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The Impact of the Use of Artificial Intelligence (AI) Technology on Improving Reading and Writing Literacy in Students of the Uny Culinary Education Study Program

Nur Aulia Wijayanti[1*], Endang Mulyatiningsih[2], Prihastuti Ekawatiningsih[3], Sunarni[4], Taufiq Yahya[5], Rani Aprilianti[6]
Fakultas Teknik, Pendidikan Teknik Boga Busana, Universitas Negeri Yogyakarta
Corresponding Author: Nur Aulia Wijayanti nurauliawijayanti@uny.ac.id

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A B S T R A C T

This research is motivated by the low level of reading literacy in Indonesia, which is reflected in the 2022 PISA score of 359, as well as a similar phenomenon in Culinary students who tend to download references without reading in depth. The purpose of the study is to analyze the behavior of using Artificial Intelligence (AI), the level of reading and writing literacy, and the influence of AI use on literacy. The method used was a survey with a sample of 90 students out of a total of 123 students, using an AI behavioral questionnaire and a literacy rubric. Data analysis was carried out descriptively and product moment correlations. The results showed that the behavior of using AI was in the good category (score 70.24), while literacy was in the good category (score 63.6). AI is most widely used for information search and writing references. There was a positive but low correlation between the use of AI and literacy (r = 0.315), with a contribution of 9.9%. These findings suggest that AI helps access to information, but that improving literacy remains dependent on critical reading and writing skills.

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INTRODUCTION

Reading literacy in Indonesia is still a big challenge, as reflected in the 2022 PISA score which recorded a score of 359 points, far below the OECD country average (OECD, 2022). In Culinary Education students, low reading literacy can be seen from the tendency to collect assignments without reading references critically and only relying on sources downloaded from the internet. The development of artificial intelligence (AI) technologies such as ChatGPT, Gemini, and Copilot has made it easier to access information, but it does not necessarily improve students' in-depth text comprehension and scientific writing skills (Chan & Hu, 2023; Albayati, 2024).

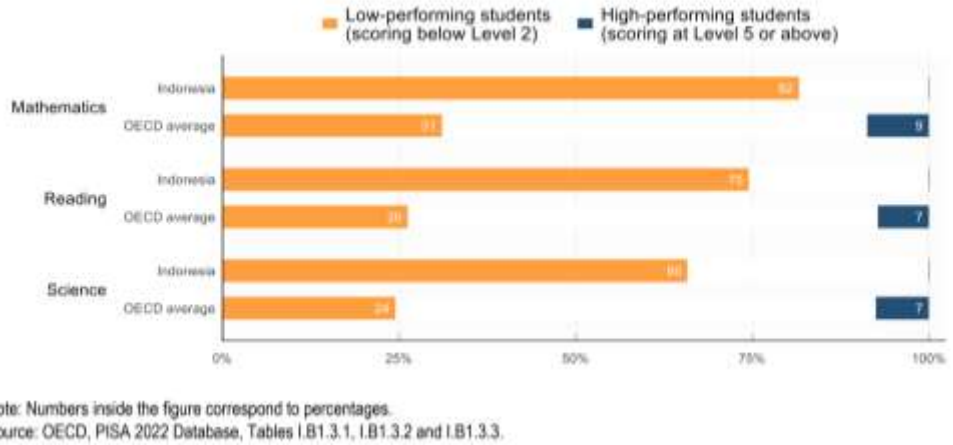

Figure 1. Top performance and low performance in mathematics, reading and science Sources: (OECD, 2022)

In the context of higher education, reading and writing literacy is a fundamental competency that prospective teachers must have. Reading literacy includes the ability to understand, interpret, evaluate, and reflect on information critically (UNESCO, 2023; Amir, Irfan, & Raihan, 2024). However, studies show that while AI technology helps students access learning resources and provide reading recommendations, its use does not necessarily improve critical thinking skills or deep literacy understanding (Gamage, 2021; Siahaan et al., 2024). Several studies have found that AI can improve learning efficiency but also have the potential to decrease reading diligence and academic honesty (Fauziddin et al., 2025; Budiyono, He, & Li, 2025).

