

# The Role of Principal Leadership, Work Culture, and Work Motivation in Enhancing Digital Literacy Among Public Junior High School Teachers in Boja District

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## ABSTRACT

Digital literacy has become a crucial competence for teachers to ensure the quality of education in the digital era. This study examines the influence of principal leadership, work culture, and work motivation on the digital literacy of teachers in public junior high schools in Boja District. A quantitative approach with a correlational design was employed, involving 105 teachers selected through proportional random sampling. Data were collected using a validated and reliable questionnaire and analyzed through regression techniques after meeting prerequisite statistical tests. The results indicate that principal leadership, work culture, and work motivation each have a significant effect on teachers' digital literacy, contributing 56.4%, 51.3%, and 49.8% respectively. When tested simultaneously, these three factors explain 71% of the variance in digital literacy, underscoring the importance of a comprehensive approach to strengthening teachers' digital competencies. The findings suggest several practical implications. Transformational school leadership, innovation-oriented work culture, and motivational support through recognition and professional development are essential in fostering digital literacy. Schools with limited resources may adopt community-based training, while better-equipped schools can expand the integration of digital technologies into learning. This study contributes empirical evidence on the relationship between leadership, culture, and motivation in developing teachers' digital competencies. Future research is recommended to investigate additional factors such as infrastructure, policy, and professional learning communities using experimental or longitudinal designs to assess the effectiveness of interventions.

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## 1. INTRODUCTION

Digital literacy has become a fundamental requirement in education, particularly in efforts to improve the quality of teaching and learning in the digital era. The rapid advancement of technology has

transformed how knowledge is accessed, processed, and disseminated, making it essential for teachers to develop strong digital competencies. Teachers are no longer only knowledge transmitters; they must also act as facilitators who integrate digital tools into instruction to prepare students for participation in a technology-driven society (Rahma Dewi, 2024). As Khalisatun Husna et al. (2023) highlight, teachers' digital literacy skills are now indispensable in ensuring that students are equipped with the competencies needed for digital transformation in education.

Despite this importance, the quality of learning in public junior high schools in Boja District has remained at a moderate level over the past years, with overall scores hovering around the middle range and showing little improvement. Field observations further reveal that technology integration in classroom practices is still limited, as many teachers face difficulties in effectively utilizing digital tools to support teaching. This gap between the increasing demand for digital learning and the current digital literacy of teachers underscores the urgency of examining the factors that influence teachers' capacity to adopt and apply digital technologies in schools.

Digital literacy itself is a multifaceted construct that encompasses several dimensions. Scholars generally define it as the ability to access, evaluate, and use digital information effectively while participating in digital environments (Aini & Nuro, 2023). In this study, digital literacy is conceptualized across four key aspects: (1) information literacy, which involves accessing, managing, and participating in digital spaces; (2) hypertextual navigation, which emphasizes navigating online environments, critical thinking, and guiding digital learning; (3) digital scholarship, which reflects teachers' engagement in digital applications, development of digital teaching materials, and participation in knowledge-sharing platforms; and (4) ICT literacy, which includes skills in analyzing information, integrating diverse media, and applying internet-based resources in real-life contexts. Together, these aspects illustrate how teachers' digital literacy extends beyond technical skills to include critical engagement and pedagogical innovation.

Preliminary observations suggest that the low levels of digital literacy among teachers in Boja District can be attributed to three main factors: weak leadership from school principals in promoting digital practices, a work culture that does not fully support technological innovation, and insufficient teacher motivation to adopt and apply digital tools in instruction. Research has consistently shown that leadership plays a central role in driving digital transformation in schools. Ahyani et al. (2024) found that strong school leadership fosters teacher engagement with technology by providing policies and training that encourage digital learning practices. Similarly, Haddad Alwi et al. (2024) demonstrated that principals who actively promote technology use and offer ongoing professional development significantly improve teachers' digital skills. Gusliana et al. (2023) also reported that transformational leadership, supported by policies aligned with digital innovation, enhances teachers' willingness and ability to integrate technology into instruction. Yet, such leadership strategies have not been consistently implemented in the Boja District, leaving teachers without adequate support for digital capacity-building.

In addition to leadership, the role of organizational culture cannot be underestimated. Aini and Nuro (2023) emphasize that work culture functions as a collective framework shaping how teachers respond to innovation. Schools that foster collaboration, openness to change, and innovation-oriented practices tend to create conditions that support digital literacy development. Conversely, when schools lack a supportive culture, teachers often resist adopting new tools, even when training and infrastructure are available. Trianung D. S. et al. (2024) argue that creating an adaptive culture in schools is just as important as providing technological resources.

Motivation also emerges as a significant driver of teachers' digital literacy. Teachers with high intrinsic and extrinsic motivation are more likely to participate in training, experiment with digital tools, and persist in overcoming challenges (Manadin et al., 2024). Incentives, recognition, and career development opportunities can enhance motivation, whereas limited appreciation or lack of rewards can reduce teachers' willingness to innovate. Riza Pratama et al. (2024) caution that low motivation, combined with weak leadership and unsupportive culture, can reinforce negative outcomes in technology adoption. Thus, leadership, culture, and motivation should not be viewed in isolation but rather as interconnected factors that collectively influence teachers' digital literacy.

