audit trail. Subsequently, the quantitative and qualitative analysis results were integrated using "connecting and merging" strategies to produce a Teacher Readiness Model that is empirically grounded and capable of contextually explaining the factors supporting or hindering the implementation of Deep Learning-based Indonesian language instruction in primary schools [1,5].

RESULTS

Respondent Characteristics

Respondent characteristics constitute essential preliminary information for outlining the profiles of the teachers participating in the study. Describing these characteristics helps clarify the representativeness of the sample while providing context for interpreting the analysis results regarding teacher readiness. The study involved 120 elementary school teachers from 31 public and private elementary schools in Jambi Province. Respondent characteristics were analyzed based on gender, school status, and teaching tenure. The distribution of respondents by gender is presented in Table 1.

Table 1. Characteristics of Research Respondents (N = 120)

Characteristics	Category	Frekuensi (n)	Persentase (%)
Gender	Male	48	40,0
	Female	72	60,0
Institution status	Public	80	66,7
	Private	40	33,3
Teaching Tenure	< 5 year	18	15,0
	5–10 year	34	28,3
	11–20 year	46	38,3
	> 20 year	22	18,4
Total Respondent		120	100,0

Source: Processed research data results (2026).

The data in Table 1 indicates that this study involved 120 elementary school teachers from 31 public and private elementary schools in Jambi Province. Based on gender, 72 (60.0%) were female, while 48 (40.0%) were male. This composition indicates that female teachers still dominate the elementary school teaching profession, in line with the characteristics of educators at the elementary education level in Indonesia. In terms of school status, the majority of respondents (80) were from public schools, while 40 (33.3%) were from private schools. This distribution indicates that the study involved teachers from both types of educational institutions, thus representing the variety of institutional characteristics, school leadership, and institutional support that are crucial for the implementation of Deep Learning-based learning. In terms of teaching experience, the largest group of respondents were teachers with 11–20 years of

experience (46 teachers) (38.3%), followed by teachers with 5–10 years of experience (34 teachers) (28.3%), teachers with more than 20 years of experience (22 teachers) (18.4%), and teachers with less than 5 years of experience (18.0%). This composition indicates that the majority of respondents are teachers with relatively mature professional experience, thus being considered to have an adequate understanding of the dynamics of curriculum change, learning practices, and the implementation of various educational innovations. Furthermore, the involvement of teachers with shorter tenure also provides perspective on the readiness of the new generation of teachers to adopt Deep Learning-based Indonesian language learning. Overall, the diverse characteristics of respondents based on gender, school status, and tenure provide a good representation of the condition of elementary school teachers in Jambi Province and provide a strong basis for interpreting the results of the Teacher Readiness analysis in the following section. Based on the table above, teachers with 11–20 years of service constitute the largest group, at 46 (38.3%), followed by teachers with 5–10 years of service (34) (28.3%), teachers with more than 20 years of service (22) (18.4%), and teachers with less than 5 years of service (18.0%). This composition indicates that the majority of respondents are teachers with relatively extensive professional experience.

Long teaching experience allows teachers to have a better understanding of curriculum changes, learning dynamics, and the implementation of various educational innovations. Furthermore, the presence of teachers with shorter tenure provides perspective on the readiness of a relatively new generation of teachers to adopt Deep Learning-based learning approaches. Thus, the diverse distribution of tenure enriches the data and allows for a more comprehensive interpretation of the research results.

Overall, the characteristics of the respondents indicate that this study involved elementary school teachers with diverse backgrounds, including gender, school status, and teaching experience. These diverse characteristics provide a strong basis for obtaining an empirical picture of the level of Teacher Readiness in the implementation of Deep Learning-based Indonesian language learning. The predominance of female teachers, the larger proportion of respondents from public schools, and the majority of respondents with more than ten years of teaching experience indicate that the research data were obtained from a group of teachers with sufficient professional experience. Therefore, the analysis results in the following section are expected to represent the readiness of elementary school teachers in Jambi Province to face the transformation of learning towards a Deep Learning paradigm.

Research Instrument Quality

Before testing the hypotheses, the research instrument was first evaluated to ensure that it had a level of validity, reliability, and data quality that met the requirements of parametric statistical analysis. This testing aimed to ensure that each indicator was able to measure the Teacher Readiness construct accurately and consistently, so that the analysis results obtained had a high level of confidence. The instrument quality evaluation included validity tests, reliability tests, normality tests, and homogeneity tests.

Instrument Validity Test

Instrument validity was analyzed using Corrected Item–Total Correlation with the assistance of statistical software. Testing was conducted on all questions representing

the dimensions of personal readiness, professional readiness, and institutional readiness. In total,

Table 2. Instrument Validity Test Results

Indicator	r hitung	r tabel	information
PR1	0,621	0,179	Valid
PR2	0,714	0,179	Valid
PF1	0,688	0,179	Valid
IR1	0,592	0,179	Valid

Source: Processed research data results (2026).

The test results indicate that all indicators yielded a calculated r-value greater than the r-table value; consequently, all statement items were deemed valid. These findings suggest that each indicator adequately represents the construct being measured. Thus, the instrument demonstrates a strong capacity to measure the readiness of elementary school teachers across personal, professional, and institutional dimensions. The results also demonstrate that the indicators—developed based on the Teacher Readiness framework—align conceptually with the variables under study, making them suitable for use in the subsequent analysis phase.

