



## The Influence of Discipline, Independence, And Peers On Learning Outcomes Smk PGRI 2 Taman Pemalang: Learning Motivation As Mediator

Dian Retno Sari<sup>a</sup>, Tusyanah Tusyanah<sup>b</sup>

<sup>a</sup> Universitas Negeri Semarang, Semarang, Indonesia

<sup>b</sup> Universitas Negeri Semarang, Semarang, Indonesia

### ARTICLE INFO

#### Keywords:

Learning Discipline, Learning Independence, Peers, digital-based document learning outcomes, Learning Motivation

#### Article History:

Received 19 May 2025

Accepted 21 June, 2025

Available online 20 August, 2025



<https://doi.org/10.26740/jpap.v13n2.p552-570>

### ABSTRACT

**Phenomenon/Issue:** This study explores the effectiveness of discipline, independence, and peers in optimizing learning outcomes, especially in the basic subject of the skills program on digital-based document material. **Purpose:** This study aims to analyze the effect of learning discipline, learning independence, and peers on learning outcomes, learning motivation as a mediating variable in class X students of *SMK PGRI 2 Taman Pemalang*.

**Novelty:** This study uniquely incorporates learning motivation as a mediator within the framework of discipline, independence, and peers on learning outcomes and offers new insights for education and future research.

**Research Methods:** Data were collected from 141 students of class X majoring in office management and business services at *SMK PGRI 2 Taman Pemalang* through questionnaires, learning outcomes tests using Structural Equation Modeling (SEM) to examine the relationship between discipline, independence, and peer to learning outcomes through learning motivation.

**Results:** The results showed that learning discipline, learning independence, and peer influence had a positive and significant effect directly on learning outcomes. In addition, these three factors also have a positive and significant effect on learning motivation. Learning motivation acts as a mediator that strengthens the relationship between learning discipline, learning independence, and peer influence on learning outcomes.

**Research Contributions:** This research deepens the theoretical understanding of learning discipline, learning independence and peer influence in educational contexts and provides a practical framework for motivation-focused learning strategies to improve student learning outcomes. The findings can guide policymakers and educators in designing learning processes that meet students' academic and motivational needs.

### INTRODUCTION

In today's digital age, office and academic organizations have all gone digital. Libraries of archives or archival institutions may create archives in various forms or convert them to other media, including electronic media (Aryasatya & Katili, 2019).

#### <sup>1</sup> Correspondence:

Dian Retno Sari. Universitas Negeri Semarang, Semarang, Indonesia, [retnodian113@students.unnes.ac.id](mailto:retnodian113@students.unnes.ac.id)



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Vocational schools, especially those offering programs in office administration, business, and management, have the primary task of producing graduates (vocational school output) who have the necessary abilities and skills to perform all types of office work, including filing systems (Arifuddin et al., 2023). Digital-based document materials in the era of disruption have indeed undergone significant development compared to previous eras. It is inseparable from the massive development of ICT. Learning 4.0 has a vision of encouraging learners to not only acquire the necessary skills and knowledge but also to identify sources for learning a particular skill or subject (Sahara et al., 2023).

Risamasu et al. (2025) digital archiving is defined as the systematic process of collecting, storing, transferring, and utilizing digital information for public access. Elfaladonna & Mareta (2023) digital document archives have the advantage of faster information retrieval and the availability of electronic copies of archives, which facilitates access Oktarina et al. (2023) revealed in their observations at private vocational schools in Kendal Regency that there were five vocational schools in the adequate category and 38 in the poor category. There were various problems, including difficulties in retrieving archives, loss of archives, and a lack of consistency in the use of document storage systems. Graduates of office administration programs not only have the opportunity to become teachers but also have the opportunity to pursue careers in fields other than education. In addition to having knowledge and skills in office management, they also have other abilities, such as knowledge and skills in various aspects of business, such as institutional financial accounting, marketing, digital business, office management, and business services (Fanani et al., 2023).

In a study conducted by Zainuddin et al. (2023) the implementation of adequate digital archive storage improves the efficiency of document search and management and has a significant positive impact on data retrieval speed. Based on observations and interviews with teachers of the DPK subject during teaching and learning activities in the 10th-grade MPLB class at *SMK PGRI 2 Taman Pemalang*, it was found that teachers only provided theoretical material, PowerPoint presentations and assignments manually using worksheets. Student learning outcomes are still suboptimal, and practical training on digital document archiving is not provided, resulting in insufficient student skills.

