

# The Influence of Headteachers' Instructional Leadership and ICT Literacy on Teachers' Instructional Leadership through Teachers' Work Motivation in Primary Schools in South Solok Regency

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## Abstract

This study aimed to examine the relationships of principals' instructional leadership and teachers' information and communication technology (ICT) literacy with teacher instructional leadership, with work motivation positioned as a mediating mechanism among public elementary school teachers in South Solok Regency, Indonesia. A quantitative correlational survey design was employed involving 291 teachers selected from a population of 1,190 through proportional random sampling. Data were collected using five-point Likert-scale questionnaires and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.1.1.8 through measurement- and structural-model evaluation. The results showed that principals' instructional leadership was positively associated with work motivation ( $\beta = 0.264$ ,  $t = 4.775$ ,  $p < 0.001$ ) and teacher instructional leadership ( $\beta = 0.128$ ,  $t = 2.766$ ,  $p = 0.006$ ). ICT literacy was positively associated with work motivation ( $\beta = 0.519$ ,  $t = 9.773$ ,  $p < 0.001$ ) but not directly with teacher instructional leadership ( $\beta = 0.044$ ,  $p = 0.374$ ). Work motivation showed the strongest relationship with teacher instructional leadership ( $\beta = 0.709$ ,  $t = 14.709$ ,  $p < 0.001$ ) and significantly mediated both the principal instructional leadership pathway ( $\beta = 0.187$ ) and the ICT literacy pathway ( $\beta = 0.368$ ). The model explained 67.2% of the variance in teacher instructional leadership. These findings indicate that organizational and digital resources become more consequential when translated into sustained teacher motivation. Given the cross-sectional, self-reported design, future longitudinal and multi-source studies are needed to strengthen causal inference and generalizability.

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## Introduction

Improving the quality of basic education is a strategic agenda in human resource development, as elementary school (SD) serves as the foundation for the development of students' academic competencies, character, and 21st-century skills (Kennedy & Sundberg, 2020; Anisah, 2023; Permatasari & Tandiayuk, 2023). In the context of educational transformation, teachers are no longer viewed merely as transmitters of material but also as leaders of learning (*teacher instructional leader*) capable of directing, motivating, and creating active, innovative, and student-centered learning (Aspandi, & Muttaqin, 2025; Tambak et al., 2026). Teacher instructional leadership is a crucial factor in improving the quality of the learning process because teachers play a direct role in managing student learning experiences, developing learning innovations, and conducting ongoing reflection on their learning practices (Pan & Chen, 2021; Ghamrawi et al., 2024; Riddel & Zulfikar,

2024). Therefore, strengthening teacher instructional leadership is a key prerequisite for achieving sustainable improvements in the quality of basic education.

The success of teachers in implementing instructional leadership is inseparable from various influencing factors, including organizational factors, individual competencies, and psychological factors (Yayuk & Haqqi, 2024; Nombrado, 2025). From an organizational perspective, the principal's instructional leadership plays a crucial role in building an academic culture, implementing instructional supervision, providing professional support, and creating a learning environment conducive to teacher competency development (Shaked, 2023; Ayumi & Nasution, 2025). Meanwhile, the development of digital technology requires teachers to have adequate Information and Communication Technology (ICT) literacy to be able to integrate technology into the learning process (Fernández-Batanero et al., 2022). However, instructional leadership and ICT literacy will not necessarily produce optimal instructional leadership if they are not supported by teacher work motivation, an internal force that encourages teachers to continue to innovate, commit, and continuously improve the quality of learning.

Although various studies have explored the relationship between principal instructional leadership, ICT literacy, work motivation, and teacher performance, most studies still treat teacher performance as the dependent variable (Bektaş et al., 2022; Bada et al., 2024; Elfira et al., 2024). Research specifically examining teacher instructional leadership as the primary variable is still relatively limited, particularly at the elementary school level (Hosseingholizadeh et al., 2023). Furthermore, empirical models that integrate principal instructional leadership and ICT literacy with work motivation as a mediating variable to explain the formation of teacher instructional leadership are also rare (Bellibaş et al., 2026). This research gap highlights the need to develop a more comprehensive model to explain the factors influencing teacher instructional leadership.

The urgency of this research is further strengthened by the empirical conditions in South Solok Regency. Based on the results of initial observations of Elementary School accreditation data in 2025, the majority of schools are still in the B Accreditation category, as many as 89 schools, while only 25 schools have achieved an Accreditation. In addition, there are still 18 schools with C Accreditation and 1 school that has not been accredited. This condition is also accompanied by the dominance of the number of teachers teaching in B accredited schools, as many as 769 people, compared to teachers in an accredited school, which number 295 people. The distribution of accreditation indicates that the quality of learning in South Solok Regency is still uneven and still requires strengthening in aspects of teacher learning leadership, principal instructional leadership, and the use of technology in learning.