Previous studies have provided evidence for these relationships in various contexts. For example, Priyantini and Herawati (2023) documented how mentoring systems supported by school leaders help teachers gradually build digital competence. Similarly, Dharma (2022) showed that digital literacy skills directly enhance teacher performance, while leadership and motivation act as mediating factors. However, most of these studies have been conducted either in primary schools, vocational contexts, or higher education institutions, with limited focus on junior high schools in regional districts such as Boja. This indicates a need for more context-specific investigations to generate actionable insights for policymakers and practitioners in local settings.

This study aims to fill that gap by examining the influence of principal leadership, work culture, and work motivation on teachers' digital literacy in public junior high schools in Boja District. Specifically, it seeks to analyze how each factor individually affects teachers' digital literacy and how these factors collectively contribute to the development of digital competencies. By doing so, the research provides empirical evidence on whether the combination of these factors significantly explains variations in teachers' digital literacy levels.

Theoretically, the study is grounded in the notion that leadership creates enabling environments, organizational culture shapes collective practices, and motivation drives individual commitment. When these three elements align, schools are better positioned to achieve sustainable improvements in digital literacy (Manadin et al., 2024). Conversely, when leadership is ineffective, work culture resists change, and motivation is low, teachers are less likely to develop or apply digital skills. This dynamic highlights the importance of considering both organizational and individual dimensions in digital literacy development.

From a practical perspective, the findings are expected to inform strategies for policymakers, school leaders, and teacher development programs. Schools may consider adopting technology-based training initiatives, establishing collaborative work cultures that encourage experimentation, and implementing reward systems to sustain teacher motivation. These strategies could significantly improve teachers' digital literacy and, ultimately, the overall quality of education in the region.

In summary, this study investigates the extent to which principal leadership, work culture, and teacher motivation influence digital literacy among junior high school teachers in Boja District. By integrating these dimensions, the research not only contributes to the existing body of literature but also provides a basis for policy and practice aimed at enhancing digital transformation in education.

## 2. METHODS

This study employs a quantitative approach with a correlational method to analyze the influence of principal leadership, work culture, and work motivation on teacher's digital literacy in public junior high schools in Boja District (Sulastri et al., 2024). A correlational approach was chosen because it allows for an in-depth examination of the relationships between independent and dependent variables without manipulating them, making it suitable for understanding naturally occurring educational dynamics. This approach seeks to identify the connection between independent and dependent variables and measure their impact on teacher's digital literacy. Data were collected through surveys using validated and reliable questionnaires (Haddad Alwi et al., 2024).

This study was carried out in four public junior high schools in Boja District, Kendal Regency, with teachers from these schools as the primary respondents. The research spanned four months, from August 2024 to December 2024.

This study employs a correlational research design, linking three independent variables, principal leadership, work culture, and work motivation to the dependent variable, teacher's digital literacy (Sosial & Budaya ; Al-Furqan, 2023). The conceptual framework is visualized as follows:

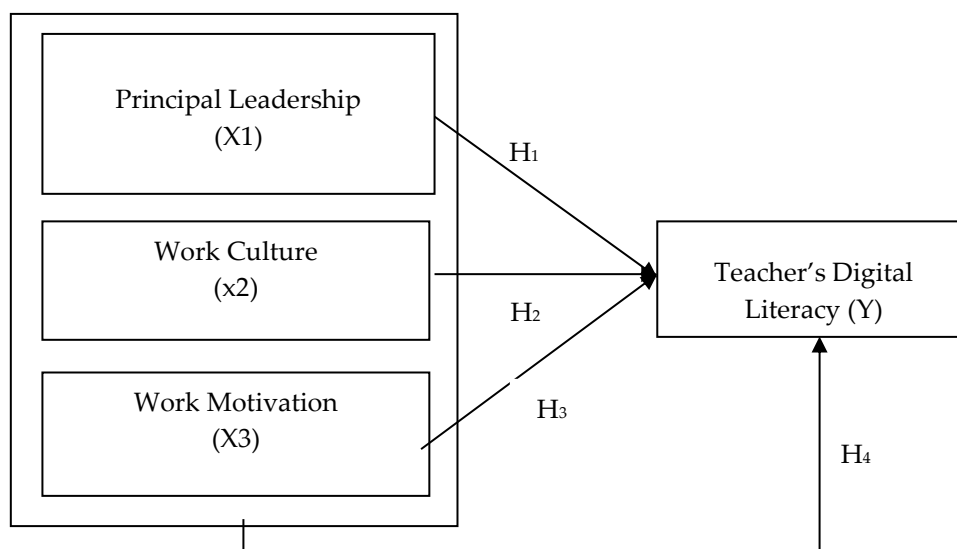


Figure 1. Design of research

This research provides empirical evidence that supports educational policies aiming to enhance teacher’s digital competencies through strategic leadership, adaptive work culture, and motivational support. Future studies should consider additional factors such as technological infrastructure, digital education policies, and teacher learning communities while employing experimental or quasi-experimental methods to evaluate intervention effectiveness.

