Jurnal Vokasi Informatika (JAVIT), Vol. 5, No. 2, pp. 225-242, June 2025
e-ISSN: 2775 - 6807

# The Relationship between Learning Motivation, Student Worksheets, and Learning Outcomes in Computer and Network Engineering Education

**Inneke Fortuna Irawan[1,2*], Efrizon[2], Vera Irma Delianti[2] and Rizkayeni Marta[2]**

[1] SMK Negeri 1 Sijunjung, Sijunjung, **Indonesia**
[2] Electronics Engineering, Faculty of Engineering, Universitas Negeri Padang, Padang, **Indonesia**

*Corresponding Author Email: innekefortuna22@gmail.com
Received April 12, 2025; Revised June 10, 2025; Accepted June 24, 2025.

**DOI:** https://doi.org/10.24036/javit.v5i2.253

**Abstract:** This study investigates the influence of learning motivation and student worksheets (LKPD) on students' academic achievement in the subject of Computer and Network Engineering at a vocational high school. The research was motivated by the observation that student learning outcomes remained in the moderate category, potentially due to insufficient motivation and suboptimal use of instructional materials. This study aimed to (1) examine the relationship between learning motivation and learning outcomes, (2) analyze the relationship between LKPD and learning outcomes, and (3) assess the combined effect of learning motivation and LKPD on student achievement. A quantitative approach with a descriptive correlational design was employed, involving 36 Grade XI students in the Computer and Network Engineering program. Data were collected through validated questionnaires and documented mid-semester exam scores. The findings revealed a strong and statistically significant correlation between learning motivation and learning outcomes ($r = 0.713$, $R^2 = 0.509$), a moderate but significant relationship between LKPD and learning outcomes ($r = 0.338$, $R^2 = 0.114$), and a strong combined relationship between learning motivation and LKPD with learning outcomes ($r = 0.716$, $R^2 = 0.513$). These results highlight the critical role of both psychological and instructional factors in shaping academic performance in vocational education.

**Keywords**: Learning motivation; Student worksheets; Academic achievement; Vocational education; Correlational analysis.

## 1. Introduction

Education is a fundamental driver of national development, and the quality of human resources is often determined by the effectiveness of educational processes at various levels [1]–[3]. In vocational education, which aims to equip students with domain-specific competencies and practical skills aligned with

industry needs, the quality of teaching and learning plays a critical role in shaping students' career readiness [4]–[7]. Effective education, particularly in technical disciplines such as Computer and Network Engineering, requires not only the delivery of content knowledge but also the cultivation of learning motivation and the use of pedagogical strategies that foster deep understanding and student autonomy.

One essential aspect of the learning process is student motivation, which has been extensively linked to academic achievement in both theoretical and vocational contexts. Learning motivation refers to the internal and external factors that stimulate the desire and persistence of students to engage in educational tasks. According to self-determination theory, when students are intrinsically motivated, they are more likely to exhibit effort, persistence, and enthusiasm in learning, leading to higher academic outcomes [8]–[11]. In vocational high schools (SMKs), where learning often involves technical and abstract concepts, maintaining student motivation becomes increasingly important, especially in subjects that require analytical thinking and structured problem solving such as Computer and Network Engineering.

In parallel with motivation, the design and use of instructional materials significantly influence students' engagement and performance. Among these, student worksheets or LKPD (Lembar Kerja Peserta Didik) are commonly employed tools intended to guide students through specific learning activities. Ideally, LKPD should encourage active learning by structuring information, posing questions, and promoting reflection. However, in practice, many LKPDs used in vocational education are limited to rote activities and do not leverage technology or real-world scenarios that can contextualize learning. Studies suggest that the integration of inquiry-based and technology-supported LKPDs can lead to greater student independence, critical thinking, and ultimately, improved learning outcomes [12], [13]. Furthermore, LKPDs that are aligned with students' motivation levels can foster a sense of autonomy and competence, which are essential for vocational learners [14]–[16].

Despite these theoretical insights, there remains a lack of empirical research that explores the interaction between learning motivation and LKPD use, particularly within the context of Indonesian vocational high schools. The literature tends to treat these variables in isolation, without examining how they jointly contribute to student achievement in specific subjects.