A number of recent research in higher education shows that the use of AI is related to self-efficacy, writing quality, and student academic outcomes (Bećirović et al., 2025; Bewersdorff et al., 2025). Meanwhile, global research confirms that AI is increasingly influencing learning habits, cognitive reflection abilities, and academic performance (Moşoi et al., 2025; Wang et al., 2024). The use of AI in learning also impacts students' metacognitive abilities, digital literacy abilities, and information management (Ifenthaler et al., 2024; U.S. Department of Education, 2023). Thus, a deeper understanding is needed on how students use AI and how the behavior of using AI affects their reading and writing literacy.

On the other hand, reading literacy skills can be improved through effective reading strategies such as skimming, scanning, skipping, selecting, as

well as the SQ3R (Survey, Question, Read, Recite, Review) method, which has been proven to improve reading comprehension and performance (Cantu, 2006; Costello, 2020; Jonson, 2013; Soma et al., 2015). Reading literacy is not only technical ability, but also cognitive and social abilities that are influenced by context and readers' interaction with the text (Vygotsky, 1978).

Based on these findings, this study is important to describe the behavior of Culinary students in using AI technology, measure the level of reading and writing literacy, and analyze whether the behavior of using AI affects students' academic literacy. The findings of this research are expected to contribute to the development of digital literacy theory and become the basis for the preparation of technology-based learning strategies that maintain the quality of critical thinking and academic ethics in higher education.

THEORETICAL REVIEW

Types of Research

This study uses a survey method with a quantitative descriptive approach. This method was chosen to describe the behavior of using artificial intelligence (AI) technology as well as the level of reading and writing literacy of students objectively through the measurement of research variables. The research was carried out at the Culinary Education Study Program, Yogyakarta State University (UNY) from February to October 2025.

Research Variables

This research involves two main variables, namely:

1. Reading and writing literacy, which is the ability of students to access, understand, evaluate texts, and rewrite information using their own language. These literacy indicators include the speed of access to reading materials, the quality of the selected sources, the ability to summarize, the effectiveness of sentences, and the use of standard language.

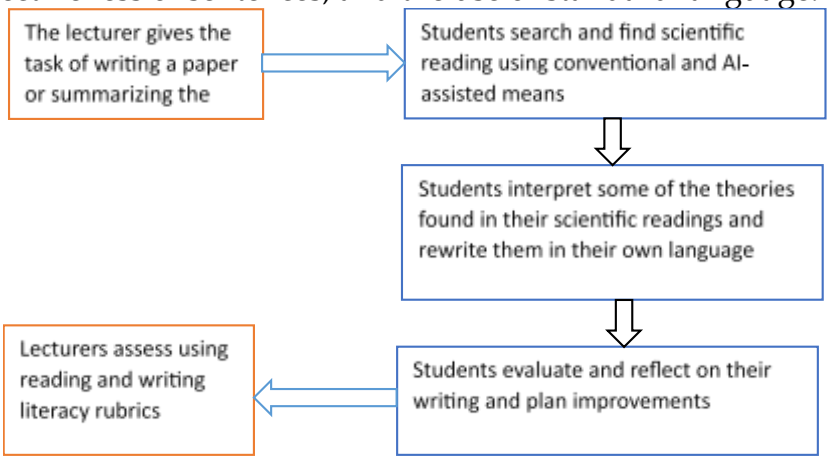

Figure 2. Reading literacy measurement procedure

2. The behavior of using AI technology, which is based on the theoretical construction of *the Technology Acceptance Model* (TAM). This behavior is formed through the process:

a. Perceived Usefulness
b. Perceived ease of use
c. Attitude toward using AI
d. Intention to use AI (behavioral intention to use)
e. Actual system use

This stage reflects the process of accepting technology starting from cognitive evaluation, affective attitudes, to the act of using AI in daily academic tasks.