The operational definition of variables is structured in the following instrument grid table:

Table 1. Research Instrument Grid

| Variable                              | Dimension                       | Indicator  | Item Number |
|---------------------------------------|---------------------------------|--|-------------|
| <b>Teacher’s Digital Literacy (Y)</b> | Information Literacy            | Ability to access and manage information, and participate in digital spaces      | 1-9         |
|                                       | Hypertextual Navigation         | Ability to use digital navigation features, critical thinking in navigation      | 10-18       |
|                                       | Digital Scholarship             | Participation in digital applications, development of digital teaching materials | 19-27       |
|                                       | ICT Literacy                    | Ability to use digital media, information analysis                               | 28-42       |
| <b>Principal Leadership (X1)</b>      | Open to New Ideas               | Decision-making, providing opportunities for teachers to innovate                | 1-9         |
|                                       | Role Model                      | Responsibility in tasks, guidance for teachers                                   | 10-18       |
|                                       | Ability to Foster Collaboration | Ability to motivate subordinates and establish good communication                | 19-27       |
| <b>Work Culture (X2)</b>              | Integrity                       | Responsibility in tasks, honesty at work   | 1-9         |
|                                       | Teamwork                        | Ability to collaborate with colleagues and the principal                         | 10-18       |
| <b>Teacher’s Work Motivation (X3)</b> | Rewards and Recognition         | Promotion opportunities, acknowledgment of achievements                          | 1-9         |
|                                       | Security and Responsibility     | Need for a stable work environment   | 10-18       |

The population in this study consists of all public junior high school teachers in Boja District, totaling 143 individuals. The study sample was chosen using a proportional random sampling method, calculated

using Slovin's formula (Sambaralam et al., 2023). Slovin's formula ensures that the sample size is representative while minimizing sampling error. To ensure fairness in selection, stratified random sampling was applied to maintain proportionality across schools. Based on the calculation, a total of 105 teachers were selected as samples, distributed across four schools as follows:

**Table 2.** Research Population Size

| School Name       | Total Teachers | Sample |
|-------------------|----------------|--------|
| SMP Negeri 1 Boja | 47             | 34     |
| SMP Negeri 2 Boja | 47             | 34     |
| SMP Negeri 3 Boja | 38             | 28     |
| SMP Negeri 4 Boja | 11             | 9      |

The main instrument used in this study is a Likert scale questionnaire with five response options.. Each indicator in this study was developed based on relevant theories and has undergone validity and reliability testing using the Pearson Product Moment and Cronbach's Alpha tests (Ayu et al., 2021).

The validity test results indicate that most items in the questionnaire are valid, with the calculated  $r$ -value exceeding the  $r$ -table value (0.361). Specifically, validity coefficients ranged from 0.40 to 0.85, indicating strong item validity. Meanwhile, the reliability test using Cronbach's Alpha shows that all variables have values above 0.6, with reliability coefficients ranging from 0.75 to 0.92, confirming the internal consistency of the instrument.

Data were collected through questionnaires using a five-point Likert scale. Analysis was conducted in three stages: (1) Descriptive Analysis (mean, median, standard deviation), (2) Prerequisite Tests (normality, multicollinearity, heteroscedasticity, linearity), and (3) Hypothesis Testing (regression analysis, t-test, F-test, and  $R^2$  to measure variable influence).

This research aims to offer a more comprehensive understanding of the factors affecting teacher's digital literacy and offer recommendations for school principals and policymakers to enhance teacher's digital competencies in schools.

### 3. FINDINGS AND DISCUSSION

#### 3.1. Data Description

The data description in this study illustrates the perceptions of 105 respondents regarding principal leadership, work culture, work motivation, and teacher's digital literacy in public junior high schools in Boja District. The data were obtained from respondent's total responses, categorized into five perception levels based on the Likert scale. The research data present the measurement results of the four variables to systematically understand the respondent's perception levels.

##### 3.1.1. Principal Leadership in Public Junior High Schools in the Boja District

The data on school principal leadership was collected through 33 statements with a scale of 1 to 5 from 105 respondents. The statistical analysis results showed that the leadership scores ranged from 91 to 160, with an average of 133.48 and a standard deviation of 15.462. The leadership of the school principal was categorized into five levels: Excellent, Good, Satisfactory, Poor, and Very Poor, with an interval of 14 points for each category. As a result, the majority of respondents (35.2%) rated the school principal's leadership as Good.

