

Influence AI Literacy, Technology Self-Control, and Self-Efficacy Towards the Ethics of AI Use with Moderation Motivation Study Vocational High School Students

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Article Info

Article history:

Received February 02, 2026

Revised March 03, 2026

Accepted April 11, 2026

Keywords:

AI Literacy

Self-control Technology

Self-Efficacy

Motivation Study

Ethics of AI Use

ABSTRACT

This study aim for analyze influence Artificial Intelligence (AI) literacy, self-control technology, and efficacy self to ethics use of AI on participants educate Vocational High School (SMK) with motivation Study as variables moderation. Research This use approach quantitative with explanatory research design. Data collected through distribution questionnaire to 140 participants vocational high school students in South Sulawesi who have use generative AI technology in the learning process. Data analysis was carried out using Structural Equation Modeling – Partial Least Squares (SEM-PLS) with help device soft SmartPLS 3. Research results show that self-control technology has an effect positive and significant to ethics use of AI ($\beta = 0.228$; $p = 0.018$), whereas motivation learning also has an effect positive and significant to ethics AI use ($\beta = 0.379$; $p = 0.006$). In contrast, AI literacy ($\beta = -0.044$; $p = 0.566$) and efficacy self ($\beta = 0.169$; $p = 0.205$) no own significant influence to ethics AI usage. Moderation test results show that interaction AI literacy and motivation learning ($\beta = 0.229$; $p = 0.054$), interaction of technology self-control and motivation learning ($\beta = -0.016$; $p = 0.901$), as well interaction efficacy self and motivation learning ($\beta = 0.016$; $p = 0.906$) No influential significant to ethics use of AI. This is show that motivation Study No capable moderate connection between AI literacy, technology self-control, and efficacy self to ethics use of AI on participants education. Findings study This confirm that ability control self in use technology as well as motivation Study is factor important in form behavior ethical participant educate in utilizing AI in the learning process. Therefore that, strengthening digital self-control and increasing motivation Study become aspect important in support responsible use of AI answer in education.

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1. INTRODUCTION

Development intelligence artificial intelligence (AI) has bring change significant in various field life, including education, so that demand participant educate own ability AI literacy to be able to understand, evaluate, and use technology the in a way responsible answer [1]. In line with matter that, AI literacy is not only related with ability technical use AI technology, but also includes understanding critical, attitude, and awareness ethical in utilizing AI in the learning process in the digital era [2]. In addition, strengthening AI literacy becomes important for students and participants educate Because development rapid AI technology demand individual capable understand, use, and evaluate technology the in a way effective as well as notice aspect ethics and safety in its use [3]. Besides AI literacy, other factors psychological like ability control self in use technology also becomes aspect important in determine How participant educate utilise intelligence

artificial in activity academic they. Research show that level low self-control related with frequency use more AI tools high, including For finish task academic or answer various need Study in a way fast [4] .

On the other hand, the efficacy self also plays a role in influence behavior individual when use AI technology, because perception individual to ability himself For finish task certain can determine is AI used as tool supporters learning or precisely as replacement business Study [5] . Efficacy self become factor important in the learning process based technology Because belief participant educate to ability himself can influence How they utilise digital technology, including intelligence artificial, in support activity Study in a way independent [6] . Utilization intelligence artificial in learning No only influenced by ability owned technology participant education, but also influenced by internal factors such as efficacy self and abilities think critical that can determine How technology the utilized in a way effective in the learning process [7] . In the context learning AI- based, use technology like chatbot based intelligence artificial proven capable increase trust self, attitude learning, and motivation participant educate through giving bait Fast feedback and interaction more personal learning [8] . However, the use of intelligence artificial in education also gives rise to various implications ethical like issue data privacy, potential algorithm bias, and importance transparency and accountability in taking decision AI- based so that technology the can utilized in a way fair and responsible answer in the learning process [9] .