Table 1  
Final Semester Exam Scores for DPK Subjects

| Class         | Number of students | Students completed | Incomplete students | Incomplete in percentage |
|---------------|--------------------|--------------------|---------------------|--------------------------|
| X MPLB 1      | 35                 | 13                 | 22                  | 62.9 %                   |
| X MPLB 2      | 36                 | 16                 | 20                  | 55.6%                    |
| X MPLB 3      | 34                 | 10                 | 24                  | 70.6%                    |
| X MPLB 4      | 36                 | 14                 | 22                  | 61.1%                    |
| <b>Amount</b> | 141                | 53                 | 88                  | 62.4%                    |

Source: Processed primary data, 2025

Based on the data in Table 1 regarding the learning outcomes of the basic course content of the MPLB class of 2024 at *SMK PGRI 2 Taman Pemalang* consisting of 141 students, it shows that 88 students, or 62.4%, did not achieve the required passing score, while 53 students achieved the required passing score on the final exam. In the MPLB 3 class, only 10 students met the required passing score, and 24 students, or 70.6%, were still incomplete. The number of students who scored below the minimum passing score in the final semester exam indicates that the learning outcomes of the basic program are low.

Observation results in Jus et al. (2025) show that MPLB grade X students have low motivation to learn, as indicated by their lack of active participation in learning activities, tardiness in completing assignments, and unsatisfactory learning outcomes. Various factors can affect learners' learning achievement during the learning process, both from within (internal) and from the surrounding environment (external). Internal factors include things like intelligence level, motivation, interest, discipline, attitude, and talent. Meanwhile, external factors are divided into two main groups: social aspects, which include influences from family, teachers, friends, and the community, and non-social aspects, which include the physical conditions of the learning environment, such as school buildings, the location of classrooms and the availability of supporting facilities (Damayanti, 2022).

Learning discipline is an internal factor in students that can affect the achievement of learning outcomes. It is supported by Rofiuddin & Darmawan (2024). Research shows that discipline in learning plays an important role in improving learning achievement, where students who have high discipline generally obtain more optimal learning outcomes. However, findings from other studies reveal that learning discipline does not have a significant influence on student learning outcomes in Economics subjects in class XI SMA Negeri 1 Jatilawang (Pangesti & Rahman, 2024). The achievement of optimal learning outcomes is also influenced by the level of learning independence of students. As an internal factor, learning independence needs to be fostered and developed so that students are able to achieve maximum learning outcomes (Loka et al., 2024). It is in line with research by Umamiyah et al. (2022) indicates that learning independence has a significant positive influence on the achievement of learning outcomes in Mathematics. However, in contrast to Aulia et al. (2023) in their research, it was found that the ability of independence did not affect the students' Arabic learning outcomes.

External factors, peers, can also influence the acquisition of learning outcomes. In line with research by Hikmah et al. (2022) the results showed that peers have a positive and significant effect on student learning outcomes in science subjects at SMP Negeri 31 South Konawe. Different from the research of Rahmadhany & Wahjudi (2021) the peer friendship environment has no influence on the learning outcomes of XII Accounting class students of SMKN 1 Surabaya in the subject of Tax Administration. Lestari et al. (2023) in his research, it ariwas stated that there is a positive relationship between learning motivation and learning outcomes achieved by students. It means that learning motivation plays an important role in determining student learning outcomes. The level of motivation students have will affect their enthusiasm and passion in undergoing the learning process. However, the research results of Safna and Wulandari (2022) indicate that learning motivation does not have a significant effect on the achievement of student learning outcomes.

From several studies described, there are still inconsistencies in the results of research on the influence of learning discipline and learning independence on student learning outcomes. Learning motivation was chosen to be a mediating variable on digital-based document learning outcomes to determine whether learning independence can strengthen or weaken student learning outcomes. This study was conducted with the aim of analyzing the effect of discipline, independence, and peers on digital-based

document learning outcomes with learning motivation as a mediating variable at *SMK PGRI 2 Taman Pemalang*.

## LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

### Learning Outcomes

Learning outcomes reflect a collection of achievements obtained by students, covering three domains: cognitive, affective, and psychomotor (Bunyamin, 2021). Learning outcomes are the achievements that students make after participating in a series of learning activities. These achievements include various competencies in the domains of knowledge, attitudes, and skills that students acquire through their learning experiences (Rahman, 2022). Indicators used to measure learning outcomes, according to Sudjana (2017) consist of (1) the Cognitive domain, (2) the affective domain (3) the psychomotor domain.

### Learning Discipline

Learning discipline is an aspect of educational discipline theory that aims to familiarize students to consciously obey the rules and regulations at school so that a personality is formed that is in harmony with the norms of society (Mamonto et al., 2023). Discipline plays a role in influencing, encouraging, directing, shaping, and changing student behavior to be in line with the values that have been instilled, recommended, and exemplified by the surrounding environment (Trinova et al., 2022). Some indicators used to measure learning discipline, according to Mirdanda (2018) are (1) obedience to discipline, (2) obedience to learning activities at school, (3) carrying out tasks to be responsible, and (4) discipline to study at home.