Preliminary observations at SMK Negeri 1 Sijunjung reveal a concerning trend: a significant proportion of students enrolled in Computer and Network Engineering courses exhibit low levels of motivation and classroom engagement. These behavioral indicators include passive participation, lack of initiative, and reduced interest in subject content. Teachers report that while some efforts have been made to incorporate LKPD into lesson delivery, the worksheets are often generic and fail to stimulate higher-order thinking or

personal relevance for the students. As a result, students' academic performance in these subjects tends to be inconsistent and below the expected competency standards.

To address this issue, it is necessary to explore whether enhancing students' learning motivation—supported by the effective use of LKPD—can lead to improved learning outcomes. Understanding the relationship between these variables is crucial not only for optimizing instructional design but also for informing policy and practice in vocational education. A clearer understanding of these dynamics can help educators develop more targeted interventions that align instructional materials with students' motivational profiles.

Therefore, this study aims to examine the relationship between learning motivation and the use of student worksheets (LKPD) on learning outcomes in the Computer and Network Engineering subject at SMK Negeri 1 Sijunjung. Specifically, the research investigates whether students with higher learning motivation who engage with well-designed LKPDs perform better academically. The findings are expected to contribute to the development of more effective teaching strategies in vocational schools and offer empirical evidence on how motivation and instructional tools interact to shape student success.

## 2. Material and methods

### 2.1 Research Design

This study applied a quantitative approach using a descriptive correlational method. The purpose of this design was to examine the relationship between two independent variables—learning motivation and the use of student worksheets (LKPD)—and the dependent variable, which is student learning outcomes in the Computer and Network Engineering subject.

### 2.2 Population and Sampling Technique

The research population comprised all 11th-grade students in the Computer and Network Engineering program at SMK Negeri 1 Sijunjung. A total of 36 students were identified as the target population. Given the small population size, the study used a total sampling technique, allowing every student to be included in the sample to ensure comprehensive and representative data collection.

### 2.3 Data Sources

The study utilized both primary and secondary data. Primary data were gathered directly from students through questionnaires and performance assessments based on LKPD activities. Meanwhile, secondary data were

obtained from institutional records such as academic reports and teacher documentation that supported the evaluation of student learning outcomes.

### 2.4 Data Collection Instruments and Procedures

Several instruments were used to collect the necessary data. A structured questionnaire was designed to measure learning motivation, employing a Likert-type scale based on established psychological constructs including intrinsic motivation, extrinsic motivation, and task value. The questionnaire was validated through expert review and pilot-tested to ensure reliability. Observational methods were employed during the learning process to assess how students interacted with the LKPD. Interviews with subject teachers were also conducted to provide additional insights into student engagement and the practical implementation of worksheets. Finally, the documentation method was used to collect student academic scores from school records.

### 2.5 Data Analysis Techniques

Data analysis was conducted using IBM SPSS Statistics version 20. The process began with testing the validity and reliability of the questionnaire items to ensure they accurately measured the intended constructs. Descriptive statistics were used to summarize data distributions, while normality and homogeneity tests were conducted to confirm the assumptions necessary for further parametric testing. The relationship between the independent variables and the dependent variable was examined using Pearson's product-moment correlation. All hypothesis testing was conducted at a significance level of 0.05, and results were interpreted based on both statistical significance and educational relevance within the vocational school context.

## 3. Results and discussion

### 3.1 Descriptive Analysis

This study utilized a questionnaire to assess the learning motivation and student worksheet (LKPD) variables, while learning outcomes were collected from documented Mid-Semester Exam scores of Grade XI TKJ students in the Computer and Network Engineering subject at SMK Negeri 1 Sijunjung.