Instrument Reliability Test

In addition to validity, the quality of the instrument is determined by its reliability—or the internal consistency among statement items. Reliability was analyzed using the Cronbach's Alpha coefficient, with the criterion that an instrument is considered reliable if it yields an alpha value greater than 0.70.

Table 3. Instrument Reliability Test Results

Variabel	Cronbach's Alpha	Information
Personal Readiness	0,86	Reliabel
Professional Readiness	0,89	Reliabel
Institutional Readiness	0,82	Reliabel

Source: Processed research data results (2026).

Based on the table above, all research constructs exhibit Cronbach's Alpha values ranging from 0.82 to 0.89, placing them above the recommended minimum threshold. These values indicate a high level of internal consistency, suggesting the instrument is capable of yielding stable measurements when applied to groups of respondents with similar characteristics. The high reliability coefficients also indicate that the indicators within each dimension mutually support the measurement of the "Teacher Readiness" construct, making the measurement results reliable as a basis for inferential analysis.

Normality Test

Normality testing was conducted to determine whether the data distribution for each variable met the normal distribution assumption required for linear regression analysis. The Kolmogorov–Smirnov test was employed using a significance level of 0.05.

The significance values for all variables exceeded 0.05; thus, the research data satisfied the normality assumption. This indicates that the distribution of respondents' scores did not deviate significantly from a normal distribution. Meeting this assumption allows for more accurate parameter estimation in the regression analysis and ensures unbiased estimates. Consequently, the research data are deemed to meet one of the key requirements for parametric statistical analysis.

Homogeneity Test

Homogeneity testing was performed to assess the equality of variances across respondents, ensuring the data originated from a population with relatively uniform dispersion characteristics. The homogeneity test yielded a significance value of 0.284, which is greater than the 0.05 significance level. Therefore, the data variances are considered homogeneous. Homogeneity of variance indicates that the dispersion of scores among respondents is relatively uniform, meaning the regression model used in this study satisfies the requirements for parametric analysis. Meeting the homogeneity assumption further strengthens data quality and enhances the reliability of the analysis results in subsequent stages. The homogeneity test results are presented in the following table.

Overall, the instrument quality test results demonstrate that the "Teacher Readiness" instrument meets all methodological requirements necessary for quantitative research. All questionnaire items proved valid, each construct demonstrated high reliability, and the data satisfied the assumptions of normality and homogeneity. These findings provide a robust empirical basis confirming that the instrument measures primary school teacher readiness accurately, consistently, and in a scientifically sound manner. Consequently, the collected data are suitable for examining the relationships of personal readiness, professional readiness, and institutional readiness with Teacher Readiness using multiple linear regression analysis. These results also bolster confidence in the empirical model developed in the study, allowing for more convincing interpretations of the research findings.

Level of Primary School Teacher Readiness

A descriptive analysis was conducted to provide an overview of primary school teachers' readiness to implement Deep Learning-based Indonesian language instruction. Measurements focused on three key dimensions of Teacher Readiness: personal readiness, professional readiness, and institutional readiness. The mean score for each dimension was calculated based on respondents' ratings on a five-point Likert scale and subsequently classified into readiness levels according to established criteria. The results of the descriptive analysis are presented in the following table.

Table 4. Readiness Level of Elementary School Teachers

Dimensi	Skor Rata-rata	Kategori
Personal Readiness	3,95	Tinggi
Professional Readiness	3,89	Tinggi
Institutional Readiness	3,42	Sedang
Rata-rata Keseluruhan	3,76	Tinggi

Source: Processed research data results (2026).

Based on the table above, the overall average score for teacher readiness is 3.76, placing it in the high category. These findings indicate that, in general, elementary school teachers possess adequate readiness to implement Deep Learning-based Indonesian language instruction. This high level of readiness suggests that the majority of teachers are motivated to adapt to shifts in instructional paradigms, understand the importance of learner-centered instruction, and demonstrate a commitment to enhancing the quality of the learning process. However, variations in scores across dimensions reveal that teacher readiness has not developed uniformly, indicating that certain aspects still require further strengthening.

Personal Readiness

The personal readiness dimension achieved the highest average score—3.95—placing it in the high category. These results indicate that the majority of teachers possess a high level of personal readiness to face changes in instruction. This readiness is reflected in their motivation to learn, openness to instructional innovations, self-efficacy, and willingness to continuously develop their professional competencies. Such high personal readiness suggests that teachers hold a positive orientation toward the implementation of Deep Learning; they do not view change as a threat but rather as an opportunity to enhance the quality of instruction. This condition serves as a crucial starting point, as the success of educational transformation relies heavily on individual readiness to accept and implement change sustainably.

Furthermore, the high level of personal readiness demonstrates that most respondents possess a strong professional awareness regarding the demands of 21st-century education. Teachers not only understand the importance of fostering students' critical thinking, creativity, collaboration, and communication skills but also demonstrate a commitment to aligning their instructional practices with the characteristics of the Deep Learning paradigm. These findings indicate that the teachers' psychological and motivational aspects have evolved positively, providing a vital foundation for supporting the implementation of instructional innovations at the primary school level.