**Table 1.** Initial Observation Results of Elementary School Accreditation and Teacher Distribution in South Solok Regency in 2025

| No | District Name       | School Accreditation Level |    |    |     | Number of Accredited Teachers |     |    |     |
|----|---------------------|----------------------------|----|----|-----|-------------------------------|-----|----|-----|
|    |                     | A                          | B  | C  | NOT | A                             | B   | C  | NOT |
| 1  | KPGD                | 1                          | 20 |    |     | 11                            | 185 |    |     |
| 2  | Sungai Pagu         | 3                          | 19 |    |     | 44                            | 164 |    |     |
| 3  | Pauh Duo            | 6                          | 10 |    |     | 50                            | 86  |    |     |
| 4  | Sangir              | 10                         | 18 | 4  |     | 142                           | 151 | 25 |     |
| 5  | Sangir Jujuan       | 3                          | 8  | 1  |     | 28                            | 62  | 6  |     |
| 6  | Sangir Balai Janggo | 2                          | 8  |    |     | 20                            | 72  |    |     |
| 7  | Sangir Batang Hari  |                            | 6  | 13 | 1   |                               | 49  | 88 | 7   |

|        |    |    |    |   |     |     |     |   |
|--------|----|----|----|---|-----|-----|-----|---|
| Amount | 25 | 89 | 18 | 1 | 295 | 769 | 119 | 7 |
|--------|----|----|----|---|-----|-----|-----|---|

*Source: Researcher analysis based on data from South Solok Regency in 2025.*

The observational data indicates that most elementary schools in South Solok Regency are still in the moderate quality category and therefore require systematic efforts to improve the quality of learning. This condition is reinforced by the results of initial observations that show the still low level of learning innovation, the dominance of teacher-centered learning, the less-than-optimal use of digital media, and the still limited learning reflection activities carried out by teachers. On the other hand, the implementation of instructional leadership by school principals is still more oriented towards fulfilling administrative needs than pedagogical development, while teachers' ICT literacy skills and work motivation also still show quite high variations. This situation indicates that improving teacher learning leadership requires synergy between the principal's instructional leadership, ICT literacy, and teacher work motivation as interrelated factors.

Based on the description, this study aims to analyze the influence of principals' instructional leadership and ICT literacy on teachers' instructional leadership through teacher work motivation in elementary schools in South Solok Regency. This study offers novelty by placing teacher instructional leadership as the dependent variable and examining the role of work motivation as a mediating variable in the relationship between principals' instructional leadership and ICT literacy on teachers' instructional leadership. The research findings are expected to enrich the study of Educational Administration as well as serve as an empirical basis for formulating policies to improve teacher professionalism, strengthen principals' instructional leadership, and develop digital transformation of learning in elementary schools.

The theoretical model of this study is based on the assumption that teacher instructional leadership is shaped by the interaction between organizational support, technological competence, and teachers' psychological motivation. In this model, Principal Instructional Leadership (X1) and ICT Literacy (X2) are positioned as exogenous variables, Work Motivation (Z) as an intervening variable, and Teacher Instructional Leadership (Y) as the endogenous outcome variable. This causal ordering is grounded in the theoretical framework developed in this study, which views principal instructional leadership as an organizational factor, ICT literacy as a technological-professional factor, and work motivation as an internal psychological mechanism that translates organizational and technological conditions into teachers' instructional behavior. The thesis specifically identifies organizational factors through the instructional role of the principal, technological factors through teachers' ICT literacy, and psychological-motivational factors through teachers' work motivation.

Principal instructional leadership is theoretically expected to influence teachers' work motivation because principals establish the instructional environment in which teachers perform their professional roles. Through clear instructional direction, academic supervision, professional support, monitoring, and the development of an academic culture, principals can provide teachers with guidance, recognition, professional support, and opportunities for development. These conditions can strengthen teachers' sense of competence, responsibility, commitment, and enthusiasm toward their professional duties. The theoretical discussion in this study therefore places principal instructional leadership before work motivation in the causal sequence. Accordingly, H1 is proposed: Principal instructional leadership has a positive and significant effect on teachers' work motivation.

ICT literacy is likewise positioned as an antecedent of teachers' work motivation because technological competence can reduce difficulties in performing instructional tasks and increase teachers' confidence in designing and implementing learning activities. Teachers who are able to use digital technologies, access online learning resources, develop digital instructional media, and utilize digital learning platforms are expected to experience greater competence and effectiveness in carrying out their professional responsibilities. The theoretical model consequently assumes that ICT literacy contributes first to teachers' psychological readiness and motivation before being translated into instructional leadership behavior. This ordering is consistent with the study's theoretical discussion, which identifies ICT literacy as a technological factor and work motivation as the psychological mechanism that transforms technological capacity into actual instructional behavior. Therefore, H2 is proposed: ICT literacy has a positive and significant effect on teachers' work motivation.

Work motivation is positioned as a proximal determinant of teacher instructional leadership because motivated teachers are more likely to invest effort, persist in professional tasks, demonstrate initiative, develop innovative learning practices, and engage in reflection and professional development. In this study, teacher instructional leadership is reflected in teachers' ability to provide direction for learning, manage active learning, serve as role models, create a positive classroom climate, reflect on and develop professionally, make instructional decisions, collaborate with colleagues, and utilize assessment results. These behaviors require sustained psychological energy and professional commitment. Thus, motivation is theoretically expected to provide the internal mechanism through which external organizational support and technological competence are converted into concrete instructional leadership practices. Accordingly, H3 is proposed: Teachers' work motivation has a positive and significant effect on teacher instructional leadership.

