

Research Article

The Influence of Principal's Instructional Leadership, Infrastructure, and Teacher Professional Development on the Quality of Learning in Senior High School

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ABSTRACT

This study aims to analyze the influence of principal instructional leadership, infrastructure, and teacher professional development on learning quality in public senior high schools (SMA Negeri) in Blora Regency. A quantitative approach with an associative research design was employed to examine the relationship between these variables. The research involved 200 teachers as respondents, selected through proportional random sampling. Data were collected using a structured questionnaire and analyzed using descriptive and inferential statistical methods, with the assistance of SPSS Statistics Version 26. The findings reveal that all three independent variables significantly influence learning quality. Principal instructional leadership has a strong positive effect on learning quality, with a correlation coefficient of 0.918 and an impact of 84.2%. Infrastructure also plays a crucial role, showing a correlation coefficient of 0.872 and contributing 76% to learning quality. Teacher professional development demonstrates a strong correlation of 0.890, influencing 79.2% of learning quality. The multiple regression analysis indicates that these three factors simultaneously explain 86.6% of the variance in learning quality, while the remaining 13.4% is influenced by other factors outside the model. The study concludes that effective principal instructional leadership, adequate infrastructure, and continuous teacher professional development are key determinants in enhancing learning quality. Schools with strong leadership, well-maintained facilities, and active teacher training programs tend to achieve higher educational outcomes. These findings emphasize the importance of a holistic approach in improving learning quality through leadership empowerment, facility enhancement, and professional teacher development. Future research is recommended to explore additional factors affecting learning quality, such as curriculum implementation, student motivation, and parental involvement. Policymakers and school administrators should prioritize leadership training, facility investment, and professional development programs to optimize the quality of education in Blora Regency and beyond.

Keywords: Principal Instructional Leadership; Infrastructure; Teacher Professional Development; Learning Quality

1. INTRODUCTION

The quality of learning is a crucial factor in enhancing the overall quality of education. An effective learning process must involve various elements such as planning, implementation, assessment, and reflection on learning outcomes to ensure the achievement of educational goals (Sapitri, 2024; Daryanto in Nuryanti, Abdullah, & Muniarti, 2022). The success of learning quality can be measured through the effectiveness of learning, teacher professionalism, and the instructional leadership of the principal in creating a conducive learning environment (Warisno, 2022). Furthermore, Ministry of Education, Culture, Research, and Technology Regulation No. 9 of 2022 states that the quality of learning is influenced by various factors such as teacher reflection, the utilization of technology, and the alignment of the curriculum with workforce needs. However, low learning quality in Indonesia remains a major challenge in the education sector. Despite various efforts such as increased budgets, provision of infrastructure, and enhancement of teacher competence, the results have not shown significant improvements (Supriyadi, Rukajat, & Sholeh, 2022). This issue indicates that in addition to technical factors and facilities, the instructional leadership of the principal and teacher professional development also play a crucial role in improving learning quality.

The instructional leadership of school principals has a significant impact on the success of education in schools. As leaders, principals must be able to create a vision, strategy, and learning environment that supports student development (Efendi & Sholeh, 2023). Effective leadership can encourage teachers to be more creative in teaching and ensure the optimal

utilization of infrastructure to support the learning process (Hartati, Fernadi, & Pramudya, 2022).

Besides school leadership, adequate infrastructure is also a key factor in improving learning quality. Comprehensive facilities such as laboratories, libraries, and information technology equipment can create a conducive learning environment for students and educators (Setiawan & Pratiwi, 2021). However, budget constraints often pose challenges in providing adequate facilities in schools, especially in certain regions, including Blora Regency. Another factor that contributes to the improvement of learning quality is teacher professional development. Teachers who actively engage in professional development through training, seminars, and workshops tend to have broader insights in implementing innovative teaching methods (Nuryanti, Abdullah, & Muniarti, 2022). However, in practice, many teachers face challenges in implementing training results due to limited resources or lack of support from the school administration (Pariana, 2020). Therefore, improving teacher quality through continuous professional development should be a primary focus in efforts to enhance learning quality.