In context education, use intelligence artificial need accompanied by with understanding ethics academic Because uncontrolled use of AI right, like copy direct AI results without analysis process or without list relevant sources, can leading to violations integrity academic like plagiarism [10] . For face various challenge emerging ethics from development intelligence artificial, ability control selfbecome aspect important Because individual need capable arrange behavior and decisions in a way rational for use AI technology remains in harmony with applicable moral values and norms [11] . Therefore that, understanding about ethics use intelligence artificial need implanted to participant educate them so that they capable use technology in a way wise, aware potential impact negative like violation privacy and algorithmic bias, as well as responsible answer to consequence social from utilization technology the [12] .

In the research this, motivation Study play a role as variables moderation that can strengthen or weaken influence AI literacy, technology self-control, and efficacy self to ethics use of AI on participants educate. Motivation Study is factor important in success of the educational process Because students who have motivation tall tend more active , enthusiastic in follow activity learning , as well as capable endure face various challenge academic For reach objective Study [13] . Research results show utilization intelligence artificial in learning , such as use chatbots and other AI systems, proven can increase motivation Study student Because capable provide experience interactive, adaptive, and personal learning, as well as give access information and feed come back in a way fast and real-time help student understand material and overcome difficulty Study in a way more effective [14]–[16] .

Based on description said, research This aim for analyze influence AI literacy, technology self-control, and efficacy self to ethics use of AI on participants vocational school education, with motivation Study as variables moderation. Motivation Study play a role as variables alleged moderation strengthen connection between variables the in context utilization of AI in learning [17] .

2. METHOD

2.1 Research Design

Study This use approach quantitative with design purposeful explanatory research for analyze influence AI literacy, technology self-control, and efficacy self to ethics use of AI on participants educate vocational school with motivation Study as variables moderation. Approach This chosen Because give clear picture about connection between variables studied as well as allows For do analysis in -depth statistics [18] . Research This done for understand How ability understand technology intelligence artificial, ability control use technology, as well as belief selfstudent can influence behavior ethical in use technology Generative Artificial Intelligence (AI). as a learning medium.

The analysis method used in study This is Structural Equation Modeling (SEM) based on Partial Least Squares (PLS) use device soft SmartPLS 3. The SEM-PLS method is analysis statistics multivariate For estimate influence between variables that are carried out in a way simultaneous with focus on studies exploration/prediction/development of structural models [19] .

Study This consists of of five variables that is AI literacy (X1), technology self-control (X2), efficacy self (X3), ethics use of AI (Y) and variables moderation that is motivation learning. Variable motivation Study used as variables moderation for know whether motivation Study can strengthen or weaken influence AI literacy, technology self-control, and efficacy self to ethics use of AI on participants educate.

Data collection was carried out through distribution questionnaire to participant vocational school students who use generative AI technology as a learning medium. Data obtained Then analyzed use SmartPLS For testing the measurement model and structural model.

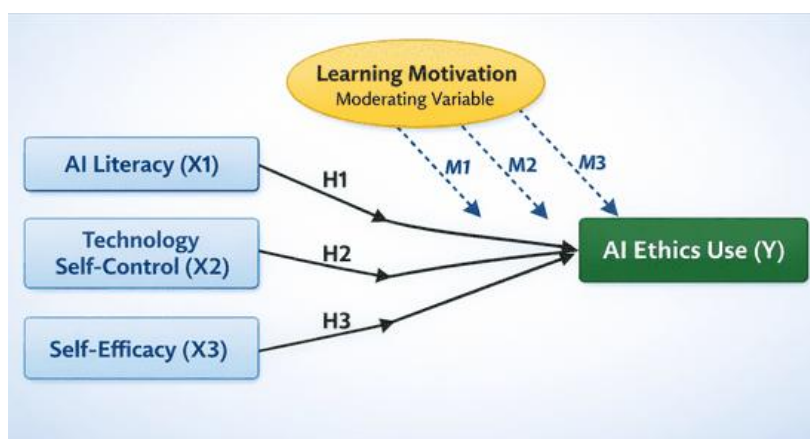


Figure 1. Conceptual framework of the research model

2.2 Research Procedure

Procedure study This done through a number of stages systematic for obtain data and analyze connection between variables research. Procedure study as following:

1. Determine design study quantitative with approach explanatory research.
2. Determine variables researcher that is AI literacy (X1), technology self-control (X2), efficacy self (X3), motivation learning (variable moderation), and ethics use of AI(Y).
3. Determine population and sample participant Vocational high school students in South Sulawesi use purposive sampling with amount respondents as many as 140 respondents.
4. Collecting data through questionnaire Likert scale 1–4 to respondents.
5. Analyzing data using SEM-PLS with SmartPLS 3.
6. Do evaluation outer model, inner model and moderation test for know connection between variable.