In addition to the indirect mechanism through work motivation, principal instructional leadership is expected to have a direct effect on teacher instructional leadership. Principals who provide instructional direction, conduct meaningful academic supervision, monitor learning, provide professional support, and establish an academic culture can directly encourage teachers to assume greater responsibility for instructional quality. This relationship reflects the distributed nature of instructional leadership in which instructional leadership initiated at the school level can be translated into teachers' leadership practices in the classroom. The theoretical framework of this study therefore proposes H4: Principal instructional leadership has a positive and significant direct effect on teacher instructional leadership.

ICT literacy is also hypothesized to have a direct effect on teacher instructional leadership because digital competence provides teachers with the practical capacity to design innovative learning experiences, access learning resources, use digital instructional media, and adapt instructional strategies to students' needs. In the context of the Merdeka Curriculum and digital transformation, ICT literacy is considered an important professional resource for teachers to perform their role as instructional leaders. Thus, teachers with stronger ICT literacy are theoretically expected to have greater capacity to lead technology-supported, active, innovative, and student-centered learning. Therefore, H5 is proposed: ICT literacy has a positive and significant direct effect on teacher instructional leadership.

The mediating role of work motivation follows from the preceding causal sequence. Principal instructional leadership provides an organizational stimulus that can strengthen teachers'

motivation, while ICT literacy provides technological and professional competence that can increase teachers' confidence and readiness to perform their work. Increased work motivation subsequently encourages teachers to devote greater effort and commitment to instructional planning, implementation, innovation, reflection, collaboration, and evaluation. Consequently, the effect of principal instructional leadership on teacher instructional leadership is expected to operate partly through work motivation. Hence, H6 is proposed: Work motivation positively and significantly mediates the relationship between principal instructional leadership and teacher instructional leadership. Similarly, because ICT literacy can enhance teachers' competence and confidence, which subsequently strengthens their motivation to perform instructional responsibilities, H7 is proposed: Work motivation positively and significantly mediates the relationship between ICT literacy and teacher instructional leadership. This mediation structure is consistent with the study's original conceptualization of work motivation as an intervening variable between principal instructional leadership and ICT literacy on the one hand and teacher instructional leadership on the other.

Finally, the model assumes that principal instructional leadership, ICT literacy, and work motivation operate together in explaining teacher instructional leadership. Teacher instructional leadership is unlikely to be determined by a single organizational, technological, or psychological factor. Rather, teachers require organizational direction and support from school principals, adequate technological competence to implement contemporary instructional practices, and sufficient psychological motivation to translate these resources into sustained instructional behavior. Therefore, H8 is proposed: Principal instructional leadership, ICT literacy, and work motivation jointly have a positive and significant effect on teacher instructional leadership. The complete theoretical model consequently specifies both direct paths ( $X1 \rightarrow Z$ ,  $X2 \rightarrow Z$ ,  $X1 \rightarrow Y$ ,  $X2 \rightarrow Y$ , and  $Z \rightarrow Y$ ) and indirect paths ( $X1 \rightarrow Z \rightarrow Y$  and  $X2 \rightarrow Z \rightarrow Y$ ), thereby providing an explicit causal ordering among the four constructs examined in this study.

## Method

This study uses a quantitative approach with a correlational research design to analyze the causal relationship between principal instructional leadership, Information and Communication Technology (ICT) literacy, work motivation, and teacher instructional leadership (Liu et al., 2021; Cansoy et al., 2022; Berkovich et al., 2024; He et al., 2024; Rahman et al., 2024). The research model was analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS) with the help of SmartPLS 4 software. The SEM-PLS approach was chosen because it is able to analyze direct and indirect relationships (mediation) between latent constructs simultaneously and is suitable for use in predictive research models (Alaba et al., 2025; Simatupang et al., 2025). The study population was all public elementary school teachers in South Solok Regency who were Civil Servants (PNS) and Government Employees with Work Agreements (PPPK), totaling 1,190 teachers spread across 133 schools in seven sub-districts. The sample size was determined using the Krejcie and Morgan (1970) formula with a 95% confidence level and a 5% margin of error, resulting in a total sample of 291 teachers.

**Table 2.** Characteristics of Population and Research Sample

| No | Subdistrict                     | Teacher Population | Sample Calculation      | Number of Samples |
|----|---------------------------------|--------------------|-------------------------|-------------------|
| 1  | Koto Parik Gadang Diateh (KPGD) | 195                | $(195/1190) \times 291$ | 48                |

|   |                     |       |                         |     |
|---|---------------------|-------|-------------------------|-----|
| 2 | Pagu River          | 208   | $(208/1190) \times 291$ | 51  |
| 3 | Pauh Duo            | 136   | $(136/1190) \times 291$ | 33  |
| 4 | Sangir              | 319   | $(319/1190) \times 291$ | 78  |
| 5 | Sangir Jujuan       | 96    | $(96/1190) \times 291$  | 23  |
| 6 | Sangir Balai Janggo | 92    | $(92/1190) \times 291$  | 23  |
| 7 | Sangir Batang Hari  | 144   | $(144/1190) \times 291$ | 35  |
|   | Amount              | 1.190 |                         | 291 |

Source: Researcher Analysis

The sample was determined using proportional random sampling, so that each sub-district received a number of respondents according to its population proportion (Li et al., 2021; Astuti et al., 2024; Rahman et al., 2024). Furthermore, respondents were selected in each sub-district using a simple random sampling technique, so that all members of the population had an equal opportunity to become research respondents. The research instrument was a closed-ended questionnaire compiled based on the indicators of each research variable and measured using a five-level Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Before use, the instrument was tested on 30 teachers outside the research sample to determine its validity and reliability.