### Learning Independence

Learning independence is students' awareness and initiative to learn voluntarily without coercion as a form of personal responsibility in facing and overcoming various learning difficulties (Ananda & Hayati, 2020). The main characteristics of learning independence include the ability to take initiative, believe in one's abilities, take responsibility for actions, and be able to make decisions independently (Karmila & Raudhoh, 2021). Measuring learning independence using indicators, according to Suciati (2016) consists of (1) being responsible for learning, (2) being active and creative in learning, (3) being able to solve learning problems, and (4) being continuous in learning.

### Peers

Peer groups play an important role as a means to learn to interact with others, control social behavior, develop age-appropriate skills and interests, and exchange feelings and problems (Gurning et al., 2019). In the context of learning, the presence of peers has a significant role because it can influence students' attitudes, enthusiasm for learning, and academic achievement. In addition, the peer environment is also a valuable source of emotional support in supporting the smooth learning process (Siahaan et al., 2024). Indicators measure peers according to the function of peers Desmita (2017) consists of (1) interaction in a peer environment, (2) individual involvement in interacting, (3) peer support, (4) being a study buddy, (5) increasing student self-esteem

### Learning Motivation

Motivation to learn is the drive, both from within and outside the student, which generates enthusiasm, focus, and sustainability in the learning process in order to achieve specific goals (Hrp et al., 2022). Learning motivation is an internal drive that arises from self-will to achieve learning goals, with an important role in directing interests and talents so that students can optimally gain knowledge (Leny, 2022). The indicators to measure learning motivation, according to Dimyati & Mudjiono (2018), are

(1) student ideals or aspirations, (2) student abilities, (3) students' physical and spiritual conditions, (4) classroom environmental conditions, (5) teachers try to teach students.

Hypothesis 1 (H1): Learning discipline has a positive and significant effect on learning outcomes.

Hypothesis 2 (H2): Learning independence has a positive and significant effect on learning outcomes.

Hypothesis 3 (H3): Peers have a positive and significant effect on learning outcomes.

Hypothesis 4 (H4): Learning discipline has a positive and significant effect on learning motivation.

Hypothesis 5 (H5): Learning independence has a positive and significant effect on learning motivation.

Hypothesis 6 (H6): Peers have a positive and significant effect on learning motivation.

Hypothesis 7 (H7): Learning motivation has a positive and significant effect on learning outcomes.

Hypothesis 8 (H8): Learning motivation mediates the relationship between learning discipline and learning outcomes.

Hypothesis 9 (H9): Learning motivation mediates the relationship of learning independence to learning outcomes.

Hypothesis 10 (H10): Learning motivation mediates peer relationships on learning outcomes.

## METHOD

This research uses a quantitative approach, which emphasizes the collection and analysis of data in the form of numbers. The data collection process is carried out through research instruments that have been designed, followed by quantitative or statistical analysis to test the hypothesis that has been set (Sugiyono, 2023). The research design used in this study is a causal design, which aims to identify cause-and-effect relationships. This research uses statistical calculation techniques through descriptive and quantitative analysis approaches with PLS-SEM (Partial Least Squares Structural Equation Modeling). It serves to investigate the impact of prior learning on student learning outcomes, as well as assess the role of learning motivation as a mediating variable. PLS-SEM was chosen for its ability to maximize the explained variance in the dependent variable and estimate the relationship between constructs based on the measurement structure. This method is beneficial, especially when the research model has many latent variables and their indicators (Hair et al., 2021)

The respondents of this study consisted of X-grade students of *SMK PGRI 2 Taman Pemalang*. A total of 141 students filled out questionnaires and tests through Google Forms distributed via WhatsApp. Data were collected from January to March 2025, focusing on variables: learning discipline, learning independence, learning outcomes, and motivation in learning. A survey was used to determine the outcomes of *SMK PGRI 2 Taman Pemalang*. The research instruments used were customized from previous studies and literature review, transformed questionnaire according to the context to be studied; learning discipline and learning independence can be measured with four items, while peers and motivation are measured with five items. In student learning outcomes, processed primary data only take two domains as needed: the cognitive and psychomotor domains; cognitive and psychomotor consist of tests and practices that are processed in the questionnaire system. In measuring the questionnaire using a Likert scale of 1 - 4, each statement was from 1 (strongly disagree) to 4 (strongly agree). This study used Smart PLS 4.0 for partial least squares structural equation modeling (PLS-SEM).