##### 3.1.2. Work Culture in Public Junior High Schools in Boja District

The data on work culture was collected through 31 statements with a scale of 1 to 5 from 105 respondents. The scores ranged from 95 to 150, with an average of 129.55 and a standard deviation of 13.383. The work culture categories were also divided into five levels: Excellent, Good, Satisfactory,

Poor, and Very Poor, with an interval of 11 points for each category. The majority of respondents (29.5%) rated the work culture as Good.

### 3.1.3. Work Motivation of Public Junior High School Teachers in Boja District

The data on work motivation was obtained from 31 statements with a scale of 1 to 5 from 105 respondents. The highest score was 151, the lowest score was 97, with an average of 130.34 and a standard deviation of 12.112. The work motivation categories were divided into five levels: Excellent, Good, Satisfactory, Poor, and Very Poor, with an interval of 11 points for each category. The majority of respondents (39%) rated the teachers' work motivation as Good.

### 3.1.4 Teacher's Digital Literacy Skills in Public Junior High Schools in Boja District

The data on digital literacy was collected from 31 statements with a scale of 1 to 5 from 105 respondents. The scores ranged from 95 to 152, with an average of 132.91 and a standard deviation of 11.909. The digital literacy categories were divided into five levels: Excellent, Good, Satisfactory, Poor, and Very Poor, with an interval of 12 points for each category. The majority of respondents (46.7%) rated the teachers' digital literacy as good.

## 3.2. Prerequisite Test Analysis

Before conducting simple and multiple linear regression analyses for hypothesis testing, prerequisite tests were required, including normality, linearity, multicollinearity, and heteroscedasticity tests (Alwy Yusuf et al., 2024).

### 3.2.1. Normality Test

The normality test is conducted to assess whether the collected data follows a normal distribution. This test was performed using the One-Sample Kolmogorov-Smirnov test (Sintia et al., 2022). Data is considered normally distributed if the Sig. value exceeds 0.05. The results are shown below :

**Table 3.** Normality Test Results (Kolmogorov-Smirnov Test)

| Variable                     | Asymp. Sig. (2-tailed) |
|------------------------------|------------------------|
| Principal leadership         | 0.638                  |
| Work Culture                 | 0.407                  |
| Work motivation              | 0.353                  |
| Digital literacy skills guru | 0.130                  |

Based on Table 3, all variables, principal leadership (X1), work culture (X2), work motivation (X3), and teacher's digital literacy (Y), follow a normal distribution as their Sig. values exceed 0.05.

### 3.2.2. Linearity Tes

The linearity test assesses whether there is a linear relationship between the independent and dependent variables. If the significance value (Sig.) is greater than 0.05, the relationship is considered linear; otherwise, it is non-linear (Nasikah & Yuliyanto, 2022).

**Table 4.** Linearity Test Results for Principal Leadership and Teacher's Digital Literacy

|                |                          | Sum of Squares | df  | Mean Square | F       | Sig. |
|----------------|--------------------------|----------------|-----|-------------|---------|------|
| Between Groups | (Combined)               | 12021.162      | 52  | 231.176     | 4.405   | .000 |
|                | Linearity                | 8318.042       | 1   | 8318.042    | 158.493 | .000 |
|                | Deviation from Linearity | 3703.120       | 51  | 72.610      | 1.384   | .123 |
| Within Groups  |                          | 2729.067       | 52  | 52.482      |         |      |
| Total          |                          | 14750.229      | 104 |             |         |      |

Since Sig. = 0.123, principal leadership and teacher's digital literacy have a linear relationship.

**Table 5.** Linearity Test of Work Culture and Teacher's Digital Literacy Skills

|                |                          | Sum of Squares | df  | Mean Square | F       | Sig. |
|----------------|--------------------------|----------------|-----|-------------|---------|------|
| Between Groups | (Combined) Linearity     | 11151.945      | 46  | 242.434     | 3.908   | .000 |
|                | Deviation from Linearity | 7022.938       | 1   | 7022.938    | 113.201 | .000 |
|                |                          | 4129.008       | 45  | 91.756      | 1.479   | .080 |
| Within Groups  |                          | 3598.283       | 58  | 62.039      |         |      |
| Total          |                          | 14750.229      | 104 |             |         |      |

As shown in Table 6, the findings confirm that work culture and teachers' digital literacy skills are linearly related.

**Table 6.** Linearity Test of Work Motivation and Teacher's Digital Literacy Skills

|                |                          | Sum of Squares | df  | Mean Square | F      | Sig. |
|----------------|--------------------------|----------------|-----|-------------|--------|------|
| Between Groups | (Combined) Linearity     | 9701.421       | 39  | 248.754     | 3.203  | .000 |
|                | Deviation from Linearity | 6037.123       | 1   | 6037.123    | 77.724 | .000 |
|                |                          | 3664.299       | 38  | 96.429      | 1.241  | .219 |
| Within Groups  |                          | 5048.807       | 65  | 77.674      |        |      |
| Total          |                          | 14750.229      | 104 |             |        |      |

The test results shown in Table 7 indicate that Work Motivation and Teacher's Digital Literacy Skills have a linear relationship.