2.3 Data Acquisition

Population in study This is participant educate Vocational High Schools (SMK) in South Sulawesi, as many as 140 respondents used technology Artificial Intelligence (AI) in activity learning. Participants selected vocational school students as population study Because is groups that use digital technology and start utilise technology intelligence artificial as a learning medium independent.

Taking technique sample in study This use method purposive sampling, namely technique taking sample based on criteria certain appropriate with objective study [20] . Criteria respondents in study This is participant vocational school students who have know or use generative AI technology in activity Study.

Research data obtained through distribution questionnaire to respondents with use Likert scale 1–4 For measure level agreement respondents to every statement in instrument study.

2.4 Research Instrument

Instrument research used in study This in the form of questionnaire with Likert scale 1–4 developed based on indicator from each variable research. Instruments AI literacy is used For measure level understanding participant educate to draft base intelligence artificial, way AI work, as well as ability use AI technology in general critical and responsible answer in the learning process [21] . Instruments self-control technology used For measure ability participant educate in control use AI technology, including ability arrange time use technology , avoiding abuse technology , as well as guard focus moment use technology in the learning process [22] . Instruments efficacy self used For measure level belief participant educate to ability participant educate in use AI technology for support the learning process in a way independent [23] . Instruments motivation Study used For measure level internal and external motivation external participant educate in learning , including interest study, perseverance in finish tasks, as well as Spirit in utilise AI technology as a learning medium [24] . Instruments ethics the use of AI is used For measure behavior ethical participant educate in use AI technology, such as honesty academic, use of AI responsible answer, and awareness to limitation use AI technology in learning [25] .

2.5 Data Analysis

Data analysis in study This done use method Structural Equation Modeling (SEM) based Partial Least Squares (PLS) with help device soft SmartPLS 3. SEM-PLS method was selected Because capable analyze complex relationships between latent variables in simultaneous as well as suitable used in research that is predictive and exploratory. In addition, the method this can also used in research models involving variables moderation and not need assumptions strict data distribution.

1. Measurement Model (Outer Model)

Aim For test quality instrument research. Evaluation This done with see mark outer loading, Composite Reliability, Cronbach's Alpha, and Average Variance Extracted (AVE).

2. Structural Model (Inner Model)

aim for analyze connection between variables in the research model. At the stage This done testing path coefficient, T-Statistics and P-Values.

3. Moderating Effect Analysis

For know whether variables motivation Study capable strengthen or weaken connection between AI literacy, technology self-control, and efficacy self to ethics use of AI on participants Vocational High School Education. Testing moderation done with analyze interaction between variables independent with variables moderation as well as see mark significance from connection mentioned in the results bootstrapping in the SEM-PLS model.

3. RESULTS AND DISCUSSION

3.1. Model Pengukuran (*Measurement Model*)

Test results outer loading show that all over indicators for each variable own the above value 0.70, so can stated fulfil criteria validity convergent the outer loading value on the variable AI Literacy (X1) be in range 0.707–0.865, which shows that indicators the capable represent construct AI literacy with Good. On the variable Technology Self-control (X2), value outer loading range between 0.779–0.879, which shows that every indicator own strong contribution in measure ability participant educate in control use technology. Next on the variables Self-Efficacy (X3), value outer loading be in range 0.753–0.819, which shows that indicators used has capable describe belief self participant educate in use AI technology for support the learning process. Indicators on variables Ethics of AI (Y) Use own mark outer loading between 0.764–0.826, which shows that indicator the Enough strong in measure behavior ethical participant educate in use AI technology. Meanwhile that, on the variable Motivation Learning (M) mark outer loading be in range 0.702–0.792, which has also been fulfil criteria validity convergent. With Thus, all indicators in the research model declared valid and worthy used for analysis more carry on in the structural model.