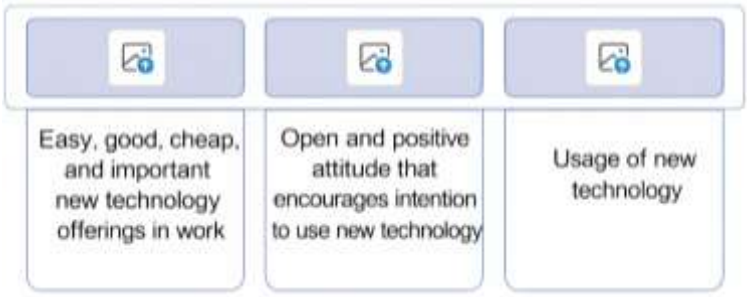

Figure 3. flow charts or conceptual frameworks for the use of new technologies

Figure 3 is a flow chart or concept framework that illustrates the factors that influence the use of new technologies.

1. The offer of new technologies that are easy, good, cheap, and important in work are external factors that are the initial triggers.
2. An open and positive attitude that encourages the intention to use new technology is an internal actor in the form of user attitudes or perceptions.
3. The use of new technology is the end result in the form of technology adoption behavior.

METHODOLOGY

Population and Research Sample

The research population is all students of the UNY Culinary Education Study Program class of 2024 (semester 2) consisting of classes A, C, and D with a total of 123 students. Samples were determined using *a simple random sampling* technique. Based on the table of Isaac and Michael (1984) at an error level of 5%, the population of 120 people requires a sample of 74% or about 89 respondents. With a population of 123 students, the sample used in this study was set at **90 students**.

Table 1. Population Framework and Research Sample

CLASSES	TOTAL POPULATION	NUMBER OF SAMPLES
A	42	31
C	37	27
D	44	32
TOTAL	123	90

Data Collection Methods

1. AI Use Behavior Data

Collected using questionnaires developed based on TAM constructs. Each indicator is measured using an interval scale of 1–5.

2. Reading and Writing Literacy Data

Collected through performance tests in the form of tasks to find definitions of concepts or terms Using two conditions:

a. using AI-assisted, and

b. without using AI.

Students are asked to assess their writing results through *self-evaluation* using the reading-writing literacy assessment rubric that has been prepared by the lecturer.

Table 2. Research Instrument Grid

Variable	**Indicator**	**Data Type**
AI Use Behavior	1) Perception of the benefits of AI	Interval scale questionnaire 1–5
	2) Perception of ease of use	
	3) Attitudes towards AI	
	4) Intention to use AI	
	5) Actual use	
Reading and Writing Literacy	1) Speed of finding information	Rubric scale 1–5
	2) Source credibility	
	3) Effective reading ability	
	4) Ability to write/react information	
	5) Reasonableness of self-reflection and evaluation	

Data Analysis Methods

The data from the questionnaire results and task assessment were converted to a standard score of 1–10 before being analyzed. The analysis is carried out using two techniques:

1. Quantitative Descriptive Analysis

To describe the behavioral trends in the use of AI as well as the level of literacy of students.

2. Product-Moment Correlation Analysis

Used to test the relationship between AI usage behavior and read-write literacy. If the correlation value shows a positive and significant relationship, then it can be concluded that the higher the behavior of using AI, the higher the reading and writing literacy ability of students.

RESULTS

Culinary Student Behavior in the Use of AI

AI usage behavior is assessed through five indicators within the *Technology Acceptance Model* (TAM) framework: perception of benefits, perception of ease of use, attitude towards AI, intention to use AI, and actual use. Each indicator consists of five questions on a Likert scale of 1–5, then converted to a score of 0–100.

Table 3. Average Value of AI Use Behavior Indicators

YES	INDICATORS OF AI USAGE BEHAVIOR	AVERAGE
1	Perceived benefits	77,96
2	Perception of ease of use	73,11
3	Attitudes towards AI	59,69
4	Intention to use AI	69,16
5	Actual use	71,29
TOTAL SCORE	**–**	**70,24**

The highest score is found in **the perception of benefits**, showing that students recognize the contribution of AI in supporting academic activities. The lowest score is in **attitude**, which indicates that there are doubts about the accuracy and reliability of the information provided by AI. This shows that students are selective and still feel the need to verify information from AI.