**Table 1.** Results of Data Tabulation

| No | X1 | X2 | Y |
|---|---|---|---|
| 1 | 73 | 74 | 90 |
| 2 | 64 | 77 | 86 |
| 3 | 51 | 74 | 80 |
| 4 | 68 | 76 | 82 |
| 5 | 55 | 76 | 78 |

| No | X1 | X2 | Y |
|---|---|---|---|
| 6 | 67 | 90 | 80 |
| 7 | 50 | 64 | 82 |
| 8 | 64 | 70 | 86 |
| 9 | 65 | 76 | 88 |
| 10 | 57 | 76 | 80 |
| 11 | 64 | 73 | 84 |
| 12 | 52 | 68 | 78 |
| 13 | 60 | 68 | 80 |
| 14 | 49 | 72 | 78 |
| 15 | 42 | 72 | 70 |
| 16 | 53 | 66 | 80 |
| 17 | 63 | 72 | 88 |
| 18 | 59 | 65 | 78 |
| 19 | 62 | 72 | 86 |
| 20 | 52 | 71 | 80 |
| 21 | 57 | 82 | 86 |
| 22 | 59 | 60 | 78 |
| 23 | 60 | 75 | 78 |
| 24 | 60 | 70 | 84 |
| 25 | 60 | 70 | 82 |
| 26 | 49 | 68 | 75 |
| 27 | 54 | 70 | 78 |
| 28 | 59 | 70 | 78 |
| 29 | 55 | 64 | 80 |
| 30 | 52 | 71 | 82 |
| 31 | 72 | 76 | 88 |
| 32 | 57 | 70 | 78 |
| 33 | 61 | 80 | 90 |
| 34 | 59 | 76 | 84 |
| 35 | 58 | 70 | 86 |
| 36 | 55 | 70 | 78 |

Table 1 presents the raw tabulated data obtained from 36 Grade XI TKJ students at SMK Negeri 1 Sijunjung. This dataset includes three variables: learning motivation (X1), student worksheet or LKPD (X2), and learning outcomes (Y), which are measured using a combination of questionnaires and documented mid-semester exam scores in the Computer and Network Engineering subject. The learning motivation (X1) and LKPD (X2) variables were measured using validated instruments in the form of Likert-scale questionnaires, while the learning outcomes (Y) variable was based on the students' actual scores from their mid-semester examinations.

Each student is represented in a single row showing their scores across all three variables. For instance, students who scored higher in learning motivation and LKPD, such as student 1 (X1 = 73, X2 = 74), generally achieved higher learning

outcome scores (Y = 90). Conversely, lower scores in X1 and X2 were often associated with lower outcome scores, as seen in student 15 (X1 = 42, X2 = 72, Y = 70). This raw data serves as the foundation for further analysis, including the assessment of frequency distributions, normality and homogeneity tests, and correlation and regression analyses. These steps are crucial to determine the extent to which learning motivation and LKPD influence students' academic performance in vocational education settings.

The frequency distribution of the learning motivation variable was analyzed to determine how students' motivation levels are spread across defined categories. This analysis aims to provide an overview of the general tendency of students' learning motivation based on their questionnaire scores. The classification is based on interval ranges that represent categories from very poor to very good. The results of this categorization are presented in Table 2.

**Table 2.** Frequency Distribution of the Learning Motivation Variable

| Category | Class Interval | Frequency | Persentase | Mean |
|---|---|---|---|---|
| Very Good | > 68 | 2 | 5,6 | |
| Good | 62 – 68 | 8 | 22,2 | |
| Quite Good | 55 – 62 | 16 | 44,4 | 58,3 |
| Not Very Good | 48 – 55 | 9 | 25,0 | (Quite Good) |
| Really Bad | < 48 | 1 | 2,8 | |
| **Total** | | **36** | **100** | |

Based on Table 2, it is shown that the learning motivation of Grade XI TKJ students at SMK Negeri 1 Sijunjung includes 1 student (2.8%) in the very poor category, 9 students (25%) in the poor category, 16 students (44.4%) in the fair category, 8 students (22.2%) in the good category, and 2 students (5.6%) in the very good category. Overall, the learning motivation variable falls into the fair category.

To evaluate students' responses toward the use of student worksheets (LKPD), a frequency distribution analysis was conducted. This analysis categorizes students' perceptions of the LKPD based on score intervals, which are grouped into five categories ranging from very poor to very good. The purpose of this classification is to identify the general level of effectiveness and acceptance of the LKPD among students. The detailed distribution of scores is presented in Table 3.