### 3.2.3. Multicollinearity Test

The multicollinearity test is conducted to identify whether there is a correlation among independent variables in the regression model (Pangow et al., 2024). A reliable regression model should be free from multicollinearity. This test is performed using the Variance Inflation Factor (VIF) and Tolerance values.

**Table 7.** Multicollinearity Test

| Variable             | Collinearity Statistics |       |
|----------------------|-------------------------|-------|
|                      | Tolerance               | VIF   |
| Principal leadership | .538                    | 1.860 |
| Work Culture         | .501                    | 1.995 |
| Work motivation      | .553                    | 1.808 |

Referring to Table 7, all independent variables—Principal Leadership, Work Culture, and Work Motivation—have VIF values below 10 and Tolerance values above 0.1, confirming no multicollinearity. Therefore, all independent variables are suitable for inclusion in the regression model.

### 3.2.4. Heteroscedasticity Test

The heteroscedasticity test examines whether there is an inequality in the variance of residuals across observations. If the residual variance remains constant, the model exhibits homoscedasticity; otherwise, heteroscedasticity occurs (Raharja et al., 2022). A good regression model should not have heteroscedasticity. The test results using SPSS are presented below.

**Table 8.** Heteroscedasticity Test

| Model                | Unstandardized Coefficients |           | Standardized Coefficients | t      | Sig. |
|----------------------|-----------------------------|-----------|---------------------------|--------|------|
|                      | B                           | Std Error | Beta                      |        |      |
|                      | (Constant)                  | 17.621    | 4.431                     |        |      |
| Principal leadership | -.013                       | .034      | -.049                     | -.373  | .710 |
| Work Culture         | -.029                       | .041      | -.097                     | -.720  | .473 |
| Work motivation      | -.055                       | .043      | -.166                     | -1.292 | .199 |

The Sig. values for Principal Leadership (0.710), Work Culture (0.473), and Work Motivation (0.199) are all greater than 0.05, indicating the absence of heteroscedasticity in the regression model.

### 3.3. Hypothesis Testing

After fulfilling the prerequisite tests, hypothesis testing was conducted using simple and multiple linear regression analysis (Bao, 2024). To facilitate data analysis, all data processing was performed using SPSS, with the following results:

#### 3.3.1. The Influence of Principal Leadership on Teacher's Digital Literacy Skills in Public Junior High Schools in Boja District

The first hypothesis states. "Principal leadership has a significant influence on teacher's digital literacy skills." A simple linear regression analysis was used to test this hypothesis. The Pearson correlation coefficient was calculated to measure the relationship between principal leadership and teacher's digital literacy skills, as shown below:

**Table 9.** Correlation Between Principal Leadership and Teacher's Digital Literacy Skills

| Value               | Result |
|---------------------|--------|
| Pearson Correlation | 0.751  |
| Sig. (2-tailed)     | 0.000  |
| N                   | 105    |

Based on Table 9, the correlation coefficient between principal leadership and teacher's digital literacy skills is 0.751, which falls into the strong category according to the correlation classification table. This indicates a strong relationship between principal leadership and teacher's digital literacy skills in public junior high schools in Boja District.

**Table 10.** The Influence of Principal Leadership on Teacher's Digital Literacy Skills

| Model                | Unstandardized Coefficients |           | Standardized Coefficients | t      | Sig. |
|----------------------|-----------------------------|-----------|---------------------------|--------|------|
|                      | B                           | Std Error | Beta                      |        |      |
|                      | (Constant)                  | 55.713    | 6.734                     |        |      |
| Principal leadership | .578                        | .050      | .751                      | 11.541 | .000 |

From Table 10, the t-value for principal leadership is 11.541, while the t-table value is 1.98304. Since  $11.541 > 1.98304$ , and the Sig. value (0.000) is less than 0.05,  $H_0$  is rejected, and  $H_a$  is accepted. This confirms that principal leadership has a significant influence on teacher's digital literacy skills in public junior high schools in Boja District.

To assess the extent of principal leadership's contribution to teacher's digital literacy skills, we use the R-square determination coefficient, expressed as a percentage.

**Table 11.** Contribution of Principal Leadership to Teacher's Digital Literacy Skills

| R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------------------|----------|-------------------|----------------------------|
| .751 <sup>a</sup> | .564     | .560              | 7.902                      |

According to Table 11, the R-square value of 0.564 indicates that principal leadership accounts for 56.4% of the variation in teacher’s digital literacy skills, while the remaining 43.6% is influenced by other variables not included in this study.

Based on Table 18, the constant coefficient is 55.713, and the principal leadership coefficient ( $X_1$ ) is 0.578. Thus, the regression equation is:

$$Y = \alpha + \beta X_1$$

$$Y = 55,713 + 0,578 X_1$$

From this equation, the constant value (55.713) indicates that when principal leadership is 0, teacher’s digital literacy skills remain at 55.713. The positive coefficient (0.578) suggests a positive relationship between principal leadership and teacher’s digital literacy skills. This means that for every increase in principal leadership, teacher’s digital literacy skills improve by 0.578.