The use of AI in various learning contexts was also measured. Students use AI the most to find new information, while the use of AI to answer exam assignments is the lowest, indicating caution as well as strict lecturer supervision in assignment assessment.

Table 4. Average Use of AI in Various Academic Activities

Yes	*Activities Using AI*	*Average*
1	Search for new information	75,70
2	Find references	72,10
3	Finding a solution to a problem	69,00
4	Answering assignments/tests	64,20
5	Writing scientific articles	70,20
Total score	**–**	**70,24**

The behavior of using AI by students in academic assignments shows that this technology is most used for the search for new information with the highest average score of 75.70, followed by the use to find writing references 72.10, write scientific articles 70.20, and find problem solutions 69.00. Meanwhile, the use of AI to answer exam questions or lecturers' assignments obtained the lowest score, which was 64.20, with an overall total score of 70.24. These findings indicate that Culinary students use AI more for exploratory activities and learning support, rather than answering evaluative academic questions. The low confidence of students in the accuracy of AI performance and the caution of lecturers in giving written assignments, for example by assessing articles orally, cause students to

rely less on AI to answer exam questions. In addition, students who rely too much on AI usually do not understand the content of the submitted articles, so the use of AI in the evaluative context remains relatively low.

Reading and Writing Literacy for Culinary Students

Reading and writing literacy is measured from student performance in completing open-ended assignments that assess five literacy indicators. The scores are converted to a scale of 0–100 and categorized into five groups.

Table 5. Distribution of Literacy Values in Reading, Writing, and Their Combination

Categories	*Range*	*Reading f (%)*	*Write f (%)*	*Combination f (%)*
Excellent	>85	2 (2,2%)	10 (11,1%)	2 (2,2%)
Good	71–85	21 (23,3%)	37 (41,1%)	29 (32,2%)
Enough	56–70	50 (55,6%)	35 (38,9%)	49 (54,4%)
Less	41–55	15 (16,7%)	8 (8,9%)	10 (11,1%)
Very Less	≤40	2 (2,2%)	0 (0%)	0 (0%)
Total	**–**	**90**	**90**	**90**

The majority of students are in the sufficient category, showing that the ability to understand and select readings still needs to be improved.

The average per literacy indicator reads:

The reading literacy score of students measured through four assessment tasks and one question about reading habits showed an average standard score of 63.6. Students are able to access and find references quickly 77.6 and have quite effective reading habits 76.2. However, the ability to download references only reached a score of 70, and the most notable thing was the low credibility of the references found, both through ChatGPT 47.3 and Google 46.7. These findings indicate that although students are quite skilled in finding information, they still have difficulty determining the quality and reliability of sources. In addition, the difference in the quality of search results from ChatGPT and Google is not significant, confirming that Google remains a reliable search engine. A more detailed explanation of each item of reading literacy is explained in the next section.

Table 6. Average Reading Literacy Indicators

Yes	*Indicator*	*Average*
1	Speed of finding references	77,6
2	Ability to download references	70,0
3	Referential credibility of ChatGPT	47,3
4	Referential credibility from Google	46,7
5	Effective reading habits	76,2
Average Reading Literacy	**–**	**63,6**

From this data, it appears that quick access does not always result in credible sources. Although students are able to acquire many references in a short period of time, only a small percentage meet academic standards.

a. Speed of Finding Information

As many as 65.5% of college students can download more than 8 references in 5 minutes, demonstrating fast access capabilities.

Table 7. Speed of Finding Information

Criteria	***Value***	***Number of references obtained and downloaded***	***Frequency***	***Presses***
Excellent	5	>10	26	28,9
Good	4	8 – 10	32	36,6
Enough	3	5 – 7	27	30
Less	2	2 – 4	5	5.6
Very less	1	< 2		
Quantity			90	100

b. Reference Credibility

More than 50% of college students are only able to identify **two** quality references, either from ChatGPT or Google. This shows that the ability to assess the quality of sources still needs to be strengthened.

