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Desire or Routine? Evaluating Their Influence on Computer-Aided Design Learning Achievement

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Abstract: Technological progress can be felt in various sectors, including vocational schools. One of these technological advances is computer-aided design (CAD). Many articles discuss the desire to learn and the learning routine influencing learning achievement. However, only some discuss how significant the influence is and what factors affect the results of this contribution to learning achievement in CAD theory and practice. This article explores in depth the direct and indirect influence between the variables of desire to learn and learning routine on learning achievement in CAD theory and practice of vocational school students majoring in mechanical engineering, analysing their influence and what factors influence the findings. Ex-post facto research was conducted involving 339 participants. Data was collected through questionnaires, multiple-choice tests (primary data), and structured interviews (cross-check). Path analysis tests the direct and indirect effects of several variables. The findings show that the proposed model can directly influence CAD learning achievement in theory and practice with significant value, and its contribution is in the weak category. Indirectly, the desire to learn variable cannot mediate the CAD practice learning achievement variable through CAD theory learning achievement. Still, on the contrary, the learning routine variable can reconcile the CAD practice learning achievement variable through the CAD theory learning achievement variable as an intervening variable. Several factors that influence this include unexplained absences, exclusion at school, inappropriate learning methods, psychological, economic, health, family, environmental, and social.

Keywords: Computer-aided design, vocational school, learning achievement, TVET

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1. Introduction

Education is essential for individual survival; the impact of education will determine the quality of the human resources (HR) (Trilaksana et al., 2023). Developed countries have the potential to succeed in building their governments because they prioritise the education sector to help secure reliable and highly competitive human resources (Alharbi, 2023). Likewise with the Republic of Indonesia, as stipulated in the Law of the Republic of Indonesia Number 20 of 2003, concerning the National Education System, Chapter II Article 3, National Education functions to develop capabilities and shape dignified national character and civilisation to educate the nation's life (Farhan et al., 2023), education cannot be separated from learning. Learning is a process or effort carried out by everyone to acquire knowledge, attitudes, skills, and positive values by practicing various materials that have been studied (Inderanata & Sukardi, 2023). Learning aims to increase knowledge and improve thinking or strategies (Li et al., 2023). This goal can be achieved through the learning process. All groups can obtain the learning process formally and informally (Njenga, 2023). One of the formal schools in Indonesia is a vocational school. Vocational schools are an education system that trains students with knowledge and skills that suit the needs of the world of work, and vocational schools are designed for students to be ready to work after graduating (Sulistiobudi & Kadiyono, 2023).

Several countries have a vocational education sector equivalent to high school and university (Billett, 2022). This research explicitly discusses vocational schools comparable to high schools in Indonesia. Vocational schools have many areas of expertise, including the mechanical engineering department. In the mechanical engineering department, there is learning about Manufacturing Engineering Drawing (MED), which uses the Computer Aided Design (CAD) application. CAD is widely used in the industrial and academic worlds because it is seen as more effective and efficient and keeps up with current developments or relevance between the worlds of work and education, especially vocational schools (Jakiela & Tan, 2019), (Saleh et al., 2019). In every lesson that students take part in, there must be a learning objective. Just as MED learning uses the CAD application, it also has a learning objective. Usually, these learning objectives can be measured by learning outcomes. Learning outcomes are the results of a person's learning that are generally specific to a lesson and refer to effects that initially articulate what students should know, be able to do, or appreciate for following a lesson (Fandos-Herrera et al., 2023). Apart from learning outcomes, at least several methods can be used to measure student abilities, including learning achievement. Learning achievement cannot be separated from learning activities because learning achievement is the output of the learning process. Learning achievement can also be measured through the results of assignments, which include practical grades, mid-semester grades, and final semester grades, or they are not a summary of all the rates obtained by someone while following specific lessons (Romadhoni et al., 2020). It can be concluded that learning outcomes are the results achieved by students after or during the teaching and learning process. Learning achievement is evidence of the student's success or failure in learning but not from the recapitulation of all grades during the student's study. Learning achievement is also one of the goals of improving the quality of learning in education. So, questions arise regarding the learning achievement (LA) of vocational school students in theory and practice in learning manufacturing engineering drawing (MED) using computer-aided design (CAD) applications because vocational schools do not only study theory but also prioritise (Ferm, 2021).

Several references reveal that motivation, interests, family environment, socio-emotional skills, learning methods or styles, teacher role, school culture, and learning facilities can influence student learning achievement (Watts, 2020; Dietz et al., 2007). These factors are internal and external. However, external factors are more dominant in influencing student learning achievement. Chamidy et al. (2023) stated that internal and external factors could influence student learning achievement; however, external factors dominated student learning achievement with a coefficient of determination value of 0.135. So, the question arises about students' internal factors, such as student motivation and interest in learning. Findings (Seven, 2020) reveal that reason can be driven by curiosity, which fosters a desire to learn and will cause someone to continue learning regularly. Many articles discuss motivation and interest in learning, which can influence learning achievement. However, few discuss the desire to learn and learning routine, so researchers will more precisely examine the influence of the desire to learn (DTL) and learning routine (LR) on learning achievement (LA).