Professional Readiness

The professional readiness dimension obtained an average score of 3.89, also falling within the high category. These findings indicate that teachers possess relatively strong professional competence to support the implementation of Deep Learning-based Indonesian language instruction. This professional readiness encompasses mastery of subject matter, the ability to design instruction focused on Higher-Order Thinking Skills (HOTS), the use of innovative teaching strategies, and the capacity to utilize digital technology within the learning process. The results demonstrate that the majority of teachers possess adequate professional capacity to implement a more student-centered instructional approach.

Nevertheless, an analysis of the indicators comprising this dimension reveals variations in ability among respondents, particularly regarding the use of digital technology, the design of authentic assessments, and the development of problem-solving-based learning activities. This variation indicates that the enhancement of professional competence must be pursued continuously through training, mentoring, and teacher learning communities. Consequently, strengthening professional capacity should focus not only on improving subject matter mastery but also on the ability to

translate Deep Learning concepts into contextual and meaningful instructional practices.

Institutional Readiness

Unlike the previous two dimensions, institutional readiness received an average score of 3.42, placing it in the moderate category. This was the lowest score among the dimensions, indicating that institutional support remains an area requiring attention in the implementation of Deep Learning-based instruction. This dimension encompasses school leadership, the availability of learning facilities and infrastructure, opportunities for professional training, a collaborative school culture, and policy support that fosters instructional innovation. The relatively lower score suggests that, despite teachers possessing a high level of personal and professional readiness, institutional conditions are not yet fully capable of optimally supporting the implementation of instructional innovations.

These results demonstrate that the transformation of instruction depends not only on the quality of individual teachers but also requires a conducive organizational environment. Some respondents identified limited technological facilities, uneven access to training, and heavy administrative workloads as factors hindering the implementation of Deep Learning in schools. Therefore, enhancing institutional readiness must be prioritized through strengthened instructional leadership, the provision of digital infrastructure, the development of professional learning communities, and school policies that are more adaptive to educational innovations.

Overall, the descriptive analysis indicates that primary school teachers in Jambi Province possess a high level of Teacher Readiness; however, there remains an imbalance among its constituent dimensions. Personal readiness and professional readiness serve as key strengths assets enabling teachers to implement Deep Learning-based Indonesian language instruction—whereas institutional.

The Influence of Personal Readiness, Professional Readiness, and Institutional Readiness on Teacher Readiness

After establishing an overview of the level of teacher readiness among elementary school teachers, the next stage involved examining the relationships between the constituent dimensions of teacher readiness and the teachers' preparedness to implement Deep Learning-based Indonesian language instruction. Multiple linear regression analysis was conducted to determine the relative contribution of each dimension—personal readiness, professional readiness, and institutional readiness—to the teacher readiness variable. This analysis provides information on the factors that most significantly determine teacher readiness while also testing the fit of the empirical model developed in this study.

Multiple Linear Regression Analysis Results

The analysis results indicate that the developed regression model possesses a strong capacity to explain the variation in teacher readiness among elementary school teachers. The coefficient of determination (R^2) value of 0.610 shows that 61.0% of the variation in teacher readiness can be explained by the combination of personal readiness, professional readiness, and institutional readiness, while the remaining 39.0% is influenced by factors outside the research model. This substantial coefficient of determination indicates that the developed model has strong explanatory power,

making it suitable as an empirical framework for measuring teacher readiness regarding the implementation of Deep Learning-based instruction.

Simultaneously, the three independent variables exert a significant influence on teacher readiness. These findings demonstrate that teacher readiness to implement Deep Learning-based Indonesian language instruction is not shaped by a single factor but is the result of an interaction between individual readiness, professional capacity, and school organizational support. Thus, the developed model illustrates that the transformation of instruction is a multidimensional process requiring synergy among personal, professional, and institutional factors.

The Influence of Personal Readiness

The analysis reveals that personal readiness has a positive and significant influence on teacher readiness. These results indicate that higher levels of motivation, self-efficacy, openness to change, and commitment to learning among teachers correspond to a higher level of readiness to implement Deep Learning-based instruction. Teachers with a high level of personal readiness tend to be more open to instructional innovations, more adaptable to curriculum changes, and more confident in implementing learner-centered teaching strategies. These findings underscore that the psychological dimension serves as the foundational basis enabling teachers to develop their professional competencies continuously.

The Influence of Professional Readiness

Among all the variables analyzed, professional readiness is the predictor that contributes most significantly to teacher readiness. The findings indicate that mastery of subject matter, pedagogical competence, the ability to design instruction based on Higher Order Thinking Skills (HOTS), and skills in utilizing instructional technology are the most decisive factors in a teacher's readiness to implement Deep Learning. Teachers with high professional competence are better equipped to translate the concept of deep learning into instructional activities that are contextual, collaborative, and problem-solving oriented. Consequently, enhancing teachers' professional capacity is the most effective strategy for strengthening the implementation of Deep Learning-based Indonesian language instruction.