## RESULTS AND DISCUSSIONS

In data analysis, instrument validity is something that needs to be considered by Processed primary data, so Processed primary data use SEM-PLS analysis, which has three categories in measuring the outer model: convergent validity, discriminant validity, and Reliability Test.

## Outer Model Test (Measurement Model)

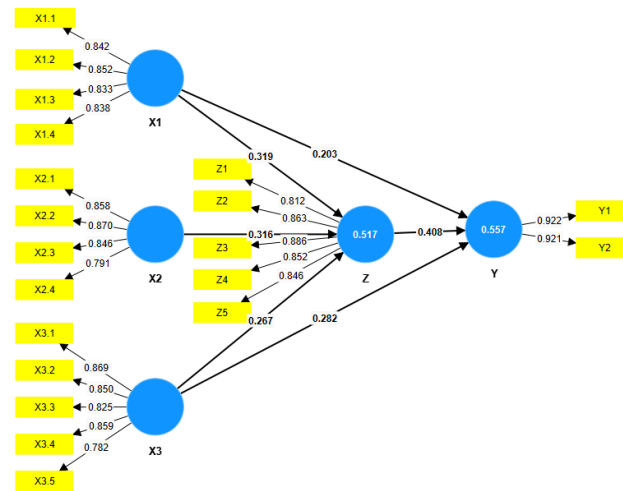


Figure 1. Outer Model Results (Measurement Model)

Source: Processed primary data, 2025

### Convergent Validity

Convergent validity refers to the level of relationship between the measurement results of items or indicators and the construct or variable being measured. According to Hair et al. (2021), indicators/items can be said to be high if they correlate more than 0.07.

Table 2  
Outer Loadings of Indicator Variables

| Variables                  | Indicator | Outer Loading | Level of convergent validity | Description |
|----------------------------|-----------|---------------|------------------------------|-------------|
| Learning outcomes (Y)      | Y1        | 0,922         | 0,7                          | Valid       |
|                            | Y2        | 0,921         | 0,7                          | Valid       |
| Learning Discipline (X1)   | X1.1      | 0,842         | 0,7                          | Valid       |
|                            | X1.2      | 0,852         | 0,7                          | Valid       |
|                            | X1.3      | 0,833         | 0,7                          | Valid       |
|                            | X1.4      | 0,838         | 0,7                          | Valid       |
| Learning Independence (X2) | X2.1      | 0,858         | 0,7                          | Valid       |
|                            | X2.2      | 0,870         | 0,7                          | Valid       |
|                            | X2.3      | 0,846         | 0,7                          | Valid       |
|                            | X2.4      | 0,791         | 0,7                          | Valid       |
| Peers (X3)                 | X3.1      | 0,869         | 0,7                          | Valid       |
|                            | X3.2      | 0,850         | 0,7                          | Valid       |
|                            | X3.3      | 0,825         | 0,7                          | Valid       |
|                            | X3.4      | 0,859         | 0,7                          | Valid       |
|                            | X3.5      | 0,782         | 0,7                          | Valid       |

|                 |            |    |       |     |       |
|-----------------|------------|----|-------|-----|-------|
| Learning<br>(Z) | Motivation | Z1 | 0,812 | 0,7 | Valid |
|                 |            | Z2 | 0,863 | 0,7 | Valid |
|                 |            | Z3 | 0,886 | 0,7 | Valid |
|                 |            | Z4 | 0,852 | 0,7 | Valid |
|                 |            | Z5 | 0,846 | 0,7 | Valid |

Source: Processed primary data, 2025

Table 2 shows the results of Outer Loading on each variable; learning discipline, independence, peers, and digital-based document learning outcomes have an outer loading value > 0.7. These results indicate that these variables are in the high category. Assessing the convergent validity of a variable with its indicators is done by looking at the Average Variance Extracted (AVE), which is greater than 0.5. The following are the results of the Average Variance Extracted (AVE) on each research variable:

Table 3  
Average Variance Extracted (AVE)

| Variables                  | AVE Value | Level Of AVE | Description |
|----------------------------|-----------|--------------|-------------|
| Learning outcomes (Y)      | 0.849     | 0.5          | Valid       |
| Learning Discipline (X1)   | 0.708     | 0.5          | Valid       |
| Learning Independence (X2) | 0.708     | 0.5          | Valid       |
| Peers (X3)                 | 0.701     | 0.5          | Valid       |
| Learning Motivation (Z)    | 0.726     | 0.5          | Valid       |

Source: Processed primary data, 2025

Table 3 shows the results of Average Variance Extracted (AVE) from the learning outcomes variables of digital-based documents, learning discipline, independence, peers, and learning motivation whose value is more than 0.5 so that the variables and indicators used can be said to be valid (Hair et al., 2021).