**Table 3.** Research Variables and Indicators

| Variables                                 | Key Indicators                                                                                                                      |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Principal's Instructional Leadership (X1) | Formulation of learning vision, academic supervision, professional teacher support, learning monitoring, academic culture           |
| ICT Literacy (X2)                         | Mastery of basic technology, use of digital media, internet as a learning resource, digital communication, digital ethics           |
| Work Motivation (Z)                       | Responsibility, work ethic, desire to achieve, perseverance, professional commitment                                                |
| Teacher Learning Leadership (Y)           | Learning vision, active learning, role model, classroom management, reflection, decision making, collaboration, learning evaluation |

Data collection was conducted through online questionnaires using Google Forms and offline at schools with limited internet access. In addition to primary data, this study also utilized documentation in the form of school profiles, number of teachers, and supporting documents related to academic supervision and digital literacy implementation in schools.

Data analysis was conducted using the SEM-PLS approach through two stages of testing, namely the measurement model (outer model) and the structural model (inner model) (Nasution et al., 2020). Evaluation of the outer model was conducted to ensure the validity and reliability of the construct through testing the outer loading, Average Variance Extracted (AVE), Composite Reliability (CR), Cronbach's Alpha (CA), Fornell-Larcker Criterion, Cross Loading, and Heterotrait-Monotrait Ratio (HTMT). The construct is declared to meet convergent validity if the outer loading value is  $\geq 0.70$  and  $AVE \geq 0.50$ , while the construct reliability is declared good if the Composite Reliability and Cronbach's Alpha values are  $\geq 0.70$ . Furthermore, an inner model evaluation was conducted to test the relationship between variables through the path coefficient, coefficient of determination ( $R^2$ ), effect size ( $f^2$ ), and bootstrapping with a significance level of 5% ( $p < 0.05$ ) (Hair et al., 2021). In addition, model fit was evaluated using the Standardized Root Mean Square Residual (SRMR) and the Normed Fit Index (NFI). The mediating effect of work motivation was analyzed through testing the specific indirect effect using the bootstrapping procedure in SmartPLS 4. The research hypothesis was declared accepted if the t-statistic value  $> 1.96$  and p-value  $< 0.05$  (Akbari et al., 2023).

Partial Least Squares Structural Equation Modeling (PLS-SEM) was selected rather than covariance-based SEM (CB-SEM) because the study aimed to examine a relatively complex predictive model involving four latent constructs, including both direct and mediated relationships, rather than primarily testing overall covariance-model fit. The thesis specifies that PLS-SEM is appropriate for analyzing causal relationships among latent variables, including direct and indirect effects, and is relatively robust when data do not strictly follow a normal distribution. The analysis was conducted using SmartPLS 4.1.1.8 through a two-stage approach for the second-order constructs. The measurement model was first assessed through convergent validity, discriminant validity, and internal consistency reliability. Convergent validity was examined using indicator loadings and Average Variance Extracted (AVE), while discriminant validity was assessed using the Fornell–Larcker criterion, cross-loadings, and the Heterotrait–Monotrait (HTMT) ratio; reliability was assessed using Composite Reliability and Cronbach’s Alpha. The study involved 291 public elementary school teachers selected from a population of 1,190 teachers across seven districts in South Solok Regency, with proportional allocation according to school accreditation. The structural model was subsequently evaluated using  $R^2$ ,  $f^2$ , model-fit indices, and path coefficients. Hypotheses were tested using the bootstrapping procedure in SmartPLS, with path coefficients, t-statistics, and p-values reported; statistical significance was determined at the 5% level, with t-statistics > 1.96 and p-values < 0.05 indicating support for a hypothesis.

To strengthen methodological rigor in response to the reviewer, the revised manuscript should also explicitly report the diagnostic procedures for common method bias, multicollinearity, and non-response bias. Because the constructs were collected through a survey instrument from the same respondents, common method bias should be assessed using an appropriate statistical procedure, while multicollinearity should be examined using variance inflation factor (VIF) values before interpreting the structural paths. Non-response bias should be examined by comparing early and late respondents, or by comparing available characteristics of respondents and the target population when such information is available. Normality should also be reported descriptively; however, strict multivariate normality is not a prerequisite for PLS-SEM because the method is suitable for non-normal data. These additional diagnostic procedures should be reported only if they were actually performed and the corresponding statistics are available. For replication, the manuscript should report the population and sampling procedure, the final sample size of 291 teachers, the proportional allocation of respondents, the questionnaire administration procedure, the software version (SmartPLS 4.1.1.8), the two-stage PLS-SEM procedure, the criteria used to evaluate the measurement and structural models, and the bootstrapping settings and decision rules.