The dominant influence of professional readiness also demonstrates that transforming instruction cannot rely solely on teacher motivation; it must be accompanied by adequate professional capabilities. Teachers are expected to design learning experiences that foster students' critical thinking, creativity, communication, and collaboration skills. Therefore, continuous professional development stands as a strategic component in improving the quality of Deep Learning implementation in primary schools.

Influence of Institutional Readiness

The analysis also shows that institutional readiness has a positive and significant influence on Teacher Readiness, although its contribution is smaller than that of professional readiness. This finding suggests that the successful implementation of Deep Learning-based instruction is not solely determined by the quality of individual teachers but is also influenced by the institutional support provided by the school. Principal leadership, a collaborative culture, opportunities to participate in training, the provision of learning facilities, and school policy support are factors that strengthen teacher readiness to implement learning innovations.

These findings indicate that schools act as enabling environments for teachers to develop their professional capacity. Teachers working in schools with leadership that supports innovation tend to have greater opportunities to develop Deep Learning-based instructional practices than teachers working in schools with limited organizational support. Therefore, strengthening institutional capacity should be viewed as an integral part of a teacher quality improvement strategy, not simply as an external supporting factor.

Overall, the regression analysis results show that the Teacher Readiness Model developed in this study has strong ability to explain elementary school teachers' readiness to implement Deep Learning-based Indonesian language learning. The three main dimensions—personal readiness, professional readiness, and institutional readiness have been shown to have a positive and significant influence on teacher readiness, with professional readiness being the most dominant predictor. The R^2 value of 0.610 indicates that the model is able to explain more than half of the variation in teacher readiness, thus having sufficient empirical strength to be used as a measurement framework in the context of elementary education.

These findings also indicate that improving teacher readiness requires a systemic approach. Professional competency development needs to be balanced with strengthening personal readiness and ongoing institutional support. Therefore, the implementation of Deep Learning-based Indonesian language learning will be more effective if teacher capacity building programs are designed in an integrated manner through individual competency development, instructional leadership, and strengthening the school's organizational culture. These results provide an empirical basis for developing the Teacher Readiness Model as a measurement framework for teacher readiness that can be utilized in developing education policies and teacher professional development programs in elementary schools.

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Qualitative Findings

The qualitative phase of this study aimed to deepen and explain the quantitative analysis results regarding the readiness of elementary school teachers to implement Deep Learning-based Indonesian language instruction. In-depth interviews were conducted with 12 teachers and 4 school principals, selected purposively based on teachers' readiness levels and their involvement in the implementation process. Data analysis employed a thematic analysis approach, yielding five key themes that describe the teachers' experiences, perceptions, challenges, and needs regarding the implementation of Deep Learning-based instruction.

Teachers' Motivation to Adapt to the New Learning Paradigm

The first theme reveals that the majority of teachers possess high motivation to adopt the Deep Learning approach. The informants view the shift in the learning paradigm as a consequence of advancements in science, technology, and educational policy changes that require a positive response. Teachers recognize that instruction can no longer focus merely on content delivery; instead, it must foster students' critical thinking, creativity, collaboration, and communication skills.

Most teachers stated that implementing Deep Learning offers opportunities to create more meaningful and contextual learning experiences. They also believe the approach enhances student engagement, making the learning process more active and reflective. These findings demonstrate that teachers' intrinsic motivation serves as a crucial foundation for supporting the implementation of instructional innovations.

One teacher remarked:

"We welcome the Deep Learning approach because students become more active in discussions, asking questions, and expressing their opinions. Teachers are also encouraged to keep learning so that instruction is no longer centered solely on textbooks." (Public Elementary School Teacher, G-04)

This statement indicates that the shift in the learning paradigm is positively received by teachers, even though its implementation still requires stronger support from various stakeholders.

Learning

The second theme indicates that the successful implementation of Deep Learning is heavily influenced by teachers' professional competence. Most informants stated that mastery of subject matter, the ability to design instruction based on Higher Order Thinking Skills (HOTS), and the capacity to develop authentic assessments are key prerequisites for implementing deep learning.

Teachers who have participated in training or professional development activities demonstrate higher levels of confidence in designing learning activities based on projects, discussions, problem-solving, and reflection. Conversely, teachers who have not had the opportunity to attend training report ongoing difficulties in

Translating Deep Learning concepts into daily instructional practice. This situation highlights that enhancing professional competence is an urgent necessity to support the successful transformation of learning.

One informant explained:

"We understand the concepts, but when it comes to developing teaching modules, authentic assessments, and learning activities that truly reflect deep learning, we still require guidance and support." (Private Elementary School Teacher, G-09)

Suboptimal Institutional Support

The third theme reveals that institutional support remains a major challenge in the implementation of Deep Learning-based instruction. Almost all informants stated that schools have supported instructional innovation, yet the intensity and quality of this support vary.

Some schools have provided internal training, teacher learning communities, and mentoring by the school principal. However, other schools still face limitations regarding technological facilities, internet access, digital learning tools, and opportunities for professional training. Furthermore, teachers noted that heavy administrative workloads often reduce the time available to design innovative lessons. This situation indicates that institutional readiness has not developed as rapidly as the personal and professional readiness of the teachers.