Table 4  
Fornell-Larcker Criterion

| Variables                  | Y     | X1    | X2    | X3    | Z     |
|----------------------------|-------|-------|-------|-------|-------|
| Learning Outcomes (Y)      | 0.921 | 0.557 | 0.376 | 0.591 | -     |
| Learning Discipline (X1)   | 0,708 | 0.841 | -     | -     | -     |
| Learning Independence (X2) | 0,708 | 0.466 | 0.842 | -     | -     |
| Peers (X3)                 | 0,701 | 0.420 | 0.469 | 0.837 | -     |
| Learning Motivation (Z)    | 0,726 | 0.578 | 0.589 | 0.548 | 0.852 |

Source: Processed primary data, 2025

The Fornell-Larcker criterion states that if the root of the AVE correlation value between indicators in one construct is higher than the correlation between different constructs, it can be concluded that the measurement model presented in table 4 is valid and has the ability to distinguish between constructs well.

Table 5  
Reliability Test

| Variables                  |            | Cronbach's Alpha | Reliability Composite | Description |
|----------------------------|------------|------------------|-----------------------|-------------|
| Learning (Y)               | Outcomes   | 0.921            | 0.864                 | Reliable    |
| Learning (X1)              | Discipline | 0,708            | 0.881                 | Reliable    |
| Learning Independence (X2) |            | 0,708            | 0.895                 | Reliable    |
| Peers (X3)                 |            | 0,701            | 0.822                 | Reliable    |
| Learning (Z)               | Motivation | 0,726            | 0.910                 | Reliable    |

Source: Processed primary data, 2025

Measurement with the reliability test serves to test the consistency of indicators as a measuring tool for each research variable. Two categories can measure the reliability test: composite reliability and *Cronbach's alpha*. If Cronbach's alpha gets a value greater than 0.7, then the variable has good reliability (Hair et al., 2021).

### Structural Model (Inner Model)

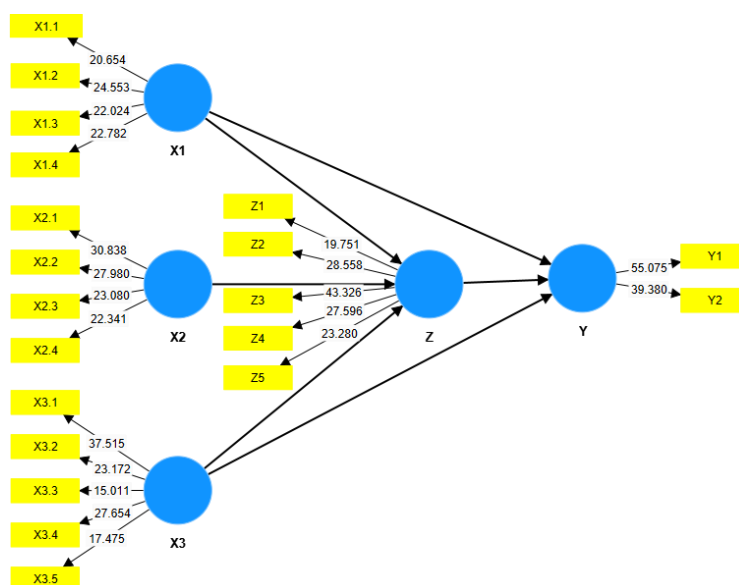


Figure 2. Inner Model Results  
Source: Processed primary data, 2025

This stage focuses on evaluating the predictive ability of the model through three main metrics: R-Square, Q-Square, and Path coefficient. The coefficient of determination ( $R^2$ ) measures how much the independent variables in the model can explain the variation in the dependent variable.  $Q^2$ , which is obtained through a blindfolding procedure, with a redundancy validity approach to measure how well

the model can predict value of investigation that are not used in the model estimation.  $Q^2$  results greater than zero indicate that the model has good predictive relevance. The path coefficient in SmartPLS analysis is a standardized regression value that indicates the strength and direction of the relationship between exogenous and endogenous latent variables (Sarstedt et al., 2017)

Table 7  
Q-Square ( $Q^2$ )

| Variables     |            | Q-Square | Description |
|---------------|------------|----------|-------------|
| Learning (Y)  | Outcomes   | 0.456    | Large       |
| Learning (X1) | Motivation | 0.361    | Large       |

Source: Processed primary data, 2025

Q-square shows that the relevance of the influence of exogenous variables in the study on student learning outcomes is obtained at 0.456 and learning motivation at 0.361. The  $Q^2$  value criteria are 0.02, 0.15, and 0.35 in the sense of getting small, medium, and large, and the provisions are more than zero (Sarstedt et al., 2017). With this, the Q-square value of the exogenous variables has a relatively large predictive relevance to the endogenous variables.