There are at least several articles that discuss the desire to learn. Desire is behaviour and the feeling of accomplishment it generates related to learning. The desire to learn (DTL) arises as a result of productive interactions between frequent encounters with knowledge and the steadfast commitment that emerges, and the desire to learn will have a positive impact on several communities, including the world of education (Whitney, 2019), (Jensen, 2007). However, the desire to learn is most clearly visible in elementary grades and becomes weaker in high school, and so on, even though a person's desire to learn is fundamental in the learning process (Kaiper, 2018; Ludeman, 1961). The (Scager et al., 2012) revealed that the differentiating factor between achieving and non-achieving students appears to be their desire to learn, or in other words, the desire to learn can influence student learning achievement.

On the other hand, routines are activities that individuals carry out daily, making someone accustomed to studying and other things (Han et al., 2021; Ogunlana, 2019). So, when related to education, learning routine (LR) refer to a person's learning activities in their daily lives. However, Archer (2010) and Stein (1985) reveal routine actions as a central role in social theory and as routine training activities in studying definitions, theorem statements, and formulas

in specific fields of science. This is relevant if it relates to education because education is closely related to social matters. A person will consciously or unconsciously remember what they have learned because of routine activities. Finding (Schegloff, 1986) reveals that routines can influence a person to excel. This is also explained by the findings from Vuković et al. (2021) and Qu et al. (2018), which reveal that routines can influence academic achievement or that someone who spends more time studying becomes a routine in looking. It will have an impact on learning achievement. Confirmed (Amri et al., 2020) There is a positive correlation between learning routine and learning achievement, or the better a person's study routine, the higher their learning achievement. So, this is interesting to discuss because the desire to learn (DTL) refers to aspects of motivation and interest, while learning routine (LR) relates to a person's activities in learning something.

Based on the findings above, the desire to learn (DTL) and learning routine (LR) is closely related to a person's motivation, interests, and activities, so if a person is motivated and interested in learning, they tend to have a desire to learn, which will make them continue to learn both consciously and unconsciously. This is very relevant to vocational schools because vocational schools must focus on theory and practice. Previous references stated that the desire to learn and learning routine can influence learning achievement. However, these references are still general and descriptive, so what influence they have on CAD theory and practice lessons for vocational school students, how immense the power is, and what factors influence it still need to be clarified or specifically known. As was said at the beginning, CAD is an application used by vocational students to draw in manufacturing engineering drawing (MED) lessons, such as AutoCAD applications, Catia, Autodesk Fusion 360, Autodesk Inventor, SolidWorks, and the like. Therefore, researchers will discuss more specifically the influence of the Desire to Learn (DTL) and Learning Routine (LR) on the Theoretical Learning Achievement (TLA) and Practical Learning Achievement (PLA) of vocational school students in MED lessons using CAD applications such as SolidWorks, Catia, Autodesk Fusion 360, Autodesk Inventor, AutoCAD, and so on. It is hoped that with these findings, vocational schoolteachers will get an idea of what must be done to provide teaching to vocational school students, especially in MED lessons that use CAD applications. Vocational school students will learn and understand what must be done to achieve good learning in MED lessons using CAD applications. Researchers will discuss in more depth the factors that influence the learning achievement of vocational school students based on research findings.

1.1 Desire to Learn (DTL)

Desire to learn (DTL) is a psychological concept that refers to interest, motivation, or the urge to learn (Chervet, 2022), (Shi, 2020). DLT is also essential in determining if a person is practical at learning (Aamer & El-Zine, 2020). Several factors can influence DLT, including personal goals or motivation, interests, the learning environment, and previous learning experiences (Lu & Tian, 2023), (Tram et al., 2023), (Ulvik et al., 2021). In the context of higher education, DLT can improve achievement and even a person's academic performance and learning (Bjerkholt et al., 2023). Therefore, educators need to understand the concept of DLT and how to improve it. If someone has motivation, they can influence someone's desires (Milona, 2022). If DTL is strong, people may be motivated to present themselves as socially skilled or academically accomplished (Szumowska et al., 2023). Then, if someone has DTL, it will increase their knowledge and skills (competence) (Putwain & Wood, 2023), (Dompnier et al., 2009). DTL can also improve or maximise teaching and learning practices in various educational environments because individuals who desire to learn will show a careful and attentive attitude while increasing their self-confidence (Gumartifa et al., 2022); (Huang et al., 2016). This is very relevant when it is related to vocational education because vocational education graduates must be competent to compete in the global market both in work and even in creating jobs.

1.2 Learning Routine (LR)

Learning routine (LR) is a habit that a person forms in studying consistently. An example of a routine in learning related to technology is important in achieving success in academic or learning goals. It involves the formation of a positive attitude, an effective learning style, and discipline in adhering to the study schedule (OR & BAL, 2023), (Viola, 2022), (Guo et al., 2020). Some things included in the LR concept include setting a regular study schedule, making a task list, learning environment lifestyle, and evaluating (Farwell & Mankoff, 2022), (Rerup & Spencer, 2021). So good LR helps someone achieve learning goals more efficiently and effectively and helps improve students' skills and knowledge. Routines can stimulate students' thinking (Thanheiser & Melhuish, 2023). So, this is important to do and convey frequently (Breitwieser et al., 2023). This also aligns with research results from Nawaz (2018), showing that routines are essential and can influence an individual's overall performance and achievement. However, this relates to how individuals manage their time to get results from their daily routine so that their practice runs well (competence). If it is related to vocational education, this is very relevant because vocational education graduates must have the competencies to compete in the global market both in work and in creating jobs.