## Result and Discussion

### *Respondent Characteristics*

This study involved 291 State Elementary School teachers in South Solok Regency who were selected using the technique *proportionate stratified random sampling*. Data analysis was carried out using the approach *Structural Equation Modeling–Partial Least Squares* (SEM-PLS) with the help of the SmartPLS application version 4.1.1.8. The analysis stages consist of evaluation *measurement model* (*outer model*) to test the quality of research instruments, as well as evaluation *structural model* (*inner model*) to test the relationship between variables and research hypotheses. Respondent characteristics based on school accreditation status are presented in Table 4.

**Table 4.** Respondent Characteristics Based on School Accreditation Status

| No    | Accreditation Status | Teacher Population | Number of Samples | Percentage (%) |
|-------|----------------------|--------------------|-------------------|----------------|
| 1     | A                    | 295                | 72                | 24,7           |
| 2     | B                    | 769                | 188               | 64,6           |
| 3     | C                    | 119                | 29                | 10,0           |
| 4     | Not Yet Accredited   | 7                  | 2                 | 0,7            |
| Total |                      | 1.190              | 291               | 100,0          |

*Source:*Data from the South Solok Regency Education Office for 2025.

Based on Table 4, the majority of respondents came from schools with B accreditation, with 188 teachers (64.6%), followed by those with an accreditation with 72 teachers (24.7%), those with C accreditation with 29 teachers (10.0%), and those with unaccredited schools with 2 teachers (0.7%). This composition indicates that the sample distribution represents the proportion of the teacher population in each school accreditation category.

### **Evaluation of Measurement Model (Outer Model)**

The first stage of SEM-PLS analysis is carried out through evaluation *measurement model* to ensure that each indicator is able to measure the research construct validly and reliably. The evaluation includes testing convergent validity, discriminant validity, and construct reliability. The SmartPLS estimation measurement model is shown in Figure 1.

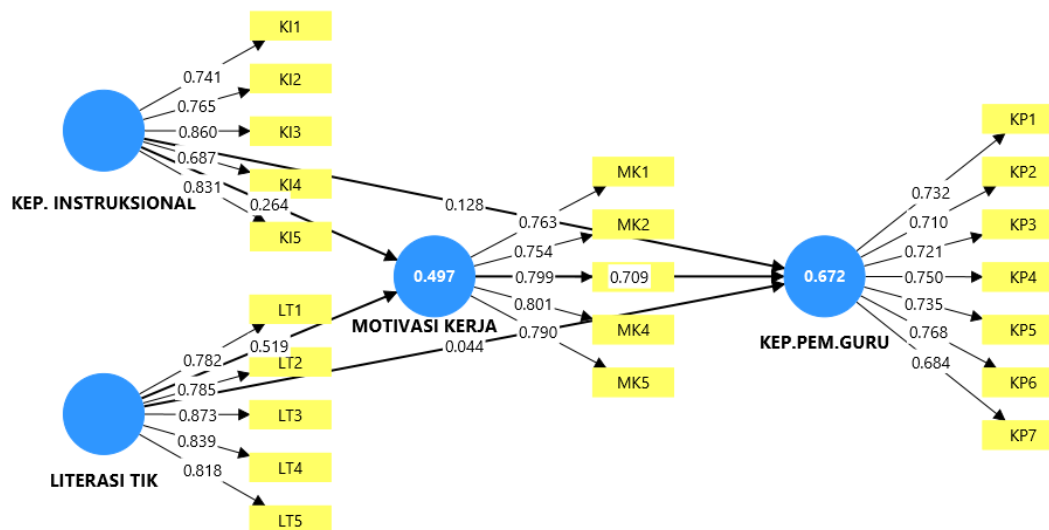
**Figure 1.** SmartPLS Measurement Model/Outer Model

Figure 1 shows the relationship between indicators and latent constructs and their values. *Outer loading* each indicator. Next, the results of the construct validity test are summarized in Table 5.

**Table 5.** Summary of Construct Validity Assessment

| Aspect              | Indicator/Criterion   | Results                                               |
|---------------------|-----------------------|-------------------------------------------------------|
| Convergent Validity | Outer Loading Range   | 0.684–0.873                                           |
|                     | Highest Outer Loading | LT3 = 0.873                                           |
|                     | Lowest Outer Loading  | KP7 = 0.684                                           |
|                     | Conclusion            | All indicators met the convergent validity criterion. |

|                       |                                    |                                                                                                                                                                                            |
|-----------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Discriminant Validity | Fornell–Larcker Criterion          | All constructs met the criterion, except the correlation between ICT Literacy and Teacher Instructional Leadership (0.811), which was slightly higher than the square root of AVE (0.782). |
|                       | Cross Loadings                     | All indicators exhibited the highest loading on their respective constructs.                                                                                                               |
|                       | Heterotrait–Monotrait Ratio (HTMT) | All HTMT values were below 0.90, except the relationship between ICT Literacy and Teacher Instructional Leadership (0.955).                                                                |
|                       | Conclusion                         | The measurement model satisfied the construct validity requirements and was considered appropriate for further analysis.                                                                   |

**Source:** The results of SmartPLS 4.1.1.8 processing by Researchers (2025).

Based on Table 5, all indicators have a value *outer loading* between 0.684 and 0.873, thus meeting the convergent validity criteria. The highest value was found in the LT3 indicator (0.873), while the lowest value was found in KP7 (0.684). Although there is a conceptual closeness between ICT Literacy and Teacher Instructional Leadership as seen in the Fornell-Larcker and HTMT values, the results *cross loading*. This indicates that all indicators still have the highest loading values on the constructs they measure. Thus, the measurement model is deemed to meet validity requirements and is suitable for use in subsequent analyses.