Table 1. Outer Loading

Variables	Literacy (X1)	Self-control Technology (X2)	-Efficacy (X3)	Ethics of AI (Y) Use	Motivation Learning (M)
X1. 1	0.865				
X1. 13	0.772				
X1. 15	0.707				
X1. 7	0.772				
X2.1		0.879			
X2.3		0.821			
X2.5		0.812			
X2.7		0.779			
X2.9		0.801			
X3.1			0.753		
X3.12			0.762		
X3.15			0.796		
X3.3			0.819		
X3.7			0.788		
Y.12				0.826	
Y.3				0.778	
Y.4				0.821	
Y.6				0.764	
M.1					0.768
M.11					0.792
M.12					0.702
M.15					0.754
M.3					0.788
M.4					0.716
M.7					0.786
M.9					0.741

Evaluation effect moderation done with see outer loading value on the construct interaction between variables independent and variable moderation. Effect moderation can seen in the table below This .

Table 2. Moderating Effect

Interaction Construct	Outer Loading
AI Literacy (X1) × Motivation Learning (M)	0.906
Technology Self-control (X2) × Motivation Learning (M)	1,065
-Efficacy (X3) × Motivation Learning (M)	1,190

The results show that all over construct interaction own outer loading value is above 0.70 so that can said to be valid in represent effect moderation. In detailed, interaction AI Literacy with Motivation Study own outer loading value of 0.906, Self-control Technology with Motivation Study of 1,065, and Self -Efficacy with Motivation Study amounting to 1,190. This value show that Motivation Study capable moderate connection third variables said, with influence the strongest moderation found in Self -Efficacy with Motivation Study.

3.2. Construct Reliability and Validity

Testing reliability construct done with see mark *Cronbach's Alpha*, ρ_A , and *Composite Reliability*. Analysis results show that all over variables own mark Cronbach's Alpha is above 0.70, namely AI literacy is as big as 0.831, *Technology Self-control* as big as 0.878, Self -Efficacy of 0.844, Ethics of AI Use of 0.809, and Motivation Study as big as 0.894. The value show that each construct own good internal consistency .

In addition, the value *Composite Reliability* across the board variables are also on top 0.70, namely range between 0.862 to 0.914, so that can concluded that instrument study own level high reliability.

Validity convergence is also tested through mark Average Variance Extracted (AVE). Entire variables own AVE value above 0.50, namely AI literacy is as big as 0.610, Technology Self-control as big as 0.671, Self -Efficacy of 0.614, Ethics of AI Use of 0.636, and Motivation Study as big as 0.572. This is show that every construct capable explain more from 50% variance the indicators. With thus, it can concluded that the measurement model in study This has fulfil criteria reliability and validity construct.

Table 3. Construct Reliability and Validity

Variables	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Literacy (X1)	0.831	0.820	0.862	0.610
AI Literacy (X1) × Motivation Learning (M)	1,000	1,000	1,000	1,000
Self-control Technology (X2)	0.878	0.889	0.910	0.671
Technology Self-control (X2) × Motivation Learning (M)	1,000	1,000	1,000	1,000
-Efficacy (X3)	0.844	0.849	0.888	0.614
-Efficacy (X3) × Motivation Learning (M)	1,000	1,000	1,000	1,000
Ethics of AI (Y) Use	0.809	0.812	0.875	0.636
Motivation Learning (M)	0.894	0.901	0.914	0.572

3.3. Discriminant Validity

Testing discriminant validity done use Fornell-Larcker Criterion. Analysis results show that mark root squared AVE at each construct more big compared to with mark correlation between construct other.