1.3 Learning Achievement (LA)

Learning achievement (LA) is an achievement or result obtained by a person in the learning or education process, which can be measured by various types of evaluation, such as exams, assignments, or projects. It can be estimated through multiple assessment indicators or test scores (Forsblom et al., 2021). LA measurement aims to evaluate the extent to which a person has achieved predetermined learning goals (Schaughency et al., 2022). LA can be influenced by several factors, such as intellectual ability, motivation, learning habits and environment, teaching quality, and learning methods used (Alamri, 2023), (Banda et al., 2023), (Tao et al., 2023). So, the LA concept refers to a person's ability to acquire knowledge and skills in a particular field of study or subject. Since vocational schools focus not only on theory but also on practice, which is more dominant, the researchers tried to study the influence of theoretical learning achievement (TLA) and practical learning achievement (PLA) in more depth.

Research results by Bai et al. (2023) state that DTL against LA is significant. The findings of Liu et al. (2022) and Wu et al. (2020) show a meaningful relationship between academic achievement, intrinsic motivation, extrinsic motivation, and learning motivation. Considering LR is a person's daily habit of studying, this concept includes several aspects such as learning style, discipline in managing schedules, etc. Still, only some discuss it directly related to LR, so researchers decided to look for various aspects that support LR. Research results (Ay, 2017) show that learning styles positively affect learning achievement. Furthermore, the findings of Quilez-Robres et al. (2021) show that study habits influence learning achievement significantly or can predict around 56–59% ($p < 0.001$) of learning achievement. However, these findings do not deeply dissect how it influences theoretical learning achievement (TLA) and practical learning achievement (PLA) and what factors affect it.

1.4 Computer-Aided Design (CAD)

Technological progress needs to be understood, as well as how it affects society (Keshishian & Pedersen, 2022). One of the lessons in vocational schools that utilise technology is the MED lesson, which utilises CAD software. CAD began to appear around the mid-1960s as a design system via computer (Bhole & Taboun, 1991); CAD is used to design 2D & 3D drawings or the like via a computer (Wang, 2007). CAD learning aims to develop the skills of vocational students, for the curriculum is also adjusted based on significant criteria and the level of vocational students (Stamati & Fudos, 2005). Many CADS software, including SolidWorks, Catia, Autodesk Fusion 360, Autodesk Inventor, AutoCAD, etc., can be used.

Based on the findings above, Desire to Learn (DTL) and Learning Routine (LR) are essential concepts with various aspects ranging from personal desires to daily routines. Therefore, it is necessary for vocational students studying CAD to have a strong desire to learn and a structured and consistent study routine to excel and even achieve optimal learning outcomes. So, if this is related to Learning Achievement (LA), then what will happen? Which one is more dominant, and what factors influence it? Considering that vocational schools do not only focus on theory, but practice is more prevalent, the researchers tried to study in more depth related Desire to Learn (DTL), Learning Routine (LR) on Theoretical Learning Achievement (TLA), and Practical Learning Achievement (PLA) Computer-Aided Design (CAD) in Manufacturing Engineering Drawings (MED) Vocational School lessons. Figures 1 and 2 are the model and visualisation of the hypotheses in this research.

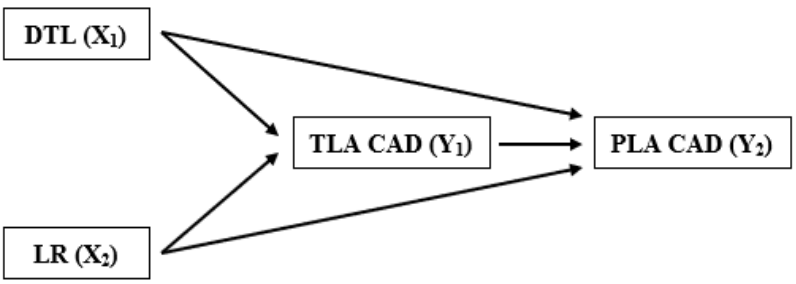
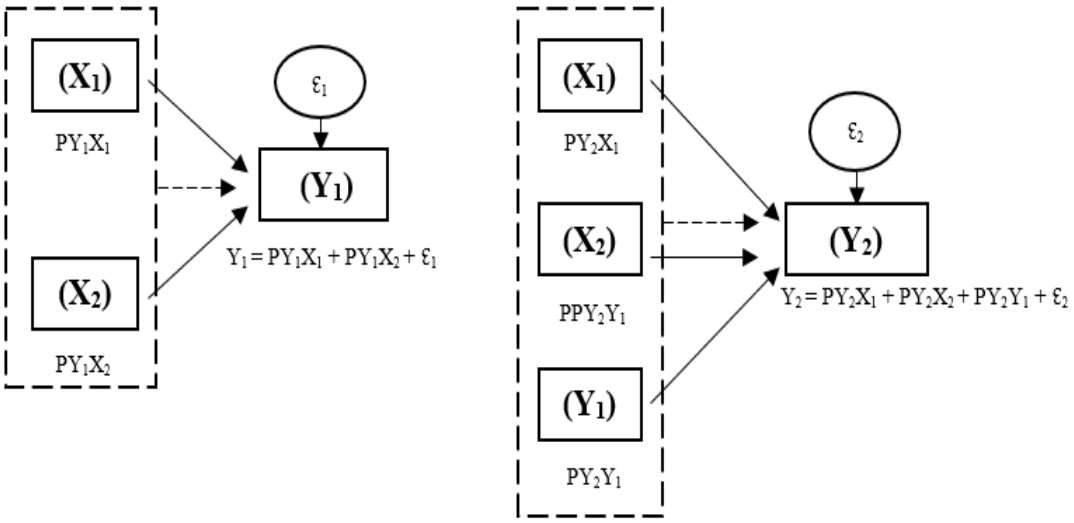


Fig. 1 - Research model

H_1: There is an influence between variable X_1 on variable Y_1.
H_2: There is an influence between variable X_2 on variable Y_1.
H_3: There is an influence between variables X_1 and X_2 on variable Y_1.
H_4: There is an influence between variable X_1 on variable Y_2.
H_5: There is an influence between variable X_2 on variable Y_2.
H_6: There is an influence between variable Y_1 on variable Y_2.
H_7: There is an influence between the variables X_1, X_2 and Y_1 on the variable Y_2.
H_8: There is an influence between variable X_1 on variable Y_2 through Y_1 as an intervening variable.
H_9: There is an influence between variable X_2 on variable Y_2 through Y_1 as an intervening variable.