According to the 2024 Education Report, the quality of learning in public senior high schools (SMA Negeri) in Blora Regency is still not optimal. Although there was a 2.96% increase compared to the previous year, the average achievement of 68.89 is still below the "excellent" category. Disparities in learning quality among schools are also evident, with some schools experiencing significant improvement while others show a decline (Regional Education Office IV, Central Java Province, 2024). Additionally, the instructional leadership of school principals in Blora Regency remains relatively low, with an average score of 62.69, indicating that learning management at the school level still needs improvement. Various factors affecting learning quality in Blora Regency need to be examined more deeply to find appropriate solutions. Therefore, this study aims to analyze the influence of school principals' instructional leadership, infrastructure, and teacher professional development on the quality of learning in public senior high schools in Blora Regency. By understanding the relationship between these three variables, it is expected that more effective strategies can be identified to improve the quality of education in this region.

Learning quality is an integral part of the overall quality of education. According to the Ministerial Regulation of Education, Culture, Research, and Technology of the Republic of Indonesia Number 16 of 2022, learning quality is defined as an effective and efficient learning process aimed at optimizing students' potential, initiative, skills, and independence. Kartika & Arifudin (2022) state that learning quality is an effort to fulfill and satisfy students' needs through a learning atmosphere realized in the stages of input, process, and educational output. Azis, Andari, & Sugiran (2022) define learning quality as an educational institution's ability to provide high-quality services, ensuring that student learning outcomes align with established standards. Improving learning quality is crucial as it directly impacts the quality of education delivered and helps students achieve their full potential and skills. Several factors influence learning quality, including student competency, teacher professionalism, infrastructure, laboratory facilities, learning environment, and effective management (Nuryanti, Abdullah, & Muniarti, 2022). Warisno (2022) explains that learning quality is closely related to three main stages in the learning process: planning, implementation, and evaluation. High-quality learning does not only focus on knowledge transfer but also on the delivery of core values implemented through appropriate learning strategies.

Instructional leadership focuses on curriculum management, assessment, teacher professional development, and the improvement of learning quality (Aqib, 2021). Effective leadership encourages teachers to be more creative in teaching while ensuring the optimal utilization of infrastructure to support the learning process (Hartati, Fernadi, & Pramudya, 2022). According to Soutworth, as cited in Sigalingging (2022), instructional leadership strategies consist of three main aspects: modeling (exemplary leadership), monitoring (teacher performance supervision), and professional dialogue and discussion (collaborative discussions to improve learning quality). Instructional leadership also includes the principal's ability to establish the school's vision and mission, manage the curriculum, supervise teaching practices, and foster a supportive learning community.

Infrastructure and facilities are crucial aspects that support successful learning. The National Education Standards (SNP), regulated under Government Regulation Number 57 of 2021, stipulate that educational infrastructure and facilities must meet minimum criteria to ensure an effective learning process. Infrastructure includes equipment and tools used directly in education, such as classrooms, books, laboratories, and learning technology. Meanwhile, facilities encompass supporting elements such as school buildings, courtyards, and sports and arts facilities (Nadiroh & Jannah, 2016). According to Irawan (2023), well-maintained infrastructure and facilities not only ensure the availability of adequate resources but also their optimal utilization and sustainable maintenance. Jumakir & Ardansyah (2024) state that the quality of

infrastructure and facilities can be assessed based on their condition, quantity, and utilization in learning. Thus, adequate infrastructure contributes directly to student learning motivation and the effectiveness of the learning process.

Teacher professional development is an effort to enhance professionalism in order to improve learning quality. According to the Ministry of Education and Culture in *Book 4: Teacher Development and Professional Growth* (2019), professional development is conducted through education and training (workshops), seminars, and collective teacher activities within professional communities. Davis, as cited in Dinata (2023), adds that professional development involves intellectual, managerial, and technical skill enhancement gained through experience and training. Busro (2018) argues that indicators of teacher professional development include opportunities to participate in training, seminars, competency courses, and professional networking reinforcement. Effective professional development leads to increased teaching motivation, innovation in learning, and better student learning outcomes.