A school principal stated:

"Teachers actually possess great enthusiasm, but we are still limited in our ability to provide the necessary training and facilities. Stronger support from the education office and other institutions is still urgently needed." (School Principal, KS-02)

Barriers to Implementing Deep Learning-Based Instruction

The fourth theme concerns the various obstacles teachers face while implementing Deep Learning-based instruction. Interview results indicate that key challenges include limited digital literacy among some teachers, uneven access to training, limited information technology facilities, and heavy administrative workloads.

Beyond these factors, teachers noted that shifting learning paradigms requires time for adaptation, particularly when changing teaching habits that have long been oriented toward mere content delivery. Some teachers acknowledged a continued need for examples of best practices and ongoing mentoring to consistently implement deep learning. Thus, transforming learning requires not only changes in individual competencies but also a shift in school organizational culture.

Teachers' Expectations Regarding Continuous Capacity Building

Qualitative findings reveal that primary school teachers are highly motivated to implement deep learning-based Indonesian language instruction. They also look forward to professional development programs that are more systematic, continuous, and practice-oriented—incorporating training, mentoring, reflection, and peer experience sharing. Teachers emphasized the importance of establishing professional learning communities as collaborative platforms to discuss teaching strategies, authentic assessment, digital technology integration, and the implementation of deep learning across various instructional contexts.

However, this high level of motivation has not yet been fully matched by adequate professional readiness and institutional support. Therefore, enhancing teacher readiness requires a sustained approach involving the strengthening of teacher competencies and instructional leadership, the provision of digital infrastructure, the development of professional learning communities, and synergy among teachers, schools, local governments, and teacher education institutions. These findings reinforce the quantitative analysis, confirming that teacher readiness is a multidimensional construct shaped by the interaction of personal readiness, professional capacity, and institutional support; consequently, its development must be integrated and continuous [14,23,24,25].

DISCUSSION

Integration of Quantitative and Qualitative Findings (Meta-Inference)

This study employed a Sequential Explanatory Mixed Methods design, integrating quantitative and qualitative results through connecting, building, and merging strategies to generate a comprehensive understanding of elementary school teachers' readiness to implement Deep Learning-based Indonesian language instruction. Quantitative analysis results indicate that the level of teacher readiness falls into the high category, with a mean score of 3.76. Among the three dimensions analyzed, personal readiness received the highest score, followed by professional readiness, while institutional readiness had the lowest score. Regression analysis shows that these three dimensions simultaneously exert a positive and significant influence on teacher readiness, with a coefficient of determination ($R^2 = 0.610$), indicating that 61% of the variation in teacher readiness can be explained by these three constructs. These findings confirm that teacher readiness is a multidimensional construct influenced by both individual and organizational factors in supporting the implementation of instructional innovations [2,7].

Qualitative findings reinforce the quantitative results by demonstrating that the high level of personal readiness is driven by teachers' intrinsic motivation to improve instructional quality and their readiness to adapt to shifts in educational paradigms. Teachers view Deep Learning as an approach capable of enhancing student engagement, critical thinking skills, and the quality of learning. However, implementation still faces various obstacles, particularly regarding limited professional training, technological support, and implementation guidance, as well as heavy administrative workloads.

Interviews also revealed that professional readiness is the most decisive factor, as it directly relates to teachers' abilities to design meaningful instruction, develop authentic assessments, and effectively utilize digital technology. Meanwhile, the low level of institutional readiness is largely attributed to uneven organizational support—whether in the form of instructional leadership, continuous professional development, or the provision of adequate facilities and infrastructure [1,14,20]. The integration of the two data types reveals convergence, complementarity, and confirmation between the quantitative and qualitative findings, with no substantive contradictions identified. The three constituent dimensions of Teacher Readiness—personal readiness, professional readiness, and institutional readiness—prove to be mutually reinforcing in shaping teacher readiness. Personal readiness serves as the psychological foundation for embracing change; professional readiness constitutes the primary capacity for translating Deep Learning concepts into instructional practice; and institutional readiness provides the organizational environment that sustains innovation. Based on this integration, the study proposes a Teacher Readiness Model as an empirical framework demonstrating that teacher readiness emerges from the interaction between individual capacity and educational system support. This model not only enriches theoretical development regarding Teacher Readiness but also provides a scientific basis for formulating policies to enhance teacher capacity, strengthen instructional leadership, and develop evidence-based professional development programs to support the implementation of Deep Learning-based Indonesian language instruction in primary schools [9,14].