Note: X_1 = desire to learn (DTL), X_2 = learning routine (LR), Y_1 = theoretical learning achievement (TLA), Y_2 = practical learning achievement (PLA)

Fig. 2 - Research model and hypothesis

2. Methodology

This research is an ex post facto design (Giuffre, 1997). Ex post facto analysis aims to find causes that allow changes in behaviour, symptoms, or phenomena caused by an event and symptoms, behaviour, or sensations that cause changes in the independent variable (Wiranto & Slameto, 2021). Questionnaire data and multiple-choice tests for CAD theory are primary data, and CAD practice scores are secondary data (CAD practice scores from teachers who teach). This research was conducted in Indonesia in the city of Yogyakarta, in the mechanical engineering department at five vocational schools, and was carried out from February 13 to April 14, 2023. Using data collection techniques and instruments such as questionnaires, multiple-choice tests, and structured interviews (cross-check).

The questionnaire in this research is based on primary data, which lies in the DTL and LR variables. The multiple-choice test is also preliminary data, but the test in this study is not an experiment. The researcher asked several questions about CAD that the respondents had studied because they had yet to carry out a CAD theory test. For CAD practice scores, we use scores from CAD teaching teachers (secondary data) because vocational school students prioritise practice, so teachers prioritise practical exams. Meanwhile, structured interviews (cross-check) are validations from teachers who teach CAD lessons and several respondents or cross-checks to validate the truth of research findings. The researcher presents questionnaire items and CAD multiple-choice tests (primary data) here.

After conducting and analysing hypothesis testing, the researcher will complete a cross-check or validation with several CAD teachers and respondents in the five vocational schools studied to validate the research findings. The researcher conducted the cross-check from August 1 to September 15, 2023. Below, the researcher presented a structured interview rubric (cross-check).

2.1 Research Respondents

The sampling technique in this research is accidental sampling. Accidental sampling is a type of non-probability sampling in which members of the target population who meet specific criteria, such as easy accessibility, geographical proximity, availability at a certain time or willingness to participate, are included for research purposes or are also called research subjects. This population is easily reached by the researcher (Etikan et al., 2016). The sample criteria in the research were: 1) the school was in the same city, namely Yogyakarta, Indonesia, and had the same department; 2) equality of use of CAD applications or curriculum used and class or age; and 3) the distance between adjacent schools. So, it can be concluded that there are 2 categories of samples in this study, including: a) categories for questionnaires and multiple-choice tests (primary data): 1) grade 11th vocational school students; 2) 11th grade vocational school students whose average age is 16–17 years; 3) manufacturing engineering drawing (MED) curriculum or subjects that use CAD applications such as Autodesk Inventor and AutoCAD; 4) The population in this study was 339 people in five vocational schools in the city of Yogyakarta, specifically in the mechanical engineering department who took MED lessons using the CAD application, because this study used an accidental sampling technique (non-probability), so the sample from this study was as large as 339 students or met the above criteria, 5) the researcher collected all respondents by meeting them at their respective schools and through teachers who teach CAD lessons; and b) categories for

structured interviews (cross-check): 1) teachers who teach MED lessons that use CAD applications, 2) some students who have studied CAD are recommended by teachers who teach CAD (not all samples were interviewed by researchers).

Table 1. Questionnaire and test items (primary data)

Variable	Indicator	Measurement Instruments	Items
DTL (X_1)	Persistence in learning CAD theory and practice	Likert scale points 4 - 1	4
	Tenacious in facing difficulties in learning CAD theory and practice		3
	Interest and sharpness of attention in learning CAD theory and practice		3
	Achievement in learning CAD theory and practice		2
	Independent in learning CAD theory and practice		2
LR (X_2)	How students follow CAD theory and practice lessons	Likert scale points 4 - 1	4
	How students learn independently in CAD theory and practice		3
	How students learn CAD theory and practice groups		4
	How students study books, journals, CAD theory and practice learning modules		2
	How students face CAD theory and practical exams		2
TLA CAD (Y_1)	Understand command functions in CAD software to create and modify 2D drawings	Guttman Scale wrong point 0, correct point 1	5
	Understand the function of commands in CAD software to create and modify 3D drawings		5

Table 2. Structured interview items (cross-check)

No.	Question Items	
	Teacher	Student
1	Are the researchers' findings regarding insignificant causal factors and weak influence between the variables studied correctly?	Are the researchers' findings regarding insignificant causal factors and weak influence between the variables studied correctly?
2	What are the inhibiting factors, or other factors, for teachers teaching CAD?	What are the inhibiting factors, or other factors, for students learning CAD?