Table 8  
Path Coefficient

|                 | Sample Original (O) | Sample Mean (M) | Standard Deviation (STDEV) | T statistics (O/STDEV) | P values |
|-----------------|---------------------|-----------------|----------------------------|------------------------|----------|
| Direct Effect   |                     |                 |                            |                        |          |
| X1 -> Y         | 0.203               | 0.205           | 0.079                      | 2.565                  | 0.010    |
| X2 -> Y         | 0.129               | 0.128           | 0.044                      | 2.928                  | 0.003    |
| X3 -> Y         | 0.282               | 0.284           | 0.083                      | 3.391                  | 0.001    |
| X1 -> Z         | 0.319               | 0.320           | 0.092                      | 3.456                  | 0.001    |
| X2 -> Z         | 0.316               | 0.318           | 0.081                      | 3.879                  | 0.000    |
| X3 -> Z         | 0.267               | 0.270           | 0.083                      | 3.224                  | 0.001    |
| Z -> Y          | 0.408               | 0.407           | 0.100                      | 4.085                  | 0.000    |
| Indirect effect |                     |                 |                            |                        |          |
| X1 -> Z -> Y    | 0.418               | 0.421           | 0.080                      | 5.196                  | 0.000    |
| X2 -> Z -> Y    | 0.270               | 0.274           | 0.077                      | 3.500                  | 0.003    |
| X3 -> Z -> Y    | 0.472               | 0.469           | 0.093                      | 5.094                  | 0.000    |

Source: Processed primary data, 2025

## Discussion

This study was conducted to analyze the effect of learning discipline, independence, and peers on digital-based document learning outcomes through learning motivation. The following table shows the direct and indirect effects of variables.

Table 9  
**The magnitude of the mediation effect**

| Influence between Variables | Magnitude of direct effect | Magnitude of influence through mediation | Description |
|-----------------------------|----------------------------|------------------------------------------|-------------|
| X1 -> Y                     | 0.203                      | 0.418                                    | Up          |
| X2 -> Y                     | 0.129                      | 0.270                                    | Up          |
| X3 -> Y                     | 0.282                      | 0.472                                    | Up          |

Source: Processed primary data, 2025

Table 9 shows that the learning independence variable as a mediating variable is successful in increasing the magnitude of the influence of the independent variable on the dependent variable. Then, it shows the results that the 10 positive hypotheses are significant and acceptable (in Table 8).

The first hypothesis is that discipline has a positive and significant effect on the learning outcomes of digital-based documents with the acquisition of the original sample 0.203. It means that learning discipline increases learning outcomes by 20.3%. Many factors can affect student learning outcomes, one of which is learning discipline; disciplined students can have more potential to get better grades (Asih, 2022; Ridho'i, 2022; Siregar & Syaputra, 2022). It is also supported by research by Prayogo and Wulandari (2025) and Dukalang (2024) which shows that learning discipline can positively and significantly affect learning outcomes.

Then, the second hypothesis shows that there is a significant positive effect of learning independence on digital learning outcomes with the acquisition of the original sample 0.129. Learning independence can improve learning outcomes by 12.9%. In today's digital era, many references can be accessed online; this can support students' independence to be able to learn and adapt not only from the teacher (Aswan, 2023; Liriwati et al., 2024). Learning independence is an important factor in the learning process; this is because with learning independence, students can learn independently before the implementation of learning at school, which will have an impact on learning outcomes (Cahyono, 2023; Ririn et al., 2021; Zafrullah et al., 2024). It is in line with research by Purba et al. (2024) and Maharani & Rosy (2024) the positive and significant data obtained means that the learning independence of students will have an impact on the achievement of the results.

In the third hypothesis, the results show that positively and significantly, peers can have an impact on student learning outcomes of 0.282 or 28.2%. Wurdaningrum et al. (2025) the peer environment plays an important role in the support of positive relationships between students. It is supported by teachers so that there are no obstacles in the learning process. Ningrum & Rafsanjani (2022) and Rochman et al. (2023) found that positive peer relationships will be an encouragement to competition for optimal learning outcomes. It is inseparable from several relevant studies. Karim (2024) and Yahya et al. (2025) stated that peers have a positive and significant influence on learning outcomes in vocational students; with good peer relationships, the acquisition of learning outcomes is increasing.