**Table 6.** Results of Construct Reliability Test

| Variables                            | Composite Reliability | Cronbach's Alpha | Information |
|--------------------------------------|-----------------------|------------------|-------------|
| Principal's Instructional Leadership | 0,85                  | 0,85             | Reliable    |
| ICT Literacy                         | 0,88                  | 0,89             | Reliable    |
| Work motivation                      | 0,84                  | 0,85             | Reliable    |
| Teacher Learning Leadership          | 0,85                  | 0,86             | Reliable    |

**Source:** The results of SmartPLS 4.1.1.8 processing by Researchers (2025).

Based on Table 6, all constructs have a value *Composite Reliability* between 0.84–0.88 and the value *Cronbach's Alpha* between 0.85–0.89. All values are above the minimum limit of 0.70, indicating that the research instrument has excellent internal consistency and is suitable for use in structural model analysis.

### **Structural Model Evaluation (Inner Model)**

After the measurement model meets the validity and reliability criteria, the next stage is to evaluate the structural model (*inner model*). Evaluation is carried out by testing the coefficient of determination ( $R^2$ ), effect size (*effect size* or  $f^2$ ), as well as the model fit (*model fit*). A summary of the results of the structural model evaluation is presented in Table 7.

**Table 7.** Structural Model Evaluation Summary

| Evaluation Aspects                     | Indicator                   | Mark  | Category/Description |
|----------------------------------------|-----------------------------|-------|----------------------|
| Coefficient of Determination ( $R^2$ ) | Work motivation             | 0,497 | Moderate             |
| $R^2$ Adjusted                         | Teacher Learning Leadership | 0,672 | Moderate             |
|                                        | Work motivation             | 0,494 | -                    |
|                                        | Teacher Learning Leadership | 0,668 | -                    |
| Effect Size ( $f^2$ )                  | KIKS → Work Motivation      | 0,092 | Small                |

|           |                                               |       |             |
|-----------|-----------------------------------------------|-------|-------------|
|           | KIKS → Teacher Learning Leadership            | 0,030 | Small       |
|           | ICT Literacy → Work Motivation                | 0,355 | Big         |
|           | ICT Literacy → Teacher Learning Leadership    | 0,003 | Very small  |
|           | Work Motivation → Teacher Learning Leadership | 0,769 | Big         |
| Model Fit | SRMR                                          | 0,079 | Good Fit    |
|           | NFI                                           | 0,729 | Pretty good |

**Source:** The results of SmartPLS 4.1.1.8 processing by Researchers (2025).

Based on Table 7, the  $R^2$  value shows that the Teacher Instructional Leadership variable has a value of 0.672, which means that 67.2% of the variation can be explained by the Principal's Instructional Leadership, ICT Literacy, and Work Motivation, while the remainder is influenced by other factors outside the model. Meanwhile, the Work Motivation variable has an  $R^2$  value of 0.497, which indicates that 49.7% of the variation is explained by the Principal's Instructional Leadership and ICT Literacy. Based on the criteria of Hair et al. (2022), both values are in the moderate category, so the model has quite good predictive ability.

Judging from the effect size ( $f^2$ ) value, the largest influence is found in the relationship between Work Motivation and Teacher Instructional Leadership ( $f^2 = 0.769$ ) which is included in the large category, followed by the relationship between ICT Literacy and Work Motivation ( $f^2 = 0.355$ ). On the other hand, the influence of the Principal's Instructional Leadership on Work Motivation ( $f^2 = 0.092$ ) and on Teacher Instructional Leadership ( $f^2 = 0.030$ ) is included in the small category, while the direct influence of ICT Literacy on Teacher Instructional Leadership ( $f^2 = 0.003$ ) is classified as very small.

Furthermore, the model fit results showed an SRMR value of 0.079, which is below the 0.08 threshold, thus meeting the good fit criteria. The NFI value of 0.729 also indicates a fairly good level of model fit. Thus, the structural model is deemed suitable for use as a basis for testing the research hypotheses.

**Table 8.** Summary of Direct Hypothesis Testing Results

| Hypothesis | Connection                                    | b     | t      | p     | Results  |
|------------|-----------------------------------------------|-------|--------|-------|----------|
| H1         | KIKS → Work Motivation                        | 0,264 | 4,775  | 0,000 | Accepted |
| H2         | KIKS → Teacher Learning Leadership            | 0,128 | 2,766  | 0,006 | Accepted |
| H3         | ICT Literacy → Work Motivation                | 0,519 | 9,773  | 0,000 | Accepted |
| H4         | ICT Literacy → Teacher Learning Leadership    | 0,044 | 0,890  | 0,374 | Rejected |
| H5         | Work Motivation → Teacher Learning Leadership | 0,709 | 14,709 | 0,000 | Accepted |

**Source:** The results of SmartPLS 4.1.1.8 processing by Researchers (2025).

Based on Table 8, four of the five hypotheses were directly accepted. Work motivation had the greatest influence on teacher instructional leadership ( $\beta = 0.709$ ), while ICT literacy did not have a significant direct effect on teacher instructional leadership ( $\beta = 0.044$ ;  $p = 0.374$ ).