2.2 Measures

This research measures the desire to learn (DTL) and learning routine (LR) against learning achievement (LA) CAD. However, in vocational schools, the measurement of learning achievement is divided into two, namely theory and practice, or more dominantly into practice, so LA in MED lessons that use CAD applications is divided into 2, namely TLA and PLA. The measurement instrument uses a 4-point Likert scale starting from a score of 4 (strongly agree) to 1 (strongly disagree) for questionnaires and multiple-choice tests using Guttman scale measurements from 1 (true) to 0 (false). So, this research collects primary and secondary data. In preliminary data, researchers used questionnaires and multiple-choice test questions. In secondary data, researchers used practical CAD test scores from teachers who taught at five vocational schools majoring in mechanical engineering in Yogyakarta, Indonesia. Questionnaires and multiple-choice test questions have, of course, gone through expert validation and reliability analysis. If the Cronbach's alpha value is $\geq .60$, the conclusion is reliable (Sander et al., 2021). Through the Cronbach's alpha test, the DTL alpha coefficient score was obtained at .92. The LR alpha coefficient value was obtained at .86, and the TLA alpha coefficient value was .78. So, it can be concluded that all the data is reliable and can be continued in the following process.

2.3 Analysis Statistics

Data analysis in this study uses path analysis, a statistical analysis technique, to determine the influence between variables in a complex model. In path analysis, variables are analysed as nodes in a graphic diagram, with arrows showing the direction of causality between variables (de Assis Lago et al., 2019). This research aims to examine the magnitude and direct and indirect influence between the variables Desire to Learn (DTL) (X_1), Learning Routine (LR) (X_2) on Theoretical Learning Achievement (TLA) CAD (Y_1) and Practical Learning Achievement (PLA) CAD (Y_2) in vocational school students majoring in mechanical engineering in the 11^{th} grade and found the factors behind the influence value in the Special Region of Yogyakarta, Indonesia, in five vocational schools. Testing in this research used the SPSS v26 and Sobel applications. After the hypothesis test is complete, the researcher will try to analyse the

magnitude of the effect by estimating an R square value of .75, which is in the strong category, an R honest value of .50 in the medium category, and an R honest value of .25 which is in the weak category (Theodorus et al., 2023). After finding insignificant deals and a weak influence between the variables studied, the researcher tried to find several things behind these findings and conducted structured interviews or cross-checks (validating the truth of the researcher's conclusions) with several teachers who taught CAD and students who had taken CAD lessons at five vocational schools majoring in mechanical engineering in the city of Yogyakarta, Indonesia.

3. Result

Before presenting the findings, the author will explain the results of the classical assumption and path equality tests. Next, proceed with hypothesis testing using SPSS v26 software and the Sobel test. This test combines primary data (questionnaires and multiple-choice tests/CAD theory) and secondary data (student CAD practice scores from CAD teachers). Meanwhile, structured interviews (cross-checking) will be discussed more precisely because they validate the findings from hypothesis testing and their influence values. Still, there are several findings from the cross-check results that the researcher will discuss in this section. The following are the results of the classic assumption test, path equality test, hypothesis test, and structured interview (cross-check).

3.1 Classic Assumption Test

The classical assumption test in this research is divided into the classical sub-structural assumption tests I and II. The following are the result of the classic sub-structural assumption tests I and II.

Results of classical sub-structural assumption testing I, with four tests 1) normality test with a value of .57 with normal conclusions; 2) multicollinearity testing $X_1 \rightarrow Y_1$ and $X_2 \rightarrow Y_1$ with a tolerance value of .63 and a VIF value of 1.59 with the conclusion that it is not multicollinearity; 3) autocorrelation test with a value of 2.19 with the conclusion that it is not autocorrelated; 4) heteroscedasticity test with a value of 41.67 with the conclusion of no heteroscedasticity.

Results of classical sub-structural assumption testing II, with four tests 1) normality test with a value of .61 with normal conclusions; 2) multicollinearity test $X_1 \rightarrow Y_2$ with a tolerance value of .59 and VIF 1.71; $X_2 \rightarrow Y_2$ with a tolerance value of .63 and VIF 1.59; $Y_1 \rightarrow Y_2$ with a tolerance value of .89 and VIF 1.12 with the conclusion that there is no multicollinearity; 3) autocorrelation test with a value of 2.17 with the conclusion that it is not autocorrelated; 4) heteroscedasticity test with a value of 27.46 with the conclusion of no heteroscedasticity.

3.2 Path Equality Test

The path equality test in this research is divided into two: path equality tests I and II. The following are the results of the classical substructure assumption tests I and II.

Results of Path Equality Tests I, with testing 1) $X_1 \rightarrow Y_1$ obtained a beta coefficient value of .326, meaning that if the values of other variables are constant and variable X_1 increases by 1%, then variable Y1 decreases by 32.6% and vice versa; 2) $X_2 \rightarrow Y_1$ obtained a beta coefficient value of -.004, meaning that if the values of other variables are constant and variable X_2 increases by 1%, then variable Y_1 decreases by 0.4% and vice versa.

Results of Path Equality Tests II, with testing 1) $X_1 \rightarrow Y_2$ obtained a beta coefficient value of .006, meaning that if the values of other variables are constant and variable X_1 increases by 1%, then variable Y_2 decreases by 0.6% and vice versa; 2) $X_2 \rightarrow Y_2$ obtained a beta coefficient value of .246, meaning that if the values of other variables are constant and variable X_2 increases by 1%, then variable Y_2 decreases by 24.6% and vice versa; 3) $Y_1 \rightarrow Y_2$ obtained a beta coefficient value of .291, meaning that if the values of other variables are constant and variable Y_1 increases by 1%, then variable Y_2 decreases by 29.1% and vice versa.