Table 8. Distribution of the credibility value of the references found and read

Number of references	*Chat GPT search engine*		*Sin Google searchers*	
	f	%	**f**	%
1	12	13.3	14	15.6
2	48	53.3	46	51.1
3	20	22.2	20	22.2
4	5	5.6	6	6.7
≥5	5	5.6	4	4.4
Quantity	**90**	**100**	**90**	**100**

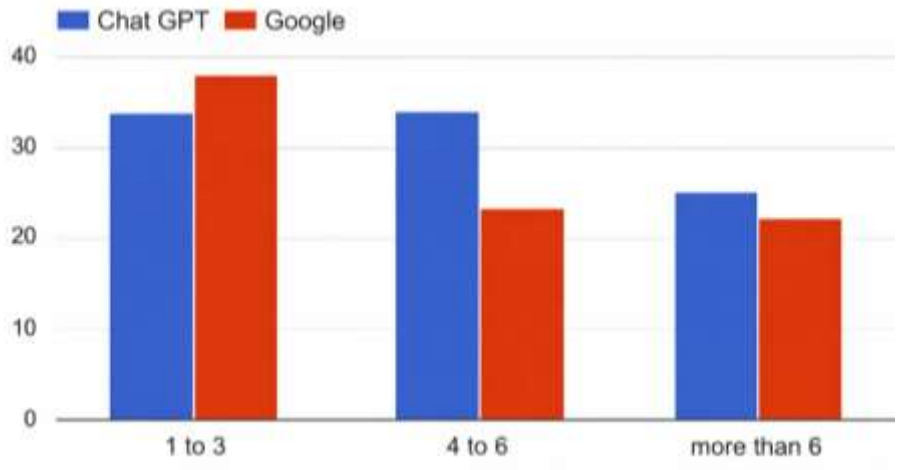

Figure 4. Number of References successfully downloaded for 5 minutes

The graph shows the difference in the number of references that students managed to download within five minutes using ChatGPT and Google. In the 1 to 3 referral category, Google became the most used source with the highest number, surpassing ChatGPT. However, in categories 4 to 6 references, ChatGPT performed better with a larger number of downloads than Google. This trend continues in categories of more than 6 references, where ChatGPT still generates a higher number of downloads than Google. This pattern indicates that Google is more often used for quick searches in small amounts, whereas ChatGPT is more effective when students need more references in a short period of time.

c. Effective Reading Habits

66.5% of college students often or very often use fast reading techniques (skimming, scanning, skipping).

Table 9. Frequency distribution of effective reading habit values

Criteria	***Value reading habits***	***Absolute frequency***	***Relative Frequency***
Very less	**1**		
Less	**2**	5	5.6
Enough	**3**	26	28.9
Good	**4**	40	44.4
Excellent	**5**	19	21.1
Quantity		90	100

d. Writing Literacy

The summary score distribution shows:

a) 31.1% did not write a summary at all
b) 53.3% write more than 5 sentences (good category)

The low proportion of students who write complete summaries is influenced by technical constraints such as the use of cellphones when filling out assignments.

Table 10. Frequency distribution of score habits of writing summaries

Habits of summarizing	Value	Absolute frequency	Relative Frequency
Never	1	0	0
Rare	2	2	2,2
Quite often	3	37	41,1
Frequent	4	36	40,0
Always	5	15	16,7
Quantity		90	100

Table 11. Frequency distribution of the score writing summary

Assessment criteria	Value	Absolute frequency	Relative Frequency
Not writing a summary	1	28	31.1
Write a summary of 1 – 2 sentences	2	6	6.7
Write a 3-sentence summary	3	1	1.1
Write a 4-sentence summary	4	7	7.8
Write a summary of ≥5 sentences	5	48	53.3
Quantity		90	100

The results of the writing literacy analysis showed that most students had a fairly good summarizing habit, with 41.1% in the *category quite often* and 40% in the *category of frequently*. However, when asked to write a summary as evidence, only 53.3% actually wrote a complete summary of ≥5 sentences, while 31.1% did not write a summary at all. The discrepancy between the habits admitted in the questionnaire and the evidence of this summary was explained through interviews, where respondents stated that they had difficulty typing the summary when filling out the questionnaire using a cellphone. These findings suggest that although the habit of summarizing is recognized to be quite high, technical limitations affect the evidence of summaries writing ability in real terms.

e. Writing Reflection

The majority of students often double-check the content of the summary and improve the writing before it is collected, but only 5.5% intend to use the references to write further scientific papers.