### 3.3.2. The Influence of Work Culture on Teacher’s Digital Literacy Skills in Public Junior High Schools in Boja District

The hypothesis states, "Work culture has a significant influence on teacher’s digital literacy skills". A simple linear regression analysis was conducted to test this hypothesis. The Pearson correlation coefficient was calculated to measure the relationship between work culture and teacher’s digital literacy skills, as shown below:

**Table 12.** Correlation Between Work Culture and Teacher’s Digital Literacy Skills

| Value               | Result |
|---------------------|--------|
| Pearson Correlation | 0.716  |
| Sig. (2-tailed)     | 0.000  |
| N                   | 105    |

Based on Table 12, the correlation coefficient between work culture and teacher’s digital literacy skills is 0.716, which falls into the strong category. This indicates a strong relationship between work culture and teacher’s digital literacy skills in public junior high schools in Boja District. To assess whether the hypothesis is accepted or rejected, we refer to the coefficients table below

**Table 13.** The Influence of Work Culture on Teacher’s Digital Literacy Skills

| Model        | Unstandardized Coefficients |           | Standardized Coefficients | t      | Sig. |
|--------------|-----------------------------|-----------|---------------------------|--------|------|
|              | B                           | Std Error | Beta                      |        |      |
|              | (Constant)                  | 50.332    | 7.968                     |        |      |
| Work Culture | .637                        | .061      | .716                      | 10.418 | .000 |

From Table 13, the t-value for work culture is 10.418, while the t-table value is 1.98304. Since 10.418 > 1.98304, and the Sig. value (0.000) is less than 0.05,  $H_0$  is rejected, and  $H_a$  is accepted. This confirms that work culture has a significant influence on teacher’s digital literacy skills in public junior high schools in Boja District.

To assess the extent of work culture's contribution to teacher’s digital literacy skills, we use the R-square determination coefficient, expressed as a percentage.

**Table 14.** Contribution of Work Culture to Teacher’s Digital Literacy Skills

| R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------------------|----------|-------------------|----------------------------|
| .716 <sup>a</sup> | .513     | .508              | 8.350                      |

From Table 14, the R-square value is 0.513, meaning that work culture contributes 51.3% to teacher’s digital literacy skills, while the remaining 48.7% is influenced by other variables not examined in this study.

Based on Table 13, the constant coefficient is 50.332, and the work culture coefficient ( $X_2$ ) is 0.637. Thus, the regression equation is :

$$Y = \alpha + \beta X_2$$

$$Y = 50,332 + 0,637 X_2$$

From this equation, The constant value (50.332) indicates that when work culture is 0, teacher's digital literacy skills remain at 50.332. The positive coefficient (0.637) suggests a positive relationship between work culture and teacher's digital literacy skills. This means that for every increase in work culture, teacher's digital literacy skills improve by 0.637. Thus, a better work culture leads to higher teacher's digital literacy skills

### 3.3.3. The Influence of Work Motivation on Teacher's Digital Literacy Skills in Public Junior High Schools in Boja District

The third hypothesis in this study states, "Work motivation has a significant influence on teacher's digital literacy skills". A simple linear regression analysis was conducted to test this hypothesis. The Pearson correlation coefficient was calculated to measure the relationship between work motivation and teacher's digital literacy skills, as shown below:

**Table 15.** Correlation Between Work Motivation and Teacher's Digital Literacy Skills

| Value               | Result |
|---------------------|--------|
| Pearson Correlation | 0.706  |
| Sig. (2-tailed)     | 0.000  |
| N                   | 105    |

Based on Table 15, the correlation coefficient between work motivation and teacher's digital literacy skills is 0.706, which falls into the strong category. This indicates a strong relationship between work motivation and teacher's digital literacy skills in public junior high schools in Boja District. To assess whether the hypothesis is accepted or rejected, we refer to the coefficients table below

**Table 16.** The Influence of Work Motivation on Teacher's Digital Literacy Skills

| Model           | Unstandardized Coefficients |           | Standardized Coefficients | t      | Sig. |
|-----------------|-----------------------------|-----------|---------------------------|--------|------|
|                 | B                           | Std Error | Beta                      |        |      |
|                 | (Constant)                  | 42.451    | 8.984                     |        |      |
| Work motivation | .694                        | .069      | .706                      | 10.112 | .000 |

From Table 16, the t-value for work motivation is 10.112, while the t-table value is 1.98304. Since  $10.112 > 1.98304$ , and the Sig. value (0.000) is less than 0.05,  $H_0$  is rejected, and  $H_a$  is accepted. This confirms that work motivation significantly influences teacher's digital literacy skills in public junior high schools in Boja District. To assess the extent of work motivation's contribution to teacher's digital literacy skills, we use the R-square determination coefficient, expressed as a percentage.