3.3 Hypothesis Test Results

Hypothesis testing is divided into two categories: 1) direct hypothesis testing for hypotheses 1 to 7 using SPSS v26, and 2) indirect hypothesis testing for hypotheses 8 to 9 using Sobel. Below, the test results will be described.

3.3.1 Direct Effect Test Results

Based on the findings in Table 3, Hypotheses 1 to 7, we received a significance value of .00, meaning that all hypothesis testing was immediately accepted. However, all relationship values and influences between variables are no more than 50% or fall into the weak category, which will be explained in table 3.

Hypothesis 1 has a t-coefficient value of 6.286 and a significance value of .00 < .05. Then the R-value is .324, and the r^2 value is .105 (positive). It can be concluded that H1 is accepted, but the relationship level is 3.24%, and the influence is 10.5%. This means that variable X_1 can explain variable Y_1. However, up to 50% are included in the weak category. Hypothesis 2 has a t-coefficient value of 3.650 and a significance value of .00 < .05. Then the R-value is .195, and the r^2 value is .038 (positive). It can be concluded that H2 is accepted, but the relationship level is 1.95%, and the influence is 3.8%. This means that variable X_2 can explain variable Y_1. However, up to 50% are included in the weak category. Hypothesis 3 has an F-coefficient value of 19.699 and a significance value of .00 < .05. Then the R-value is

.324, and the r^2 value is .105 (positive). It can be concluded that H3 is accepted, but the relationship level is 3.24% and the influence is 10.5%. This means that variables X_1 and X_2 can explain variable Y_1. However, up to 50% are included in the weak category.

Table 3. Hypothesis test results

Hypothesis 1 – Hypothesis 7		R	r^2	Coefficients t and F	Sig.	Information
Hypothesis 1 (H1)	**$X_1 \rightarrow Y_1$**	.324	.105	t = 6.286	.00	Accepted
Hypothesis 2 (H2)	**$X_2 \rightarrow Y_1$**	.195	.038	t = 3.650	.00	Accepted
Hypothesis 3 (H3)	**$X_1, X_2 \rightarrow Y_1$**	.324	.105	F = 19.699	.00	Accepted
Hypothesis 4 (H4)	**$X_1 \rightarrow Y_2$**	.250	.063	t = 4.741	.00	Accepted
Hypothesis 5 (H5)	**$X_2 \rightarrow Y_2$**	.306	.094	t = 5.909	.00	Accepted
Hypothesis 6 (H6)	**$Y_1 \rightarrow Y_2$**	.341	.116	t = 6.649	.00	Accepted
Hypothesis 7 (H7)	**$X_1, X_2, Y_1 \rightarrow Y_2$**	.419	.176	F = 23.830	.00	Accepted

Note: X_1 = desire to learn (DTL), X_2 = learning routine (LR), Y_1 = theoretical learning achievement (TLA), Y_2 = practical learning achievement (PLA)

Hypothesis 4 has a t-coefficient value of 4.741 and a significance value of .00 < .05. Then the R-value is .250, and the r^2 value is .036 (positive). It can be concluded that H4 is accepted, but the relationship level is 2.50% and the influence is 6.3%. This means that variable X_1 can explain variable Y_2. However, up to 50% are included in the weak category. Hypothesis 5 has a t-coefficient value of 5.909 and a significance value of .00 < .05. Then the R-value is .306, and the r^2 value is .094 (positive). It can be concluded that H5 is accepted, but the relationship level is 30.6%, and the influence is 9.4%. This means that variable X_2 can explain variable Y_2. However, up to 50% are included in the weak category. Hypothesis 6 has a t-coefficient value of 6.649 and a significance value of .00 < .05. Then the R-value is .341, and the r^2 value is .116 (positive). It can be concluded that H6 is accepted, but the relationship level is 34.1% and the influence is 1.16%. This means that variable Y_1 can explain variable Y_2. However, up to 50% are included in the weak category. Hypothesis 7 has an F-coefficient value of 23.830 and a significance value of .00 < .05. Then the R-value is .419, and the r^2 value is .176 (positive). It can be concluded that H7 is accepted, but the relationship level is 41.9% and the influence is 1.76%. This means that variables X_1, X_2, and Y_1 can explain variable Y_2. However, up to 50% are included in the weak category.

3.3.2 Indirect Effect Test Results

Based on the findings of Table 4, Hypothesis 8 with variable Y_2 does not mediate variable X_1 on variable Y_1 because the P-value obtained is .092 > .05. This means that it does not provide strong enough evidence to support a significant influence. Then, Hypothesis 9 with variable Y2 mediates variable X2 against variable Y1 because the P-value obtained is .001 < .05. This means that there is a significant influence between variable X2 and variable Y_2 through variable Y_1 as an intervening variable.

It can be concluded that testing hypotheses 1–7 is positive and significant. Still, the influence value obtained is weak (below 50%), and the results of testing hypothesis 8 do not provide strong enough evidence to support a significant influence. Conversely, hypothesis 9 has a considerable impact. Several possibilities cause these variables to fall into the weak category or below 50% and not mediate, including unexplained absences, several effects of welfare components, illness, and exclusion factors at school. This has a very negative impact on student academic achievement. Educators should pay attention to psychological factors or other supporting methods and factors to improve student learning achievement (Alqarni, 2023), (Nurrochmat et al., 2023), (Keppens, 2023), (Holzer et al., 2022), (Andrade et al., 2019).