As example, value root AVE squared on variables Motivation Study as big as 0.756, which is more tall compared to the correlation with other variables. The same thing is also seen in the variables Literacy AI (0.781), Technology Self-control (0.819), Self -Efficacy (0.784), as well Ethics of AI Use (0.798).

This matter show that each construct own level good and capable discrimination differentiate himself from construct other in the research model. With Thus, the research model has fulfil criteria discriminant validity.

Table 4. Fornell Larcker Criterion

Variables	Motivation Learning (M)	Literacy (X1)	X1 × M	Self-control Technology (X2)	X2 × M	Efficacy (X3)	X3 × M	Ethics of AI (Y) Use
Motivation (M)	0.756							
Literacy (X1)	-0.250	0.781						
AI Literacy (X1) × Motivation Learning (M)	0.035	0.299	1,000					
Self-control Technology (X2)	0.350	-0.253	-0.027	0.819				
Technology Self-control (X2) × Motivation Learning (M)	0.069	-0.023	0.004	-0.140	1,000			
Efficacy (X3)	0.720	-0.265	0.113	0.472	-0.094	0.784		
Efficacy (X3) × Motivation Learning (M)	-0.179	0.086	-0.126	-0.084	0.365	-0.261	1,000	
Ethics of AI (Y) Use	0.594	-0.177	0.218	0.447	-0.030	0.581	-0.148	0.798

3.4. Structural Model (Path Coefficient)

Test results path coefficient show that no all connection between variables in the research model own significant influence to Ethics of AI Use.

Variables AI Literacy (X1) No own significant influence on the Ethics of AI Use with mark T-statistics is 0.575 and p-value of 0.566 (>0.05). This show that level AI literacy of participants educate No in a way direct influence behavior ethical they in use AI technology.

Next, the variables Self-control Technology (X2) own influence positive and significant on the Ethics of AI Use with mark the t-statistics are 2.382 and the p-value is 0.018 (<0.05). This is show that ability participant educate in control use technology play a role important in form behavior ethical in use of AI.

Variables Self -Efficacy (X3) No show significant influence on the Ethics of AI Use with mark the t-statistics are 1.270 and the p-value is 0.205 (>0.05).

In addition, the variables Motivation Learning (M) own influence positive and significant on the Ethics of AI Use with mark the t-statistics are 2.736 and the p-value is 0.006 (<0.05). This is show that the more tall motivation Study participant educate, then the more high tendency they for use AI technology in general ethical.

Test results moderation show that interaction AI literacy with motivation learning, interaction self-control technology with motivation learning, and interaction efficacy self with motivation Study No influential significant to ethics use of AI. Findings This indicates that motivation Study No capable moderate connection between variables independent and ethical use of AI on participants educate.