Table 12. The results of data analysis per question item are as follows:

Yes	**Questions**	**1**	**2**	**3**	**4**	**5**	**Average**
1	Add illustrations with relevant images or diagrams to the summary to make it interesting and easy to understand	2	13	28	40	7	3,4
2	Double-check the contents of the summary until you are sure that the content is correct and there are no misconceptions	0	2	20	46	22	4
3	Checking the sentence order is already using the standard language and there are no typographical errors	0	3	25	40	22	3,9
4	Plan to improve or add to the content of the writing until it is perfect and feel satisfied	0	3	26	39	22	3,9
5	Desire to use references to write papers, books or other scientific works	12	28	27	18	5	2,7

The results of the analysis of reading and writing reflection indicators showed that most students had quite good habits in reviewing their writing. The majority of respondents were in the *frequent category* for activities to add illustrations, check the suitability of the content of the summary, improve the arrangement of sentences, and plan to improve the writing, with an average score of 3.4–4. This shows that the process of revision and improvement of writing has become part of student literacy practices. However, the motivation to continue writing activities to a higher level is still low, as can be seen from only 5.5% of students who always intend to use the references found to write papers, books, or other scientific works. These findings indicate that although reflective skills are quite good, interest in writing scientific papers still needs to be grown.

The Influence of AI Use Behavior on Reading and Writing Literacy

The results of Pearson's correlation analysis showed that AI usage behavior had a significant but low influence on reading and writing literacy, with an rxy correlation value of 0.315 and an influence contribution of only 9.9%. This means that most of the variation in reading and writing literacy is influenced by factors outside of the use of AI. In addition, reading literacy is also not completely proportional to writing literacy, which is reflected in the low correlation (rxy 0.292). The actual use of AI is more determined by the intention to use AI (0.82), the perception of ease (0.75), the perception of benefits (0.69), and the attitude of confidence in the reliability of AI (0.55). These findings are in line with the descriptive analysis, where the indicator of attitudes towards the use of AI is the aspect with the lowest score, which is 59.69.

Pearson's correlation analysis shows:

a) **r = 0.315 (p < 0.01)**
b) Contribution (r^2) = **0.099** or **9.9%**

This means that AI usage behavior has **little effect** on literacy, and 90.1% of variations in literacy ability are influenced by other factors—most notably cognitive ability, reading habits, motivation, and self-discipline.

Reading and writing literacy were also low (r = 0.292), suggesting that reading comprehension was not always followed by the ability to rewrite information effectively.

DISCUSSION

Student Behavior in the Use of AI

The behavior of Culinary students in using AI shows a cautious and critical tendency. Although attitudes towards AI have the lowest average of other indicators, it reflects the importance of caution so that information from AI is always verified for truth. These findings are in line with various studies showing that although students rate AI as beneficial—as reported by Sami et al. (2025) and Chan & Hu (2023)—they still emphasize the need for re-checking due to potential inaccuracies. A similar thing was found by Bewersdorff et al. (2025), who identified the existence of *a group of cautious critics* who use AI selectively. Interviews with respondents also confirmed this pattern: AI is considered fast and helpful in data analysis, but manual searches through Google remain essential to ensure the

quality of references. In general, students view AI as an easy-to-use and useful tool, and has the potential to become the dominant technology in education. Various international studies and policy reports predict that AI will play a strategic role in improving personalization, efficiency, and access to education, while affirming the need for AI literacy and ethical policies in its implementation.