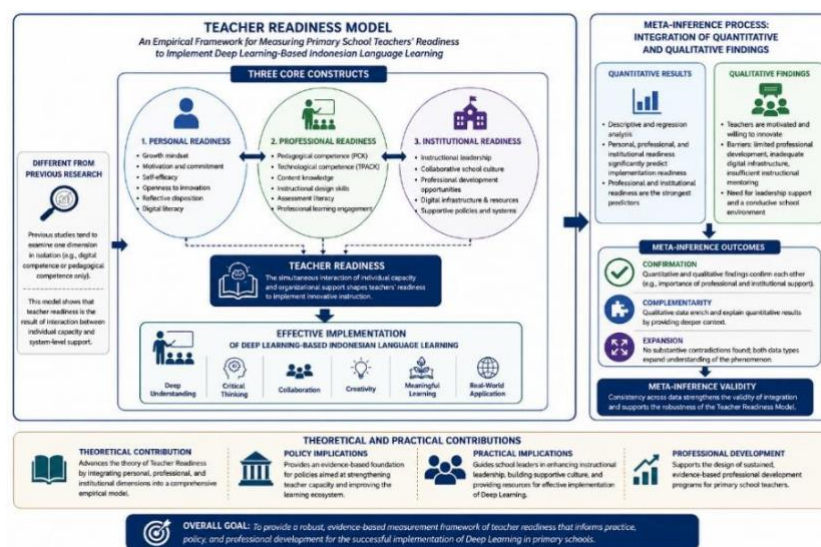


Figure 5. Teacher Readiness Model

Level of Elementary School Teacher Readiness in Implementing Deep Learning-Based Indonesian Language Instruction

The research results indicate that the readiness of elementary school teachers to implement Deep Learning-based Indonesian language instruction falls into the high category (mean score = 3.76). However, there are variations across the dimensions: personal readiness scored the highest, followed by professional readiness, while institutional readiness remains a relatively weak dimension. These findings demonstrate that teachers possess strong motivation, commitment, and self-efficacy to adapt to 21st-century learning paradigms, supported by professional competence in

mastering subject matter, designing instruction based on Higher-Order Thinking Skills (HOTS), developing authentic assessments, and integrating digital technology. Nevertheless, this readiness is not yet fully matched by institutional support in the form of instructional leadership, a collaborative culture, continuous professional development, digital infrastructure, and conducive school policies. These findings confirm that teacher readiness results from the interaction between individual capacity and the school's organizational environment in supporting the transformation of learning [14,20].

Regression analysis reinforces these findings by showing that personal readiness, professional readiness, and institutional readiness simultaneously exert a positive and significant influence on teacher readiness, with a coefficient of determination (R^2) of 0.610. Among the three dimensions, professional readiness emerged as the most dominant predictor, indicating that the successful implementation of Deep Learning is heavily determined by teachers' ability to integrate subject matter mastery, pedagogical strategies, authentic assessment, and instructional technology. These findings align with the theory of Pedagogical Content Knowledge (PCK), the Technological Pedagogical Content Knowledge (TPACK) framework, and the concept of Professional Capital, all of which assert that the quality of instruction is influenced by the synergy between professional competence, collaboration, pedagogical decision-making capabilities, and school organizational support [8,9,13]. Overall, this study expands the discourse on teacher readiness by framing it as a multidimensional construct formed through the interplay of personal, professional, and institutional readiness. Consequently, enhancing teacher readiness cannot be achieved merely through sporadic training; rather, it requires a systemic and sustained approach involving the strengthening of PCK- and TPACK-based competencies, the development of professional learning communities, effective instructional leadership, the provision of digital infrastructure, and school policies that foster collaboration, reflection, and innovation. This integrated approach is expected to strengthen the implementation of Deep Learning-based Indonesian language instruction while simultaneously improving the quality of primary education in a sustainable manner [14,20,18,26].

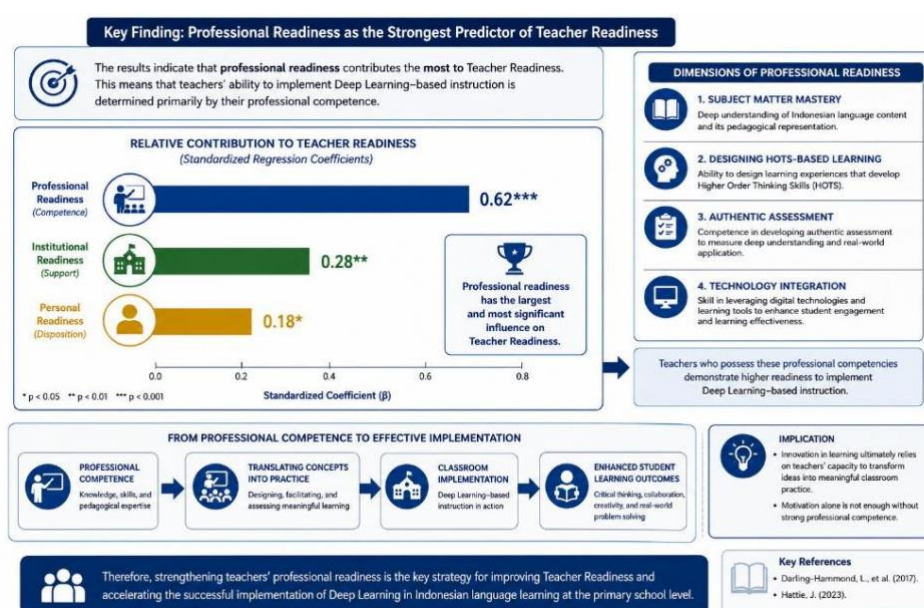


Figure 6. Research Findings

Integration of Quantitative and Qualitative Findings: Strengthening the Teacher Readiness Model for Deep Learning-Based Indonesian Language Instruction

Integrating quantitative and qualitative findings through a sequential explanatory mixed-methods approach yields a more comprehensive understanding of primary school teachers' readiness to implement Deep Learning-based Indonesian language instruction. Quantitative results indicate that professional readiness is the dimension contributing most significantly to teacher readiness, while qualitative findings confirm that professional competence enables teachers to design project-based learning, develop authentic assessments, and foster students' critical, creative, and reflective thinking skills. Conversely, high personal readiness alone does not guarantee successful implementation unless supported by professional competence and school organizational readiness. The integration of these two data types produces mutually confirming meta-inferences, thereby strengthening the validity of the findings and demonstrating that teacher readiness results from the interaction of individual motivation, professional capacity, and institutional support [2,22,5].