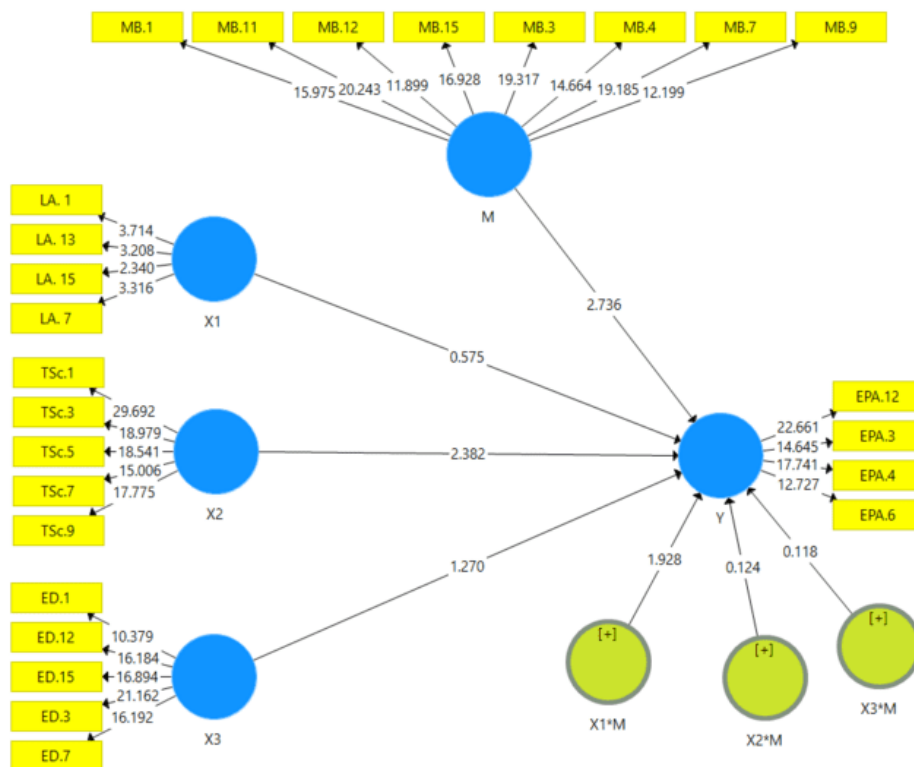


Figure 2. SEM-PLS Model

Table 5. Path Coefficient

Variables	Mean	STDEV	T Statistics	P Values	Hypothesis
Literacy (X1) -> Ethics of AI Use (Y)	-0.035	0.076	0.575	0.566	Not Significant
Literacy (X1) × Motivation Learning (M) -> Ethics of AI Use (Y)	0.179	0.119	1,928	0.054	Not Significant
Technology Self-control (X2) -> Ethical Use of AI (Y)	0.253	0.096	2,382	0.018	Significant
Technology Self-control (X2) × Motivation Learning (M) -> Ethics of AI Use (Y)	-0.025	0.130	0.124	0.901	Not Significant
-Efficacy (X3) -> AI Usage Ethics (Y)	0.170	0.133	1,270	0.205	Not Significant
-Efficacy (X3) × Motivation Learning (M) -> Ethics of AI Use (Y)	0.045	0.135	0.118	0.906	Not Significant
Motivation Learning (M) -> Ethics of AI Use (Y)	0.362	0.138	2,736	0.006	Significant

4. CONCLUSION

Study This aim for analyze influence AI literacy, technology self-control, and efficacy self to ethics use of AI on participants educate vocational school with motivation Study as variables moderation. Analysis results use SEM-PLS method shows that no all variables own significant influence to ethics use of AI. Self-control technology variables are proven own influence positive and significant to ethics the use of AI, which shows that ability participant educate in control use technology play a role important in form ethical behavior moment utilizing AI in the learning process. In addition, motivation learning also has influence positive and significant to ethics the use of AI, which means the more tall motivation Study participant educate so the more high tendency they for use AI technology in general responsible answer.

Temporary that, AI literacy and efficacy self No show significant influence to ethics use of AI. This is indicates that understanding to AI technology and belief self in use technology Not yet Of course in a way direct influence behavior ethical participant educate in utilizing AI. In addition, the results testing moderation show that motivation Study No capable moderate connection between AI literacy, technology self-control, and efficacy self to ethics use of AI.

In a way overall, research This confirm that factor control self in use technology as well as motivation Study is aspect important in form behavior ethical participant educate in use AI technology in learning. Therefore that, institution education need strengthen development ability control digital self as well increase motivation Study participant educate so that the use of AI technology can utilized in a way more responsible answer and appropriate with ethics academic.

5. ACKNOWLEDGMENTS

The author would like to express sincere gratitude to Makassar State University for providing academic support and facilities during the completion of this research. The author also thanks all students of Vocational High Schools (SMK) in South Sulawesi who participated as respondents and contributed valuable data for this study.

6. FUNDING INFORMATION

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

7. CONFLICT OF INTEREST STATEMENT

The author declares that there is no conflict of interest regarding the publication of this research article.

8. INFORMED CONSENT

Informed consent was obtained from all participants involved in this study. Participation was voluntary, and respondents were informed about the purpose of the research before completing the questionnaire.

9. ETHICAL APPROVAL

This research was conducted in accordance with ethical research standards. All procedures involving human participants were carried out responsibly and ensured the confidentiality and anonymity of respondents.

10. DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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