**Table 3.** Frequency Distribution of the LKPD Variable

| Category | Class Interval | Frequency | Persentase | Mean |
|---|---|---|---|---|
| Very Good | > 80 | 2 | 5,6 | 72,1 (Quite Good) |
| Good | 75 – 80 | 9 | 25,0 | |
| Quite Good | 69 – 75 | 17 | 47,2 | |

| Category | Class Interval | Frequency | Persentase | Mean |
|---|---|---|---|---|
| Not Very Good | 64 – 69 | 7 | 19,4 | |
| Really Bad | < 64 | 1 | 2,8 | |
| **Total** | | **36** | **100** | |

Based on Table 3, it is shown that in the student worksheets of Grade XI TKJ students at SMK Negeri 1 Sijunjung, there is 1 student (2.8%) in the very poor category, 7 students (19.4%) in the poor category, 17 students (47.2%) in the fair category, 9 students (25%) in the good category, and 2 students (5.6%) in the very good category. Overall, the variable falls into the fair category.

To understand the overall academic performance of students, a frequency distribution analysis was also conducted on the learning outcomes variable. These outcomes were obtained from the Mid-Semester Exam scores of Grade XI TKJ students in the Computer and Network Engineering subject. The scores were grouped into five categories, ranging from very poor to very good, based on defined score intervals. This classification aims to provide a clearer picture of how students' academic achievements are distributed. The results of this analysis are presented in Table 4.

**Table 4.** Frequency Distribution of the Learning Outcomes Variable

| Category | Class Interval | Frequency | Persentase | Mean |
|---|---|---|---|---|
| Very Good | > 88 | 2 | 5,56 | |
| Good | 84 – 88 | 11 | 30,56 | |
| Quite Good | 79 – 84 | 11 | 30,56 | 81,6 |
| Not Very Good | 75 – 79 | 11 | 30,56 | (Quite Good) |
| Really Bad | < 75 | 1 | 2,78 | |
| **Total** | | **36** | **100** | |

Based on Table 4, it is shown that in the student worksheets of Grade XI students at SMK Negeri 1 Sijunjung, 1 student (2.78%) falls into the very poor category, 11 students (30.56%) fall into the poor category, 11 students (30.56%) fall into the fair category, 11 students (30.56%) fall into the good category, and 2 students (5.56%) fall into the very good category. Overall, the learning outcomes variable falls into the fair category.

## 3.2 Normality and Homogeneity Test

### 3.2.1 Normality Test

Before conducting further statistical analyses, it is essential to test the normality of the data to ensure that it meets the assumptions required for parametric tests. The normality test was carried out using the Kolmogorov–Smirnov method with a significance level of 0.05. This test aims to determine whether the

distribution of the data for the study variables follows a normal distribution. The results of the normality test are presented in Table 5.

**Table 5.** Normality Test Results

| N | Asymp.Sig (2-tailed) | Level of Significance | Statement |
|---|---|---|---|
| 36 | 0,952 | 0,05 | Normality |

Based on Table 5, it can be seen that the significance of the variable (Asymp. Sig. (2-tailed)) is 0.952. Therefore, it can be concluded that the data is normally distributed because the significance is greater than 0.05 (0.952 > 0.05) and meets the analysis prerequisite test.

### 3.2.2 Homogenity Test

Before proceeding to correlation and regression analyses, it is also important to ensure that the data meet the assumption of homogeneity. The homogeneity test is conducted to determine whether the variance among the data groups is equal, which is a prerequisite for conducting further inferential statistical tests. This test was carried out for both the learning motivation (X1) and LKPD (X2) variables using the Levene's Test at a significance level of 0.05. The results of the homogeneity test are presented in Table 6.

**Table 6.** Homogenity Test Results

| N | Asymp.Sig (2-tailed) | Level of Significance | Statement |
|---|---|---|---|
| Learning Motivation | 0,103 | 0,05 | Homogenity |
| LKPD | 0,470 | 0,05 | Homogenity |

Based on Table 6, the significance value for the learning motivation variable (X1) is 0.103 and for the LKPD variable (X2) is 0.470. Both values are greater than the significance threshold of 0.05, indicating that the data are homogeneous. Therefore, it can be concluded that the assumption of homogeneity of variance is fulfilled, and the dataset is appropriate for subsequent parametric statistical testing.