**Table 17.** Contribution of Work Motivation to Teacher's Digital Literacy Skills

| R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------------------|----------|-------------------|----------------------------|
| .706 <sup>a</sup> | .498     | .493              | 8.477                      |

From Table 17, the R-square value is 0.498, meaning that work motivation contributes 49.8% to teacher's digital literacy skills, while the remaining 50.2% is influenced by other variables not examined in this study.

Based on Table 17, the constant coefficient is 42.451, and the work motivation coefficient ( $X_3$ ) is 0.694. Thus, the regression equation is :

$$Y = \alpha + \beta X_3$$

$$Y = 42,451 + 0,694 X_3$$

From this equation, the constant value (42.451) indicates that when work motivation is 0, teacher's digital literacy skills remain at 42.451. The positive coefficient (0.694) suggests a positive relationship between work motivation and teacher's digital literacy skills. This means that for every increase in work motivation, teacher's digital literacy skills improve by 0.694. Thus, higher work motivation leads to better teacher's digital literacy skills.

### 3.3.4. The Combined Influence of Principal Leadership, Work Culture, and Work Motivation on Teacher's Digital Literacy Skills

Principal leadership, work culture, and work motivation collectively have a significant influence on teacher's digital literacy skills". Multiple linear regression analysis was conducted to test this hypothesis. The Pearson correlation coefficient was used to evaluate the relationship between principal leadership, work culture, and work motivation with teacher's digital literacy skills (Rodo Landa et al., 2021), as shown below:

**Table 18.** Correlation Between Principal Leadership, Work Culture, Work Motivation, and Teacher's Digital Literacy Skills

| R                 | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics |          |     |     |               |
|-------------------|----------|-------------------|----------------------------|-------------------|----------|-----|-----|---------------|
|                   |          |                   |                            | R Square Change   | F Change | df1 | df2 | Sig. F Change |
| .843 <sup>a</sup> | .710     | .701              | 6.508                      | .710              | 82.403   | 3   | 101 | .000          |

From Table 19, the correlation coefficient between principal leadership, work culture, and work motivation with teacher's digital literacy skills is 0.710, which falls into the strong category. This indicates a strong relationship between these three variables and teacher's digital literacy skills in public junior high schools in the Boja District. To assess whether the hypothesis is accepted or rejected, we refer to the ANOVA table below:

**Table 19.** The Influence of Principal Leadership, Work Culture, and Work Motivation on Teacher's Digital Literacy Skills

| Model      | Sum of Squares | df  | Mean Square | F      | Sig.              |
|------------|----------------|-----|-------------|--------|-------------------|
| Regression | 10471.837      | 3   | 3490.612    | 82.403 | .000 <sup>b</sup> |
| Residual   | 4278.391       | 101 | 42.360      |        |                   |
| Total      | 14750.229      | 104 |             |        |                   |

From Table 20, the F-value for principal leadership, work culture, and work motivation is 82.403, while the F-table value is 2.69. Since  $82.403 > 2.69$ , and the Sig. value (0.000) is less than 0.05,  $H_0$  is rejected, and  $H_a$  is accepted. This confirms that principal leadership, work culture, and work motivation collectively have a significant influence on teacher's digital literacy skills. To assess the extent of their combined contribution, we refer to the R-square determination coefficient, expressed as a percentage.

**Table 20.** Contribution of Principal Leadership, Work Culture, and Work Motivation to Teacher's Digital Literacy Skills

| R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------------------|----------|-------------------|----------------------------|
| .843 <sup>a</sup> | .710     | .701              | 6.508                      |

From Table 20, the R-square value is 0.710, indicating that principal leadership, work culture, and work motivation collectively contribute 71% to teacher's digital literacy skills, while the remaining 29% is influenced by other variables not included in this study.

**Table 21.** Regression Coefficients of Principal Leadership, Work Culture, and Work Motivation on Teachers' Digital Literacy Skills

| Model                | Unstandardized Coefficients |           | Standardized Coefficients | t     | Sig. |
|----------------------|-----------------------------|-----------|---------------------------|-------|------|
|                      | B                           | Std Error | Beta                      |       |      |
|                      | (Constant)                  | 21.500    | 7.369                     |       |      |
| Principal leadership | .308                        | .059      | .400                      | 5.479 | .000 |
| Work Culture         | .245                        | .067      | .275                      | 3.632 | .000 |
| Work motivation      | .296                        | .071      | .301                      | 4.175 | .000 |

Based on the coefficients table, the multiple regression equation is

$$Y = \alpha + \beta X_1 + \beta X_2 + \beta X_3$$

$$Y = 21,500 + 0,308 X_1 + 0,245 X_2 + 0,296 X_3$$

This equation shows that Principal leadership ( $X_1$ ) increases digital literacy skills by 0.308 for every unit increase. Work culture ( $X_2$ ) increases digital literacy skills by 0.245 for every unit increase. Work motivation ( $X_3$ ) increases digital literacy skills by 0.296 for every unit increase.