The results of the study show that students are cautious in using AI. They acknowledge the benefits of AI, but still verify the information. These findings are consistent with several studies:

a) Students have a positive attitude towards AI but still check the correctness of the information (Sami et al., 2025; Chan & Hu, 2023).
b) Some students belong to a group of *cautious critics* who are selective and do not fully trust AI (Bewersdorff et al., 2025).
c) Attitudes towards AI are influenced by ease of use and trust, but also concerns about the accuracy of information (Albayati, 2024).

The interviews support the findings: college students use AI for speed, but still rely on Google for verification.

The global literature also reinforces the position of AI as a tool that supports but is not a substitute for human competence (Wang et al., 2024; Ifenthaler et al., 2024; Monib et al., 2024).

Reading and Writing Literacy

The results of the reading and writing literacy analysis showed that Culinary students have a variety of learning styles that form three main types. **Type 1** has high reading literacy but low writing literacy; they quickly accumulate a lot of reading but lack depth of content, making it difficult to produce quality summaries. **Type 2** showed the opposite condition, namely that writing literacy was higher than reading literacy; although the number of references was small, students such as respondent 27 read deeply so that they were able to rewrite information well. **Type 3** has a balanced reading and writing ability, as shown by the number of references read and the ability to summarize accurately, such as respondents 49 and 45 who are able to produce analytical and reflective summaries. Overall, these findings show that the quality of literacy is not only determined by the quantity of reading, but also by the depth of understanding and the ability to process information into meaningful writing.

The results of the study revealed three types of literacy profiles:

1. **Reading literacy is high, writing is low** → collecting a lot of references but not delving into the content.
2. **Reading literacy is low, writing is high,** → reading is small but deep, so the writing results are good.
3. **Literacy is balanced** → has stable literacy practices.

An example of a student summary shows that students with critical reading skills are able to rewrite scientific ideas accurately, whether assisted by AI or not.

The Influence of the Use of AI on Literacy

The influence of AI use behavior on reading and writing literacy has been shown to be very small, suggesting that AI functions primarily as an aid, rather than a primary determinant of literacy ability. Reading and writing skills are more

strongly influenced by internal factors such as talent, cognitive ability, and discipline, as affirmed by Shi and Qu (2022) and Ritchie (2024) who mention that general intelligence is the strongest predictor of academic success. In the context of technology, AI only provides technical support without a major impact on academic achievement. Several studies, such as Bećirović et al. (2025) and Moşoi et al. (2025), also show that while AI can help improve self-efficacy and writing fluency, cognitive factors remain more dominant, and excessive use of AI can even potentially reduce students' originality and creativity.

The influence of AI is only 9.9%, so AI is not the dominant factor in increasing literacy. These findings are in line with:

a) Cognitive abilities are more influential than technology (Shi & Qu, 2022; Ritchie, 2024).
b) AI literacy increases self-efficacy but does not guarantee improved academic outcomes (Bećirović et al., 2025).
c) Cognitive reflection is a more consistent predictor than AI use (Moşoi et al., 2025).
d) The use of AI can speed up writing but lower originality (Budiyono et al., 2025).

Thus, AI is only a tool, while literacy ability remains highly dependent on students' talents, reading habits, cognitive activities, and personal commitment.

CONCLUSIONS AND RECOMMENDATIONS

The behavior of AI use of Culinary students was in the good category with an average score of 70.24, the highest in the perception of benefits of 77.96 and the lowest in the attitude towards AI 59.69. Reading and writing literacy was in the category of sufficient with an average score of 63.6 although 65.5% of students were able to access more than 8 references in 5 minutes, only 4–5% found high-quality references and 53.3% wrote a complete summary of ≥5 sentences. Correlation analysis showed that the influence of AI on reading literacy, writing was very low ($r = 0.315$; $r^2 = 0.099$), so that the use of AI only contributed 9.9%, while most literacy abilities were influenced by other factors such as reading habits and cognitive abilities.

FURTHER STUDY

Future research should involve a broader sample and diverse AI-based learning tools to examine the long-term effectiveness of Artificial Intelligence in enhancing students' reading and writing literacy across different academic disciplines.

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