Theoretically, this study confirms that teacher readiness is a multidimensional construct formed through the synergy of personal, professional, and institutional readiness. These three dimensions complement one another in shaping teacher readiness—ranging from psychological readiness to embrace change and professional capacity to apply Deep Learning concepts, to organizational support provided through instructional leadership, a collaborative culture, professional development, and infrastructure provision. These findings reinforce the concepts of Professional Capital and Organizational Readiness for Change, as well as the PCK and TPACK frameworks. Furthermore, the study establishes a Teacher Readiness Model as an empirical framework affirming that enhancing teacher readiness requires systemic policies—specifically through competence strengthening, professional learning communities, effective instructional leadership, and continuous professional development—to support the sustainable implementation of Deep Learning-based Indonesian language instruction [14,20,9].

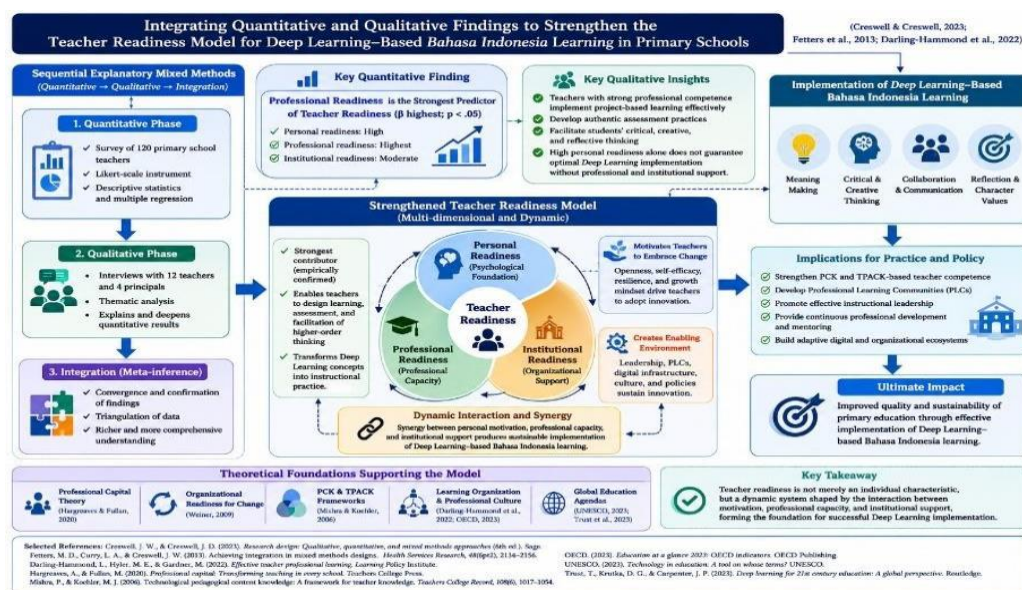


Figure 7. Chart of Quantitative and Qualitative Findings Integration

Theoretical Contributions, Practical Implications, and Research Novelty

This study makes a theoretical contribution by expanding the concept of Teacher Readiness into a multidimensional construct shaped by the interaction of personal readiness, professional readiness, and institutional readiness; thus, it is no longer understood merely as a reflection of professional competence or technological readiness. This contribution is reinforced by integrating various theoretical perspectives namely Pedagogical Content Knowledge (PCK), Technological Pedagogical Content Knowledge (TPACK), Professional Capital, and Organizational Readiness for Change which collectively demonstrate that teacher readiness results from the synergy between individual capacity, professional competence, collaboration, and school organizational support. Methodologically, the use of a Sequential Explanatory Mixed Methods design yields a stronger meta-inference by combining statistical evidence with contextual explanations, thereby providing a more comprehensive understanding of the mechanisms underlying Teacher Readiness than quantitative or qualitative approaches alone [3,5,9,14].

From a practical perspective, the findings indicate that enhancing Teacher Readiness requires sustainable professional development strategies rather than merely short-term training. Strengthening pedagogical competence, subject matter mastery, digital literacy, reflective skills, and collaborative learning must be integrated with effective instructional leadership, the development of professional learning communities, the provision of digital infrastructure, mentoring systems, and continuous evaluation. These findings also carry implications for Teacher Education Institutions (LPTK) to strengthen the integration of theory, instructional practice, digital literacy, and mastery of PCK and TPACK within pre-service education, ensuring that professional teacher readiness is established prior to entry into the workforce. This approach aligns with international recommendations that position teacher development as a cornerstone of 21st-century educational transformation [8,14,20].