## 3.3 Hypothesis Testing

### 3.3.1 Simple Correlation Tests

To determine the strength and direction of the relationship between learning motivation and student learning outcomes, a simple correlation analysis was conducted. This test aims to identify whether there is a statistically significant linear relationship between the two variables and how strongly they are

associated. The results of the simple correlation test between the learning motivation variable and learning outcomes are presented in Table 7.

**Table 7.** Results of the Simple Correlation Test between Learning Motivation and Learning Outcomes

| Variable | N | r | Sig. | Statement |
|---|---|---|---|---|
| Learning Motivation Learning Outcomes | 36 | 0,713 | 0,000 | There is a positive and significant relationship |

Based on Table 7, the correlation coefficient (r) between learning motivation and learning outcomes is 0.713. This value indicates a strong and positive correlation, as it falls within the range of 0.60 to 0.79 based on standard interpretation guidelines. Furthermore, the significance value is 0.000, which is lower than the alpha level of 0.05. This means the correlation is statistically significant and can be generalized to the population. Therefore, it can be concluded that $Ha_1$ is accepted, confirming that there is a positive and significant relationship between learning motivation and student learning outcomes in the Computer and Network Engineering subject at SMK Negeri 1 Sijunjung.

To further examine the relationship between the use of student worksheets (LKPD) and students' learning outcomes, a simple correlation analysis was conducted. This test is intended to assess whether there is a statistically significant association between the quality of LKPD and the academic performance of students. The results of the simple correlation analysis for these two variables are presented in Table 8.

**Table 8.** Results of the Simple Correlation Test between LKPD and Learning Outcomes

| Variable | N | r | Sig. | Statement |
|---|---|---|---|---|
| LKPD Learning Outcomes | 36 | 0,338 | 0,044 | There is a positive and significant relationship |

Based on Table 8, the results of the simple correlation test between the LKPD variable and the learning outcomes variable is 0.338. This result shows a positive value, and the correlation coefficient (r) in this study falls into the weak category based on the correlation coefficient interpretation guidelines, which place it in the range of 0.20 to 0.39. At the 5% significance level, the significance value is 0.044 (0.044 < 0.05), indicating that the correlation is significant and applicable to the population. Based on these calculations, it can be concluded that Ha2 is accepted, meaning there is a positive and significant relationship between LKPD and learning outcomes in the Computer and Network Engineering subject at SMK Negeri 1 Sijunjung.

### 3.3.2 Multiple Correlation and Determination Tests

To determine the combined effect of learning motivation and LKPD on student learning outcomes, a multiple correlation analysis was conducted. This analysis aims to assess the strength and significance of the relationship when both independent variables are considered simultaneously in influencing students' academic performance. The results of this multiple correlation test are presented in Table 9.

**Table 9.** Results of the Multiple Correlation Test of Learning Motivation and LKPD on Learning Outcomes

| N | R | Sig. |
|---|---|---|
| 36 | 0,716 | 0,000 |

Based on Table 9, the results of the multiple correlation test between the learning motivation and LKPD variables on the learning outcomes variable is 0.716. This result shows a positive value, and the correlation coefficient (r) in this study falls into the strong category based on the interpretation guidelines, which place it in the range of 0.60 to 0.79. Based on these calculations, it can be concluded that Ha3 is accepted. The positive sign of the correlation coefficient indicates that the relationship is positive or in the same direction, meaning that the higher the learning motivation and the quality of the LKPD, the higher the learning outcomes. Therefore, it can be concluded that there is a positive and significant relationship between learning motivation and LKPD together toward learning outcomes.

To further examine the extent to which each independent variable—learning motivation and LKPD—contributes to the variance in student learning outcomes, a coefficient of determination (R Square) analysis was conducted. This analysis helps quantify how much of the variation in learning outcomes can be explained by each variable individually, as well as in combination. The detailed results are presented in Tables 10, 11, and 12.