For the fourth hypothesis, a significant positive result of 0.319 was obtained for the relationship between the learning discipline variable and student learning motivation. Learning discipline has a 31.9%

influence on learning motivation. Discipline that starts from oneself for what is useful creates an attitude of obeying a rule; in this case, students who are disciplined can spend more time studying so that motivation arises to get something they want to achieve (Rena, 2023; Sianah et al., 2023). This research is in line with Meliana et al. (2021) and Suharningtyas & Puspasari (2024) which state that there is a significant positive relationship between learning motivation and student learning outcomes.

The fifth hypothesis, obtaining an original sample of 0.316 or a percentage of 31.6%, shows a positive and significant influence between learning independence and learning motivation. Similar research by Setiawati & Panduwinata (2024) and Rediah et al. (2025) show the same results: independence has a significant positive effect on student learning motivation. Independent learning gives students the freedom and responsibility to plan, implement, and evaluate their learning according to their style and interests, allowing them to be more creative, explore the material in greater depth, and be more enthusiastic about learning (Setiaji et al., 2021; Yogi & Pratama, 2023).

Next, in the sixth hypothesis, there is a significant positive relationship between peers and digital student learning motivation with an original sample of 0.267. It means that peers influence 26.7% of learning motivation Anggreni & Rudiarta (2022) according to him, closer interaction with peers can have a positive impact on the growth of learning motivation. Positive forms of social interaction among peers, such as chatting, playing, and studying together, play an important role in increasing students' enthusiasm for learning (Damayanti et al., 2021; Rokhim et al., 2022; Rosa et al., 2023). This study is in line with Sa'diyah & Salamah (2024) and Kaharu et al (2024) research analysis shows that peer interaction has been proven to significantly increase academic motivation positively. In other words, the more harmonious the interaction between students and their peers, the higher their motivation to learn.

For the seventh hypothesis, obtaining an original sample value of 0.408 or 40.8%, it is stated that learning motivation has a significant positive effect on learning outcomes. This finding is in line with studies by Nurrawi et al. (2023) and Ginanjar et al. (2024) student motivation can positively and significantly influence learning success. High motivation leads to good results. In addition to providing motivation, schools should also provide facilities and support from parents in the form of rewards for academic achievement, thereby encouraging students to achieve optimal results (Ramadhanti et al., 2022). In addition, students must have the desire to succeed, the drive to learn that comes from within, and the hope of achieving their goals. These factors will encourage strong motivation to achieve learning outcomes (Hariri et al., 2024).

Then, the eighth hypothesis is obtaining significant results between learning discipline and learning outcomes through learning motivation as mediation, with data for the original sample of 0.418 or 41.8%

greater than the partial gain of 0.203. It is in line with the study of Rudini et al. (2021) and Denada & Fitriyati (2022) in their research, the results show that there is a significant effect of learning discipline and learning motivation simultaneously on learning outcomes.

Next, hypothesis nine: The original sample result of 0.270 is higher than the direct effect of 0.129, so it can be concluded that learning motivation can mediate the effect of independence on learning outcomes. It is in line with the research by Lestari & Listiadi (2022) and Nurzarafah et al. (2025) which state that learning motivation can mediate the relationship between learning independence and learning outcomes in a positive and significant way. Learning independence has a significant influence on learning motivation and student learning outcomes, where learning motivation acts as the main dlink in the relationship (Wulandari et al., 2025).

The tenth hypothesis states that learning motivation can mediate the relationship between peers and learning outcomes in a positive and significant way. The original sample result was 0.472 or 47.2%, which is an increase of 0.190 from the direct influence value of 0.282. Similar research by Khairinal et al. (2020) and Alkadri et al. (2021) the data produced a positive and significant effect, illustrating that learning motivation plays an important role in improving student learning outcomes.

## CONCLUSION

Based on the analysis of the hypotheses and the interpretation of the research findings that have been presented, it can be concluded that there is a positive and significant relationship between the variables of learning discipline, learning independence, peer influence, and learning motivation on students' academic achievement. The results of the statistical analysis indicate that students who exhibit high levels of discipline and independence in their learning process, and who are surrounded by positive and supportive peers, tend to achieve better academic outcomes. Furthermore, learning motivation functions as a crucial mediating variable that strengthens the relationship between these predictors (discipline, independence, and peers) and academic achievement. This mediation is evident through the increased level of academic achievement when learning motivation is introduced as a mediating factor, compared to the direct effect of the independent variables alone.