Thus, higher principal leadership, work culture, and work motivation collectively enhance teacher's digital literacy skills.

### Discussion

The study reveals that principal leadership, work culture, and work motivation significantly influence teacher's digital literacy skills in public junior high schools in Boja District. Regression analysis shows that principal leadership contributes 56.4%, work culture 51.3%, and work motivation 49.8% to teacher's digital literacy skills. Collectively, these three variables contribute 71%, highlighting their crucial role in enhancing digital competencies among educators. These findings support the hypothesis that leadership, organizational culture, and intrinsic motivation play a vital role in improving teacher's digital competence.

Although the contributions of these three variables are quite high, they should be compared with previous studies. For instance, research by Raharja et al. (2022) found that school principals who encourage technology use and provide regular training significantly enhance teachers' digital skills. (Lapir's (2024) study also identified a strong correlation between leadership that supports technological innovation and teachers' digital adoption. This aligns with the current study, which found a strong correlation (0.751) between school principal leadership and teachers' digital literacy.

However, other unexplored factors may also affect teachers' digital literacy. About 29% of the variance remains unexplained, possibly involving factors such as school infrastructure, the quality of digital training, and technology-based education policies (Salam & Hartati, 2022). For example, a study by Sulastri et al. (2024) found that the availability of technological devices and stable internet access significantly enhances teachers' technology adoption.

Regarding work culture, this study found a correlation of 0.716 between work culture and teachers' digital literacy, with a 51.3% contribution. Studies by Fania Rahma Yunanda et al. (2025) and Rahayu et al. (2024) confirm that an innovative and collaborative work culture accelerates technology adoption in education. Schools that encourage teacher collaboration in developing digital teaching materials and experimenting with technology through internal workshops show significant improvements in technology integration (Almuslim et al., 2024). Real-world examples can be found in several schools implementing peer-led and community-based training programs, which effectively enhance digital skills without relying solely on formal training.

Work motivation also strongly correlates with digital literacy (0.706) and contributes 49.8%. Highly motivated teachers are more likely to participate in digital training and integrate technology into their teaching (Sahmaulana et al., 2024). Research by Firjanah et al. (2024) suggests that teachers receiving recognition for digital innovations are more proactive in exploring new learning technologies.

Therefore, strategies such as incentives and recognition for teachers innovating in technology can be effective policies to improve their digital literacy.

These findings emphasize the importance of a holistic approach in enhancing teachers' digital competencies. Strong leadership fosters a work culture that supports technology use (Lapir, 2024), while a positive work culture strengthens teachers' motivation to continually improve their digital skills (Salam & Hartati, 2022). Additionally, high work motivation boosts teachers' readiness to adopt digital innovations. Therefore, education policies should focus on strengthening school principal leadership to promote digital literacy, building an adaptive work culture, and enhancing teacher motivation through incentives and recognition (Mohammad Rafatta Umar et al., 2024).

Furthermore, as mentioned in the abstract, schools with limited resources can implement community-based training to enhance teachers' digital literacy. This approach has been successfully applied in several regions, where teachers actively share knowledge and experiences through informal learning groups. Further research could explore the effectiveness of this approach compared to formal training.

Future research should also consider qualitative methods, such as in-depth interviews with education policymakers and teachers, to understand the challenges and opportunities in technology implementation. Additionally, experimental or quasi-experimental approaches could be employed to evaluate the effectiveness of policy-based interventions and digital literacy training programs specifically designed for teachers.

#### 4. CONCLUSION

This study provides empirical evidence that principal leadership, work culture, and work motivation significantly influence teachers' digital literacy in public junior high schools in Boja District. The findings underscore the necessity of a holistic approach in adopting educational technology, with these three factors collectively contributing 71% to the improvement of digital literacy among teachers.

From a policy perspective, these results highlight the need for targeted interventions at both the school and governmental levels. School principals should actively promote technology-based training and implement policies that support digital transformation. Meanwhile, fostering an innovation-driven work culture through teacher collaboration and technology integration is crucial. Additionally, teacher motivation can be enhanced through structured incentives, professional recognition, and effective support systems.

Schools can adopt a phased implementation strategy based on their available resources. Those with limited infrastructure may begin with community-based training programs, which have been shown to enhance digital literacy without requiring substantial investment. Schools with better resources can integrate technology more comprehensively into teaching and learning. At the regional and national levels, education policies should support these initiatives through adequate budget allocation and curriculum alignment with technological advancements.

Future research should further explore other contributing factors, such as technological infrastructure, digital-based education policies, and the role of professional learning communities. Methodologically, longitudinal studies could provide insights into how digital literacy evolves over time, while qualitative case studies can offer deeper perspectives on the experiences of teachers and school leaders in adopting digital tools. Additionally, experimental or quasi-experimental approaches should be employed to measure the effectiveness of specific interventions aimed at enhancing teachers' digital literacy. By adopting an evidence-based approach, this research contributes to the broader discourse on improving education quality through digital competency development.

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