Based on the literature review, learning quality is significantly influenced by the instructional leadership of school principals, the availability of infrastructure and facilities, and teacher professional development. Effective school leadership fosters a conducive learning environment, encourages teacher professionalism, and enhances student engagement in the learning process. Adequate infrastructure and facilities support learning effectiveness and increase student motivation. Meanwhile, teacher professional development is a critical factor in ensuring innovative learning that aligns with scientific and technological advancements.

2. RESEARCH METHOD

This study employs a quantitative approach with an associative research design aimed at analyzing the influence of principal instructional leadership, infrastructure, and teacher professional development on learning quality in public senior high schools (SMA Negeri) in Blora Regency. According to Sugiyono (2019: 65), associative research seeks to identify relationships between two or more variables, either in terms of correlation or causal effects. In this study, a correlational technique is used to determine the relationship and influence of independent variables on the dependent variable. A survey method was applied by collecting data through questionnaires distributed to selected respondents. The research subjects include school principals and teachers at SMA Negeri in Blora Regency, while the research objects cover principal instructional leadership, infrastructure, teacher professional development, and learning quality.

This study was conducted in eight public senior high schools spread across Blora Regency: SMA Negeri 1 Blora, SMA Negeri 2 Blora, SMA Negeri 1 Tunjungan, SMA Negeri 1 Jepon, SMA Negeri 1 Cepu, SMA Negeri 2 Cepu, SMA Negeri 1 Randublatung, and SMA Negeri 1 Ngawen. The selection of these locations was based on the representation of the number of teachers and the relevance of the research topic. The research period spanned from September 2024 to March 2025, covering the stages of planning, data collection, data analysis, and the preparation and revision of the research report. The research design is associative, involving three independent variables: principal instructional leadership (X1), infrastructure (X2), and teacher professional development (X3), and one dependent variable: learning quality (Y). According to Sugiyono (2019: 69), the variables in this study consist of the dependent variable (learning quality) and independent variables, which include principal instructional leadership, infrastructure, and teacher professional development. The conceptual and operational definitions of each variable were established based on relevant theories to ensure clarity and ease of measurement in this study.

The study population comprises all teachers teaching at SMA Negeri in Blora Regency, totaling 400 individuals. The sample was selected using the proportional random sampling technique, and the Slovin formula was employed to determine a representative sample size. Based on the calculations, the sample consisted of 200 teachers distributed across eight public senior high schools in Blora Regency. The sample distribution was conducted proportionally based on the number of teachers in each school to ensure balanced representation. The research instrument used was a closed-ended questionnaire with a Likert scale, allowing respondents to provide responses based on five categories: Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly Disagree (1). The questionnaire was developed based on predefined indicators in the research instrument framework. Before data collection, the questionnaire was tested for validity and reliability. Validity testing was conducted using the Pearson Product-Moment correlation method, while reliability testing used Cronbach's Alpha, with a reliability coefficient of ≥ 0.70 considered acceptable (Sugiyono, 2019: 146).

The collected data were analyzed using statistical methods with the SPSS 26 software. The data analysis in this study involved validity and reliability testing, prerequisite analysis testing, and hypothesis testing. Validity testing was conducted using the Pearson Product-Moment correlation technique, while reliability testing used the Cronbach's Alpha method, with the criterion that an instrument is deemed reliable if the α value > 0.70 . The prerequisite analysis tests included: (1) Normality Test: Using Kolmogorov-Smirnov to ensure that the data distribution is normal. (2) Linearity Test: Using ANOVA to determine whether the relationship between the independent and dependent variables is linear. (3) Homogeneity Test: Using Levene's Test to check for variance equality across different groups. (4) Multicollinearity Test: Using Variance Inflation Factor (VIF), where the criterion for the absence of multicollinearity is $VIF < 10$.