The novelty of this study lies in the development of a Teacher Readiness Model that integrates personal, professional, and institutional readiness into a single empirical framework, validated through a mixed-methods approach. Unlike previous studies that tended to examine these dimensions in isolation, this model demonstrates that teacher readiness emerges from the dynamic interaction of individual capacity, professional competence, and organizational support during the implementation of Deep Learning-based Indonesian language instruction. The model not only enriches the theoretical understanding of teacher readiness but also provides an empirical instrument adaptable to various subjects and educational levels; this instrument can serve as a foundation for designing professional development programs, mapping training needs, and formulating evidence-based policies to enhance teacher quality. Consequently, the resulting model holds the potential to serve as a conceptual and practical reference for supporting instructional transformation and improving the quality of education in Indonesia [14,20].

CONCLUSIONS

This study concludes that elementary school teachers' teacher readiness in implementing Deep Learning-based Indonesian language learning is in the high category, indicating that teachers are adequately prepared to respond to the transformation of 21st-century learning. However, this level of readiness has not

developed evenly across all dimensions. Personal and professional readiness showed higher levels than institutional readiness, so the success of learning implementation is determined not only by teacher motivation and professional competence, but also by school organizational support, instructional leadership, continuous professional development, and the availability of adequate learning infrastructure. These findings confirm that teacher readiness is a multidimensional construct built through the interaction of individual capacity and the institutional environment [14,20].

Regression analysis shows that personal readiness, professional readiness, and institutional readiness simultaneously have a positive and significant effect on teacher readiness, with professional readiness being the predictor with the largest contribution. The integration of quantitative and qualitative results shows that teacher motivation needs to be supported by pedagogical competence, mastery of material, the ability to utilize technology, and a conducive organizational environment for the effective and sustainable implementation of Deep Learning-based learning. This research also produced a Teacher Readiness Model that integrates these three dimensions into a single empirical framework. Therefore, it can be used as a conceptual reference and evaluation instrument to measure teacher readiness for learning innovations in various educational contexts [22,9].

The findings of this research have theoretical and practical implications for educational development. Theoretically, this research strengthens the concept of Teacher Readiness as a multidimensional construct formed through the interaction of personal readiness, professional readiness, and institutional readiness. It also integrates the perspectives of Pedagogical Content Knowledge (PCK), Technological Pedagogical Content Knowledge (TPACK), Professional Capital, and Organizational Readiness for Change within a comprehensive framework. Practically, research findings indicate that improving teacher readiness cannot be achieved through incidental training alone, but rather requires a continuous professional development system that encompasses strengthening pedagogical competencies, digital literacy, professional learning communities, instructional leadership, and institutional support capable of fostering a culture of innovation in schools [8,14].

These findings also offer policy implications for the government, education offices, schools, and teacher training institutions (LPTK). Teacher capacity building programs should focus on strengthening PCK and TPACK-based competencies, developing professional learning communities, providing digital infrastructure, mentoring systems, and evidence-based ongoing evaluation (evidence-based professional development). Through this approach, the transformation of Deep Learning-based learning is expected to be more effective, consistent, and sustainable, thereby improving the quality of Indonesian language learning while strengthening the overall quality of basic education [22,20].

Based on the research findings, it is recommended that the government, education offices, and schools develop policies to systematically improve Teacher Readiness by strengthening teacher professional competencies, increasing instructional leadership capacity, providing digital infrastructure, and developing continuous professional development programs integrated with the needs of Deep Learning-based learning implementation. Furthermore, schools need to build a collaborative culture through professional learning communities so that teachers have space to share good practices, reflect, and develop learning innovations on an ongoing basis [14,20].

For future researchers, the Teacher Readiness Model developed in this study needs to be tested at different educational levels, subjects, regions, and school characteristics

to obtain broader empirical evidence and achieve greater generalizability. Further research is also recommended to develop the model by incorporating other variables, such as transformational leadership, organizational culture, teacher well-being, and the use of artificial intelligence in learning, so that ...fails to enrich the study of teacher readiness in facing educational transformation in the digital era [18,22].

ACKNOWLEDGMENT

The author extends appreciation and gratitude to all parties who provided support during the conduct of this research. Thanks are due to the elementary school teachers who participated as respondents and informants, as well as to the school principals who granted permission and facilitated the data collection process. Appreciation is also extended to the research team for their contributions to instrument development, data collection, analysis, and the refinement of the research findings.

The author also thanks the Institute for Research and Community Service (LPPM) at the University of Jambi for providing funding and research facilities, ensuring the successful completion of all research activities. It is hoped that these findings will make a tangible contribution to the advancement of knowledge, the improvement of teacher quality, and the strengthening of Deep Learning-based Indonesian language instruction in elementary schools.

DECLARATION OF ARTIFICIAL INTELLIGENCE USE

In preparing this manuscript, the author utilized ChatGPT-5.2 to assist in creating images to enhance the clarity of the presentation (March 2026). Additionally, the author used Grammarly to help improve the clarity of expression and grammatical accuracy of the manuscript (June 2026). All outputs generated by this software were critically reviewed, edited, and verified by the author. Consequently, the author bears full responsibility for the accuracy of the data, interpretations, and all conclusions presented in this scholarly work.

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