**Table 9.** Results of Indirect Effect Testing (Specific Indirect Effects)

| Hypothesis | Mediation Path                                               | b     | t     | p     | Types of Mediation |
|------------|--------------------------------------------------------------|-------|-------|-------|--------------------|
| H6         | KIKS → Work Motivation → Teacher Learning Leadership         | 0,187 | 4,658 | 0,000 | Partial Mediation  |
| H7         | ICT Literacy → Work Motivation → Teacher Learning Leadership | 0,368 | 8,319 | 0,000 | Full Mediation     |

**Source:** The results of SmartPLS 4.1.1.8 processing by Researchers (2025).

Based on Table 9, Work Motivation is proven to significantly mediate the relationship between Principal Instructional Leadership and ICT Literacy on Teacher Instructional Leadership. The indirect effect of ICT Literacy through Work Motivation ( $\beta = 0.368$ ) is greater than the indirect effect of Principal Instructional Leadership ( $\beta = 0.187$ ), thus indicating that work motivation is an important mechanism in strengthening teacher instructional leadership.

The mediation analysis was clarified by distinguishing between partial and full mediation based on the significance of both direct and indirect effects. The results of the specific indirect effects obtained through bootstrapping showed that Principal Instructional Leadership had a significant indirect effect on Teacher Instructional Leadership through Work Motivation ( $\beta = 0.187$ ,  $t = 4.658$ ,  $p < .001$ ). Because the direct effect of Principal Instructional Leadership on Teacher Instructional Leadership was also significant ( $\beta = 0.128$ ,  $t = 2.766$ ,  $p = .006$ ), Work Motivation functions as a partial mediator in this relationship. In contrast, ICT Literacy showed a significant indirect effect on Teacher Instructional Leadership through Work Motivation ( $\beta = 0.368$ ,  $t = 8.319$ ,  $p < .001$ ), while its direct effect was not significant ( $\beta = 0.044$ ,  $t = 0.890$ ,  $p = .374$ ). Therefore, Work Motivation functions as a full mediator between ICT Literacy and Teacher Instructional Leadership. These findings are consistent with the mediation criteria described in the thesis, where partial mediation occurs when both direct and indirect effects are significant, whereas full mediation occurs when the direct effect is non-significant but the indirect effect is significant.

To address the reviewer's recommendation, the revised manuscript should report bootstrap confidence intervals for the indirect effects in addition to p-values and t-statistics. The thesis currently reports the original sample coefficients, sample means, standard deviations, t-statistics, and p-values, but does not provide the lower and upper bounds of the bootstrap confidence intervals. Therefore, the confidence intervals should be obtained from the original SmartPLS 4.1.1.8 bootstrapping output and added to the mediation table rather than estimated retrospectively. The indirect effect should be considered statistically supported when its bootstrap confidence interval does not include zero. Reporting the confidence intervals will provide a more informative assessment of the stability and precision of the mediation effects than significance labels alone. The manuscript should also avoid describing Work Motivation as the "dominant" mediator or predictor solely on the basis of statistical significance or the size of an individual coefficient. Instead, the relative importance of the predictors should be discussed using comparable effect-size measures, particularly the  $f^2$  values reported in the structural model, together with the magnitude of the relevant direct and indirect effects. The thesis explicitly defines  $f^2$  as a measure of the contribution of each exogenous construct to the endogenous construct and categorizes values of 0.02, 0.15, and 0.35 as small, medium, and large effects, respectively.

The revised presentation of the results should therefore emphasize that Work Motivation has a substantial explanatory role in the model without making an unsupported claim of absolute dominance. The structural model explains 67.2% of the variance in Teacher Instructional Leadership ( $R^2 = 0.672$ ) and 49.7% of the variance in Work Motivation ( $R^2 = 0.497$ ), indicating moderate explanatory power for both endogenous constructs. All statistical tables will also be reformatted in accordance with APA 7th edition, including consistent 11-point font, centered table content where appropriate, clear table numbering and titles, and table dimensions adjusted to use the available page width without exceeding the manuscript margins. The revised tables will present direct effects and

specific indirect effects separately and will include  $\beta$ , standard error, t-value, p-value, and bootstrap confidence intervals to improve transparency and reproducibility.

### **Discussion**

The results of the study indicate that the principal's instructional leadership has a positive and significant effect on teacher work motivation ( $\beta = 0.264$ ;  $t = 4.775$ ;  $p < 0.001$ ). This finding indicates that the more effectively the principal carries out the instructional leadership function, the higher the teacher's work motivation in carrying out their professional duties. Although the effect size value ( $f^2 = 0.092$ ) is in the small category, instructional leadership still makes a significant contribution to increasing teacher motivation. This finding is in line with the Instructional Leadership theory which positions the principal as a learning leader tasked with providing academic supervision, professional development, and creating a conducive work environment (Chabalala & Naidoo, 2021). This support can increase teacher enthusiasm, commitment, and responsibility in implementing learning. Therefore, strengthening instructional leadership is an important strategy in increasing teacher work motivation in elementary schools.