Table 4. Sobel test results

Hypothesis 8 and Hypothesis 9		P-Value	Information
Hypothesis 8 (H8)	X_1 to Y_2 through Y_1 as an intervening variable	.092 > .05	Rejected
Hypothesis 9 (H9)	X_2 to Y_2 through Y_1 as an intervening variable	.001 < .05	Accepted

Note: X_1 = desire to learn (DTL), X_2 = learning routine (LR), Y_1 = theoretical learning achievement (TLA), Y_2 = practical learning achievement (PLA)

3.4 Structured Interview (Cross-Check)

The results of structured interviews (cross-check) or validation with CAD teachers and students or respondents in five vocational schools revealed: 1) CAD teachers and several respondents or students who had taken CAD lessons revealed that the researcher's findings were correct, like unexplained absences, exclusion factors at school, inappropriate learning methods, psychological factors, economic factors, factors of health, and family, environmental, and social factors. These factors greatly influence the process and even learning achievement. But sometimes they don't realise that this is very detrimental to them; 2) there are several other complaints from teachers when teaching CAD and students when taking CAD lessons, including limited funds, practical tools, or the software used is not original; original CAD software costs around $2543 for one computer; vocational students, especially mechanical engineering majors,

choose their major because of their second choice or because they did not graduate from high school; mismatch of curriculum between vocational schools and industry; there are policy gaps during inter-school CAD competitions; lack of intrinsic motivation, such as students often sleeping in class, playing with gadgets too often, keeping themselves busy during class hours, lack of will, or not being independent; lack of awareness of work health and safety (OHS), lack of student character, and soft skills.

4. Discussion

Based on the findings, the variables studied were able to influence the CAD learning achievement of vocational school students, especially those majoring in mechanical engineering. However, the level of relationship and influence is at most 50% or is included in the weak category. Although these findings are inadequate, they can reveal that the variables desire to learn (DTL) and learning routines (LR) are two factors that influence vocational students' CAD learning achievement (LA). This is because if someone desires to learn, the student will be more motivated to learn and will change the life cycle or daily routine, impacting learning achievement.

DTL is intrinsic motivation. It plays a fundamental role in determining a student's level of engagement, persistence, and academic achievement, and it is a psychological process that drives students to initiate, pursue, and achieve goals; students who have this are characterised by their meticulous attention, creating and engages in tasks promptly in any case, asks questions, responds willingly, and shows enthusiasm and interest (Ghahari & Shokouhi, 2023). Then LR is a student's daily routine or activity in learning, which refers to behaviour or ways of learning that will have an impact on the skills and intelligence that students acquire due to changes in themselves, such as changes in their knowledge, understanding, and aspects of the individual that arise as a result of the student's learning routine about something if it is linked to learning achievement, this can influence or have an impact on student learning achievement (LA) (Murray-Orr & Mitton, 2023; Liu & Merritt, 2021).

Then, suppose the question is which is the most influential variable, desire to learn (DTL) and learning routine (LR), on theoretical learning achievement (TLA) and practical learning achievement (PLA) CAD. In that case, the answer is that the variable learning routine (LR) can mediate the variable practical learning achievement (PLA) through the theoretical learning achievement (TLA) variable. This is because the routine use of technical drawing applications such as CAD can affect student learning achievement. So, it is not surprising that someone who repeatedly does activities will affect their learning achievement, just as these findings reveal that learning routine (LR) can mediate practical learning achievement (PLA) CAD through theoretical learning achievement (TLA) CAD. Several factors influence CAD learning achievement (LA) apart from the variables studied, including learning style, motivation, interest, parental attention, discipline, environment, family, school or class, and independence (Quiminsao & Sumalinog, 2023 ; Bayounes et al., 2022; Haataja et al., 2022 ; Amiri & El Karfa, 2021; Sari et al., 2021; Howell et al., 2018).

4.1 Structured Interview Results (Cross-Check)

Based on these findings, it is stated that the DLT and LR variables on TLA CAD and PLA CAD for vocational students majoring in mechanical engineering in the city of Yogyakarta are in the weak category or below 50% and do not mediate the DTL variable on PLA through TLA as an intervening variable. The causes of weak influence and failure in carrying out mediation include several factors, including 1) unexplained absences, 2) exclusion factors at school, 3) inappropriate learning methods, 4) psychological factors, 5) economic factors, 6) factors of health, and 7) family, environmental, and social factors.

An unexcused absence is when a student enrolled in an educational program is absent without a valid reason and is even accepted by the school. This can occur over several days, even months, affecting the student's competency assessment (Knage, 2023). The results of a cross-check of vocational teachers and students revealed several causes of absenteeism, including health problems, family problems, lack of interest and motivation, feelings of anxiety and fear, conflicts between students, etc. Exclusion in schools is a practice in which a particular group or students are treated unfairly or unequally and are made to feel isolated and distanced from their group or have wicked problems at school. This exclusion can hurt students' mental and emotional health (Armstrong, 2023). The cross-check results also revealed this: sometimes, students accidentally say things that contain exclusion, which impacts various factors, including their lives and learning achievements.