The hypothesis testing in this study was conducted through: (1) Pearson Correlation Analysis, which measures the relationship between variables. (2) Simple Linear Regression, which examines the effect of each independent variable on the dependent variable. (3) Multiple Linear Regression, which analyzes the simultaneous effect of the three independent variables on the dependent variable. (4) F-Test and T-Test, which evaluate the significance of the relationships between variables. (5) Coefficient of Determination (R^2), which assesses the extent to which the independent variables explain the variance in the dependent variable. This methodology enables the study to provide empirical insights into the impact of principal instructional leadership, infrastructure, and teacher professional development on learning quality in public senior high schools in Blora Regency.

3. RESULTS AND DISCUSSION

This study involved 200 public senior high school (SMA Negeri) teachers in Blora Regency as respondents. Data were collected through questionnaires and analyzed using descriptive statistics with the assistance of SPSS Statistics Version 26. The descriptive analysis results indicate that the learning quality variable has a mean value of 86.71 with a standard deviation of 12.263. The principal instructional leadership variable has a mean of 86.72 with a standard deviation of 12.098. The infrastructure variable recorded a mean of 84.79 with a standard deviation of 13.194, while the teacher professional development variable showed a mean of 86.11 with a standard deviation of 12.006. Based on frequency distribution, the majority of respondents (61%) rated learning quality as very good, and 57.5% perceived principal instructional leadership as highly effective. Perceptions regarding infrastructure were also positive, with 48.5% of respondents categorizing it as very good. Additionally, 49% of respondents stated that they consistently participated in teacher professional development programs. Before conducting regression analysis, normality, linearity, homogeneity, and multicollinearity tests were performed to ensure that the data met statistical assumptions. The Kolmogorov-Smirnov normality test showed a significance value of 0.329 (> 0.05), indicating a normal distribution. The linearity test confirmed a linear relationship between independent and dependent variables, with a significance value of deviation from linearity > 0.05 . The homogeneity test showed that variance across data groups was homogeneous, with a significance value of 0.637 (> 0.05). The multicollinearity test revealed no multicollinearity issues in the regression model, as the VIF value was < 10 for all independent variables.

The regression test results show that all independent variables have a significant influence on learning quality: (1) The first hypothesis test revealed that principal instructional leadership significantly affects learning quality, with a regression coefficient of 0.930 and a significance value of 0.000. The ANOVA test produced an F-value of 1055.961, significantly higher than the F-table value of 3.07, indicating that principal instructional leadership has a substantial impact on learning quality. (2) The second hypothesis test confirmed that infrastructure significantly affects learning quality, with a regression coefficient of 0.810 and a significance value of 0.000. The coefficient of determination showed that infrastructure accounts for 76% of the variance in learning quality. The ANOVA test yielded an F-value of 627.131, exceeding the F-table value of 3.07, confirming that infrastructure has a significant impact on learning quality. (3) The third hypothesis test demonstrated that teacher professional development significantly affects learning quality, with a regression coefficient of 0.909 and a significance value of 0.000. The F-value of 755.254, surpassing the F-table value of 3.07, suggests that higher teacher professional development leads to better learning quality. (4) Multiple regression analysis showed that principal instructional leadership, infrastructure, and teacher professional development simultaneously affect learning quality. The ANOVA test resulted in an F-value of 421.289 with a significance value of 0.000, indicating that the regression model is significant. The coefficient of determination (R^2) of 86.6% suggests that these three independent variables explain 86.6% of the variation in learning quality, while the remaining 13.4% is influenced by other factors outside this model.

The derived regression equation is: $Y=4.225+0.591X_1+0.183X_2+0.182X_3$ $Y = 4.225 + 0.591X_1 + 0.183X_2 + 0.182X_3$. These results indicate that principal instructional leadership has the strongest influence on learning quality, followed by infrastructure and teacher professional development. Therefore, improvements in instructional leadership, infrastructure quality, and teacher professional development will positively impact learning quality in public senior high schools in Blora Regency. The study results indicate that principal instructional leadership has a significant impact on learning quality. This finding aligns with Hidayat et al. (2020), who stated that principal leadership positively influences teacher performance in achieving high learning quality. Similarly, Banani (2017) found that principal leadership significantly affects teacher competence, which in turn enhances teaching effectiveness. Additionally, a study by Salsabila et al. (2024) revealed that effective school leadership contributes to teacher performance improvement in vocational high schools in Padang. These findings emphasize that effective instructional leadership is a key factor in enhancing learning quality.