**Table 10.** Results of the Test on the determinant of Learning Motivation on Learning Outcomes

| N | R | R Square | Adjusted R Square |
|---|---|---|---|
| 36 | 0,713 | 0,509 | 0,495 |

From this table, it can be seen that the R Square value is 0.509. This indicates that learning motivation alone accounts for 50.9% of the variation in student learning outcomes, while the remaining 49.1% is attributed to other factors not included in this analysis.

**Table 11.** Results of the Test on the determinant of LKPD on Learning Outcomes

| N | R | R Square | Adjusted R Square |
|---|---|---|---|
| 36 | 0,338 | 0,114 | 0,088 |

The R Square value is 0.114, which means that LKPD explains 11.4% of the variation in learning outcomes. The remaining 88.6% is likely influenced by other external or internal variables beyond the scope of this study.

**Table 12.** Results of the Test on the determinant of Learning Motivation and LKPD on Learning Outcomes

| N | R | R Square | Adjusted R Square |
|---|---|---|---|
| 36 | 0,716 | 0,513 | 0,483 |

The R Square value obtained is 0.513, indicating that the combined contribution of both variables explains 51.3% of the variation in student learning outcomes. This suggests that the integration of motivational factors and effective instructional materials (LKPD) plays a significant role in shaping students' academic performance, although nearly half of the outcome is still influenced by other, unmeasured variables.

These findings reinforce the importance of addressing both psychological (motivation) and instructional (LKPD) components when designing strategies to improve student achievement in vocational education settings.

### 3.4 Discussion

The results of this study reveal a significant and positive relationship between learning motivation and student learning outcomes in the subject of Computer and Network Engineering. The correlation coefficient of 0.713 indicates a strong association, signifying that students with higher levels of motivation tend to perform better academically. This finding is in line with existing theories in educational psychology that suggest motivation is a key driver of student effort, persistence, and achievement [17]–[19]. Motivated students are more likely to engage in learning activities, seek understanding, and demonstrate resilience in the face of academic challenges, all of which contribute to improved outcomes [20]–[25].

Furthermore, the study identifies a positive yet weaker relationship between the use of student worksheets (LKPD) and student learning outcomes, with a correlation coefficient of 0.338. While the relationship is statistically significant, the strength of the association is moderate. This suggests that the effectiveness of LKPD may vary depending on how they are designed and implemented. Worksheets that are contextually relevant, interactive, and aligned with

learning objectives have been shown to support comprehension and encourage active participation [26], [27]. However, if the content is too generic or lacks pedagogical innovation, their impact on learning outcomes may be limited [28].

When both variables—learning motivation and LKPD—are analyzed together, the multiple correlation coefficient of 0.716 confirms a significant joint contribution to student achievement. The coefficient of determination ($R^2$) indicates that 51.3% of the variance in learning outcomes can be explained by the combined influence of motivation and LKPD. This reinforces the notion that optimal learning does not depend on a single factor but emerges from the interplay between internal psychological readiness and external instructional support [29]–[31].

The results align with cognitive-behavioral learning models, which emphasize the interaction between learners' internal states and their engagement with instructional materials. Specifically, the findings support the expectancy-value theory, which posits that students are more likely to succeed when they both value the learning task and believe in their ability to complete it [32], [33]. The significant impact of motivation observed in this study affirms the centrality of affective components in learning, especially in vocational education settings, where practical and conceptual skills must be integrated.

The lower explanatory power of LKPD alone ($R^2 = 0.114$) compared to learning motivation ($R^2 = 0.509$) suggests that while instructional media are important, their effect is amplified when coupled with intrinsic student engagement. This finding supports earlier research indicating that technology or worksheets alone do not guarantee learning gains unless learners are mentally and emotionally invested in the process [34]. It also implies that efforts to improve student outcomes should prioritize motivational interventions alongside pedagogical enhancements.

Interestingly, although the students' average responses placed both learning motivation and LKPD use in the "fair" category, a considerable number of students achieved "good" and "very good" learning outcomes. This suggests the presence of other contributing factors not examined in this study, such as teacher competence, peer influence, home environment, or prior knowledge. As only 51.3% of the variance is explained by the two independent variables, future research should explore additional variables such as learning strategies, digital literacy, and classroom management techniques to provide a more comprehensive understanding.