Among the tested variables, learning motivation shows the highest contribution to academic achievement, implying that motivation serves as the psychological drive that transforms students' potential and habits into actual learning performance. This finding aligns with the theoretical framework of self-determination theory, which emphasizes that motivated learners tend to engage more deeply, persist longer, and perform better academically. Therefore, discipline and independence may provide the structural foundation for effective learning, while peer influence can shape emotional and social learning environments—but motivation is the key variable that integrates these dimensions and channels them into measurable success. Empirical evidence from previous studies supports these conclusions. Prior research consistently demonstrates that students with strong self-discipline are more likely to manage their study schedules effectively, complete assignments on time, and sustain concentration during lessons. Likewise, learning independence correlates positively with self-regulated learning behaviors, such as goal setting, time management, and self-assessment. Peer relationships, when positive, serve as sources of emotional support, collaborative learning, and constructive feedback. Consequently, this research reinforces the notion that academic achievement is a multifactorial outcome shaped not only by individual effort but also by social and motivational contexts.

In summary, to enhance students' academic achievement, schools and educators need to foster a comprehensive learning ecosystem that cultivates personal discipline, encourages independent learning, strengthens positive peer relationships, and continuously stimulates motivation. Teachers should implement classroom strategies that reward disciplined behavior, promote autonomous learning projects, and facilitate peer collaboration through group work or mentorship programs. Moreover, motivational reinforcement—such as goal-setting activities, intrinsic rewards, and feedback that emphasizes progress—should be integrated into the teaching process. By doing so, educational institutions can develop students who are not only knowledgeable but also possess the personal and social competencies needed for lifelong learning and academic excellence.

Despite its valuable findings, this study is not without limitations. The scope of the research was confined to tenth-grade students at SMK PGRI 2 Taman Pemalang during the 2024/2025 academic year, which limits the generalizability of the results to other grade levels or educational institutions. The research focused specifically on the DPK (Digital Processing of Correspondence) subject, which involves digital-based

document management, meaning that the outcomes might differ if applied to other subjects with different cognitive or practical demands. Moreover, all key variables—discipline, independence, peers, and learning motivation—were measured using self-reported questionnaires, which might introduce bias due to students' subjective perceptions or social desirability tendencies.

Additionally, academic achievement was measured based on exam results and practical assignments, which may not fully capture broader learning competencies such as creativity, critical thinking, or collaboration. The use of quantitative correlational methods also restricts the ability to draw strong causal inferences between variables. Therefore, while the relationships observed are statistically significant, the study cannot definitively determine whether the independent variables cause changes in academic performance or merely correlate with it.

Future research should aim to overcome these limitations by employing more comprehensive and diverse research designs. It is recommended that subsequent studies include additional variables such as family support, school facilities and infrastructure, and learning environment quality to better understand external factors influencing motivation and achievement. Moreover, researchers could explore innovative teaching strategies, such as problem-based learning (PBL), project-based learning (PjBL), or cooperative learning models, to examine how pedagogical approaches interact with motivation and independence to improve academic outcomes.

To strengthen causal explanations, future studies should consider using experimental or quasi-experimental methods, enabling researchers to manipulate variables such as learning motivation or instructional methods and observe their direct effects on achievement. Data collection could also be enhanced by incorporating multiple instruments, including observations, structured interviews, focus groups, and teacher evaluations, which would provide richer and more triangulated insights into students' learning behaviors.

The sampling framework could be expanded to include students from different grade levels, vocational fields, and regions, thus improving the representativeness and external validity of the findings. Furthermore, future researchers are encouraged to integrate additional psychological constructs such as self-regulation, future orientation, resilience, and self-efficacy—either as mediating or moderating variables—to develop a more holistic model of student learning performance. Advanced analytical techniques like Structural Equation Modeling (SEM) or Partial Least Squares (PLS) can also be applied to test complex interrelationships among variables and to reveal deeper mechanisms behind academic success.

In conclusion, while this study provides meaningful insights into how discipline, independence, and peer influence contribute to academic achievement through learning motivation, there remains vast potential for further exploration. By broadening the scope of inquiry, employing more rigorous methodologies, and integrating contextual factors, future studies can offer stronger empirical foundations and more practical recommendations for improving educational quality and student success in the modern digital learning era.

## ACKNOWLEDGMENTS

We would like to thank all managers, teachers, and students of SMK PGRI 2 Taman Pemalang who have actively participated in this research. Their contributions were very helpful in the data collection process. We would also like to express our appreciation to our supervisors for all the constructive feedback, as well as to our family and friends who have provided the support and encouragement that accompanied this research journey.

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## INFORMATION ABOUT THE AUTHORS

**Dian Retno Sari** : (Universitas Negeri Semarang, Semarang, Indonesia, [retnodian113@students.unnes.ac.id](mailto:retnodian113@students.unnes.ac.id))  
**Tusyanah** : (Universitas Negeri Semarang, Semarang, Indonesia, [ttusyanah@students.unnes.ac.id](mailto:ttusyanah@students.unnes.ac.id))