This study also found that infrastructure has a significant effect on learning quality. Well-equipped infrastructure supports an efficient and effective learning process. Prasetijo and Samidjo (2019) emphasized that high-quality infrastructure contributes to overall school improvement. Moreover, Supartilah and Pardimin (2021) highlighted the role of school principals in ensuring the availability and maintenance of infrastructure to support an optimal learning process. Thus, investment in infrastructure development is a strategic step toward improving learning quality.

Teacher professional development has been proven to have a significant effect on learning quality. Teachers who actively enhance their competencies tend to be more innovative and effective in teaching. Putri and Imaniyati (2017) stated that teacher professional development is crucial for improving teacher performance, which directly impacts learning quality. Additionally, Gunawan (2018) found that high teacher motivation, often derived from professional development, is closely linked to better teaching performance. Therefore, continuous teacher professional development programs are essential for achieving high learning quality. The multiple regression analysis in this study showed that principal instructional leadership, infrastructure, and teacher professional development simultaneously influence learning quality. These findings align with Ismail (2017), who emphasized that a combination of effective leadership, adequate facilities, and continuous teacher competency development is a primary determinant of effective learning. Furthermore, research by Ermita and Anisah (2013) found that effective principal coaching, supported by adequate infrastructure, enhances teacher performance and learning quality. Thus, a holistic approach encompassing leadership, infrastructure, and teacher professional development is necessary for comprehensive learning quality improvement.

4. CONCLUSION

Based on the research findings, data analysis, and discussion, it can be concluded that there is a significant influence of principal instructional leadership, infrastructure, and teacher professional development on learning quality in public senior high schools (SMA Negeri) in Blora Regency. First, principal instructional leadership has a positive and significant influence on learning quality, with the regression equation $\hat{Y} = 6.041 + 0.930X_1$. The correlation strength of 0.918 indicates a very strong relationship, with an influence of 84.2%. This result suggests that the better a principal manages the learning process, the higher the learning quality achieved. Second, infrastructure also has a positive influence on learning quality, with the regression equation $\hat{Y} = 18.002 + 0.810X_2$. The correlation strength of 0.872 indicates a very strong relationship, with an influence of 76%. This finding demonstrates that the availability and optimal utilization of infrastructure will enhance learning effectiveness. Third, teacher professional development has a positive and significant influence on learning quality, with the regression equation $\hat{Y} = 8.419 + 0.909X_3$. The correlation strength of 0.890 indicates a very strong relationship, with an influence of 79.2%. This result suggests that the more intensive teachers engage in professional development, the higher the learning quality produced. Fourth, principal instructional leadership, infrastructure, and teacher professional development simultaneously have a significant influence on learning quality, with the regression equation $Y = 4.225 + 0.591X_1 + 0.183X_2 + 0.182X_3$. The correlation strength of 0.866 indicates a very strong relationship, with an influence of 86.6%. This result suggests that these three factors collectively play a crucial role in improving learning quality in public senior high schools in Blora Regency.

ACKNOWLEDGEMENTS

The author expresses sincere gratitude to all parties who have contributed to the completion of this research and the preparation of this journal article. Special thanks are extended to the principals and teachers of public senior high schools (SMA Negeri) in Blera Regency for their participation and valuable insights. The author also appreciates the support and guidance from academic advisors, colleagues, and fellow researchers, whose feedback and suggestions have greatly improved the quality of this study. Additionally, gratitude is expressed to the institutions and funding bodies that facilitated this research. Lastly, the author extends heartfelt appreciation to family and friends for their unwavering encouragement and support throughout the research process. May this study serve as a meaningful contribution to educational research and practice.

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