Inappropriate learning methods are called ineffective learning methods or methods that do not suit students' needs. The impacts of improper learning methods include decreased motivation, limited skill development, decreased academic achievement, and practicality. This aligns with the opinion of (Pandey et al., 2023), who states that efficient teaching methodology always uses different teaching strategies to respond to changing times. Another finding during cross-checks with teachers and students said that one of the factors that causes learning methods to be ineffective and efficient is too frequent changes in the curriculum and limited practical tools in schools. Psychology is a science that studies human behaviour and mental processes. The impact of psychological factors includes decreased academic performance, behavioural disorders, decreased social or anti-social behaviour, mental health disorders, and decreased mental well-being (Beckham et al., 2023). The results of the cross-check stated that general psychological factors faced

by students, such as anxiety, stress, and a lack of motivation to learn, resulted in students' inconsistency in learning and would impact several aspects, including their learning achievement. Students also feel economic factors due to their need for more ability to manage their economy. The impact caused by limited access to quality education, the higher possibility of dropping out of school, and the difficulty of getting access to learning facilities such as books, computers, and the internet, as well as the impact of COVID-19, dramatically affects the community's economy (Bloise & Tancioni, 2021). The cross-check results reveal that students feel this factor; sometimes, students do not go to school because they are helping their parents work or earn money so the learning process could be more optimal.

Health factors, such as lack of sleep, are some problems students face. This aligns with the cross-check results, which stated that they were often sluggish, sick, and unfocused because their sleep time was not optimal. The impacts arising from this factor include increasing levels of absence from school due to illness, decreased academic and practical achievement, etc. Cusack (2021) explains that lack of physical activity is a significant public health problem, and fragile health systems stem from poor health governance. Family, environmental, and social factors influence a person's development and welfare, including students at school. The impacts of this factor include decreased physical and mental well-being, low motivation/interest, reduced academic and practical achievement, etc. This aligns with Field Yi & Ellis (2023) and Hill (2020) findings that environmental factors are positively related to students' adaptive skills and that the family significantly influences overcoming environmental and social problems. So, if the family is in harmony, it can positively impact students' environment and social aspects.

4.2 Research Limitations

The results of this research are still temporary due to the researcher's limitations, including: 1) the learning achievement variable is the result of testing CAD learning theory and the practical values of teachers who teach CAD; not all theoretical and practical lessons are studied; 2) the author's limitations in researching, analysing, and interpreting his findings; 3) the author is limited in finding several other factors that can influence LA CAD based on previous findings and cross-checking findings with teachers who teach CAD lessons and students who have taken CAD lessons or are being researched, so the writer can only provide partial information related to the factors that can affect the learning achievement of vocational school students.

5. Conclusion

This research has proven that the variables of desire to learn (DTL) and learning routine (LR) can influence the variables of theoretical learning achievement (TLA) and practical learning achievement (PAL) of CAD for vocational school students majoring in mechanical engineering. Hypotheses 1 to 7 or direct testing have a significance value of .00 < .05 in a positive direction, and the level of influence is below 50% in the weak category. Then the indirect test of hypothesis 8 did not provide strong enough evidence to support the existence of a significant influence; on the other hand, hypothesis 9 with the LR variable (X_2) was proven to be able to mediate the PAL CAD variable (Y_2) through the TLA CAD variable (Y_1) with a significance value of .001 < .05. So, it is stated that DTL is unable to mediate PLA CAD (Y_2) through the TLA CAD variable (Y_1) as an intervening variable. However, researchers assume that as students get older and are faced with various demands and tasks, this will consciously and unconsciously influence their desire to learn because the willingness to learn will arise if students often carry out good learning routines in their daily lives so that this will become student character and competence. Likewise, in this case, students who often use CAD applications in their daily lives can influence PAL CAD through TAL CAD as an intervening variable, impacting students' desire to learn and, of course, their learning achievement. Several factors cause student learning achievement to be in the weak category or below 50% and not mediated, including 1) absenteeism, 2) exclusion, 3) inappropriate learning methods, 4) psychological, 5) economic, 6) health, 7) family, environment, and social. Thus, these findings have answered which is more dominant, how much influence contributes, and what factors influence learning achievement in MED lessons that use CAD applications for vocational school students, especially mechanical engineering majors.

6. Implications and Suggestions

The implications of the research are increasing student interest, increasing student involvement, increasing student motivation, increasing student self-confidence, increasing student discipline, increasing student consistency, increasing student focus, increasing technical ability, increasing efficiency, increasing creativity, improving teamwork skills, improving employment opportunities, and increasing training opportunities. So, teachers, parents, families, and the surrounding community must always provide good things for the next generation to create generations of the nation that will have strong competitiveness in the future, and they must constantly monitor several of these factors and their implications. Especially for students, they must always listen to the advice of their parents, family, teachers at school, and the wider community. Because vocational school graduates or technical vocational education and training (TVET) aim to be able to apply what they learn at school and become a provision for when or where they work, the hope of these graduates is indeed that they are ready to work, become entrepreneurs, and even open employment opportunities. Achieving this goal requires time and various related aspects, but opportunities will arise with the passage of time and

the number of writing actions like this. Directly, the variables desire to learn (DTL), and learning routine (LR) have been proven to influence CAD's theoretical learning achievement (TLA) and practical learning achievement (PLA). However, indirectly, one variable cannot mediate the learning achievement (LA) variable between the DTL and LR variables. This is due to several factors, including unreasonable absence factors, factors of exclusion in schools, inappropriate learning methods, psychological factors, economic factors, health factors, family, and environmental and social factors. By conducting research through different scientific lenses, it will be more supportive to find other factors (for example, student absenteeism is a severe problem; this can be supported by using other scientific disciplines to dissect factors such as student psychology and the role of the family in achieving a quality education).

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