The analysis results show that the principal's instructional leadership has a positive and significant effect on teacher instructional leadership ( $\beta = 0.128$ ;  $t = 2.766$ ;  $p = 0.006$ ). Although the coefficient and effect size ( $f^2 = 0.030$ ) are relatively small, these results indicate that the principal still plays an important role in shaping teachers' ability to lead the learning process through supervision, coaching, and academic direction. This finding supports the theory that the quality of learning in schools is influenced by the principal's ability to direct and develop teacher competencies (Rostini et al., 2022). However, the small direct effect indicates that improvements in teacher instructional leadership are also influenced by other factors, especially work motivation, which in this study had a much greater influence.

The results of the study indicate that ICT literacy has a positive and significant effect on teacher work motivation ( $\beta = 0.519$ ;  $t = 9.773$ ;  $p < 0.001$ ). The effect size value ( $f^2 = 0.355$ ), which is included in the large category, indicates that ICT literacy is an important factor in increasing teacher work motivation. The ability to utilize technology makes it easier for teachers to design learning, develop digital media, and access learning resources, thereby increasing self-confidence and job satisfaction. These findings indicate that improving teachers' digital competence not only improves technical abilities but also strengthens work motivation in facing the demands of learning in the digital era (ElSayary, 2023).

In contrast to the previous relationship, ICT literacy did not significantly influence teacher instructional leadership ( $\beta = 0.044$ ;  $t = 0.890$ ;  $p = 0.374$ ), with an effect size of 0.003. These results indicate that technological mastery has not directly improved teachers' ability to lead the learning process. This finding indicates that instructional leadership is not only determined by the ability to use technology, but is also influenced by pedagogical competence, classroom management, communication, and decision-making in learning (Rasdiana et al., 2024). Therefore, improving ICT literacy needs to be integrated with the development of pedagogical competence to provide a more tangible impact on teacher instructional leadership.

The results of the study indicate that work motivation has a positive and significant effect on teacher instructional leadership ( $\beta = 0.709$ ;  $t = 14.709$ ;  $p < 0.001$ ). This value is the largest coefficient in the research model with an effect size of 0.769, indicating a very strong influence. This finding confirms that teachers with high work motivation tend to be more active in planning, implementing,

and evaluating learning effectively (Chakraborty & Biswas, 2020). Thus, improving teacher instructional leadership will be more optimal if accompanied by efforts to increase work motivation through organizational support, rewards, and teacher professional development.

The results of the Specific Indirect Effects show that work motivation significantly mediates the influence of the principal's instructional leadership on teacher instructional leadership ( $\beta = 0.187$ ;  $t = 4.658$ ;  $p < 0.001$ ). Because the direct effect ( $\beta = 0.128$ ;  $p = 0.006$ ) and the indirect effect are both significant, work motivation acts as a partial mediator. This finding indicates that the principal not only improves teacher instructional leadership directly but also through increased work motivation (Pratiwi & Warlizasusi, 2023). Therefore, the success of instructional leadership will be more optimal if followed by efforts to improve teacher motivation.

The results of the study indicate that ICT literacy has an indirect effect on teacher instructional leadership through work motivation ( $\beta = 0.368$ ;  $t = 8.319$ ;  $p < 0.001$ ). Conversely, the direct effect of ICT literacy on instructional leadership is not significant ( $\beta = 0.044$ ;  $p = 0.374$ ), so that work motivation acts as a full mediator (full mediation). This finding indicates that mastery of new technology will have an impact on instructional leadership if it can increase teacher work motivation (Berkovich & Hassan, 2024). Thus, increasing ICT literacy needs to be accompanied by programs that can strengthen teacher motivation so that technology can be optimally utilized in improving the quality of learning.

## Conclusion

This study shows that Principal Instructional Leadership and ICT Literacy have a positive effect on teacher Work Motivation, while Principal Instructional Leadership and Work Motivation have a positive effect on Teacher Instructional Leadership. Conversely, ICT Literacy does not have a direct effect on Teacher Instructional Leadership, but does have an effect through Work Motivation as a mediating variable. This finding confirms that Work Motivation is a key factor that strengthens the relationship between Principal Instructional Leadership, ICT Literacy, and Teacher Instructional Leadership, so that strengthening teacher motivation is an effective strategy in improving the quality of instructional leadership in elementary schools. The results of this study provide implications that principals, education offices, and stakeholders need to optimize instructional leadership, improve ICT literacy, and create a work environment that can encourage teacher motivation and professionalism. This study is still limited to public elementary school teachers in South Solok Regency, uses a questionnaire-based survey approach, and only involves a few research variables, so the results cannot be generalized widely. Therefore, further research is recommended to expand the scope of regions and educational levels, use a more diverse research approach, and add other relevant variables to obtain a more comprehensive model in explaining the factors that influence teacher instructional leadership.

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