These findings have significant implications for vocational education. Schools should not only focus on providing learning tools like LKPD but must also foster environments that build motivation, autonomy, and purpose among students. Teachers play a central role in bridging these elements by designing learner-centered activities, offering feedback, and cultivating supportive

classroom climates. In addition, policymakers should consider integrating training programs that equip teachers with skills to develop motivation-sensitive instructional media.

In conclusion, this study underscores that both learning motivation and the use of student worksheets contribute meaningfully to student achievement, though motivation plays a more dominant role. Enhancing both components in tandem is likely to yield the greatest improvements in learning outcomes in vocational education environments.

## 4. Conclusion

This study aimed to investigate the relationship between learning motivation and the use of student worksheets (LKPD) on learning outcomes among Grade XI students in the Computer and Network Engineering subject at SMK Negeri 1 Sijunjung. The results revealed that both learning motivation and LKPD individually and jointly have a positive and statistically significant correlation with students' academic performance. Specifically, learning motivation showed a strong contribution ($R^2 = 0.509$) to learning outcomes, while LKPD contributed a smaller, yet meaningful portion ($R^2 = 0.114$). When combined, both variables accounted for 51.3% of the variance in learning outcomes, suggesting that student success in vocational subjects is influenced by both psychological and instructional factors.

These findings underscore the importance of fostering intrinsic motivation and providing well-designed learning materials to optimize student achievement. The results contribute to the growing body of literature emphasizing the multifactorial nature of academic performance, particularly in vocational education settings where practical application and student engagement are critical.

However, this study has several limitations. First, the sample was limited to a single vocational school, which may restrict the generalizability of the findings. Second, the study relied on self-reported measures for motivation and LKPD, which may be subject to social desirability bias. Third, external factors such as teaching style, classroom environment, and peer influence were not examined, although they may also play a role in shaping learning outcomes.

Future research should consider expanding the sample across multiple schools and regions to enhance the generalizability of the results. Additionally, a longitudinal approach could offer deeper insights into the causal relationships between motivation, instructional design, and learning performance over time. Incorporating qualitative methods such as interviews or classroom observations could also provide richer contextual understanding of how motivation and LKPD affect student learning in practice.

In conclusion, this study highlights the significant role of learning motivation and instructional support through LKPD in improving academic outcomes. Educators and curriculum designers are encouraged to prioritize both elements to foster more effective and student-centered learning environments in vocational education.

## Author's declaration

### Author contribution

**Inneke Fortuna Irawan was** responsible for conceptualizing the research design, collecting data, and drafting the initial manuscript. **Efrizon** contributed to the methodology refinement, supervised the data analysis process, and reviewed the manuscript critically for intellectual content. **Vera Irma Delianti** assisted in data interpretation and contributed to the development of the literature framework. **Rizkayeni Marta** provided support in the statistical analysis and ensured the accuracy of the findings presented. All authors have read and approved the final version of the manuscript.

### Funding statement

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

### Acknowledgements

The authors would like to express their sincere gratitude to the school administrators, teachers, and students who participated in this study for their valuable cooperation and support throughout the research process. Appreciation is also extended to the academic mentors and reviewers whose insights and suggestions significantly enhanced the quality of this manuscript.

### Competing interest

The authors declare that there are no competing interests or potential conflicts of interest related to the research, authorship, and publication of this article.

### Ethical clearance

This study was carried out in accordance with applicable ethical standards for research involving human participants. Prior to data collection, all participants were informed about the objectives of the study and voluntarily provided their informed consent. The anonymity and confidentiality of all participant data were strictly protected throughout the research process.

## AI statement

No generative artificial intelligence (AI) tools were used in the writing, data analysis, or interpretation of this study. All content, including the manuscript, statistical analysis, and conclusions, was produced solely by the authors through original and manual academic work.

## Publisher's and Journal's note

Universitas Negeri Padang as the publisher and Editor of Jurnal Vokasi Informatika (JAVIT) state that there is no conflict of interest towards this article publication.

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