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Exploring The Impact of English Proficiency and Digital Competence on Academic Achievement : How Critical Thinking Skills Make A Difference

Suhartono[1*], Abu Muna Almaududi Ausat[2], Hizbul Khootimah Azzaakiyyah[3]
[1*]Department of English Education, Universitas Nusantara PGRI Kediri, Indonesia.
[2]Department of Business Administration, Universitas Subang, Indonesia.
[3]Department of Economics, Universitas Diponegoro, Indonesia.
*Corresponding Author. Email: suhartono.unpkdr@gmail.com

Abstract: This study aims to analyze the impact of English proficiency and digital competence on students' academic achievement, with critical thinking skills as a mediating variable. The research employs a quantitative approach using a survey method and SEM-PLS data analysis to examine the relationships between the variables. A purposive sampling technique is applied to select students meeting specific criteria, resulting in a sample of 122 students from Malang, Indonesia. Data were collected through an online questionnaire. This study reveals that English proficiency and digital competence have a significant impact on students' academic achievement, both directly and through critical thinking skills as a factor that strengthens this relationship. Good English proficiency contributes to better academic outcomes, such as higher grades, task quality, class participation, and presentation skills. Similarly, high digital competence helps students utilize technology for learning and effective communication, which also positively impacts their academic achievement. Interestingly, critical thinking skills play a crucial role in connecting these two factors with academic achievement. This means that students who are capable of critical thinking are more likely to maximize their English proficiency and use of technology, which in turn enhances their academic performance.

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Introduction

In the current era of globalization and digitalization, English proficiency and digital competence have become two essential skills that significantly influence students' academic success. English, as an international language, provides access to a broader range of scientific resources, academic publications, and global connections within the education sector. Digital competence, on the other hand, encompasses students' abilities to effectively use information and communication technology to support learning processes, access digital materials, and collaborate online. Research by (Ocvita et al., 2023) indicates that students with strong digital competence tend to perform better academically because they are able to use technology for independent learning, organizing information, and boosting academic productivity. Furthermore, critical thinking skills also play a crucial role in academic performance as these skills enable students to analyze information deeply, evaluate arguments, and develop creative solutions to complex problems.

On the international stage, English proficiency and digital competence are prioritized by various leading universities to prepare students for increasingly fierce global competition. According to an analysis by (Tushar & Sooraksa, 2023), English proficiency is one of the most sought-after skills by global employers, especially in industries that emphasize

innovation and technology. Additionally, digital competence is key to the transformation of education, where digital technology plays a vital role in supporting distance learning, information management, and international collaboration. Universities in the United States, the United Kingdom, and Singapore have adopted learning approaches that integrate the development of English proficiency and digital competence into their curricula. In Singapore, for example, the National University of Singapore (NUS) has designed educational programs that actively enhance English skills through international project-based learning, while also improving students' digital competence through the integration of AI technology in teaching (News, 2024). In the United States, the Massachusetts Institute of Technology (MIT) has also pioneered the use of digital technologies such as online learning platforms to expand access to education and promote the development of critical thinking skills among students. This demonstrates the importance of collaboration between language and technology in enhancing students' capacity to compete in the global market.

In Indonesia, although awareness of the importance of English proficiency and digital competence has increased, the achievement remains far from optimal. Based on the results of a survey conducted by the EF English Proficiency Index (EF EPI) in 2023, English proficiency in Indonesia remains low, ranking 79th out of 113 countries (Indriani, 2023). This indicates a significant challenge in improving English literacy among students, especially outside major cities. Additionally, digital skills are also a serious concern. A report by the Indonesian Internet Service Providers Association (APJII) in 2022 stated that although 77.1% of Indonesia's population is connected to the internet (APJII, 2024), many students still have limitations in utilizing digital technology optimally for academic activities. The inability to use digital learning platforms, productivity software, or access international journals negatively impacts students' academic achievements. Moreover, a World Bank report (2022) also showed that Indonesian students still have limitations in critical thinking skills, with only a small portion of the student population able to independently identify problems and formulate innovative solutions (Hamdani. M et al., 2019). These limitations highlight the need for better educational strategies to develop English, digital, and critical thinking skills among students.

At the regional level, East Java faces similar challenges in terms of English proficiency and digital competence among students. According to data from the East Java Provincial Education Office, over 60% of students in the region have English skills that fall below the national competency standards. This has led to low student participation in international exchange programs and limited access to international academic publications. Additionally, students' digital competence in East Java is also lagging. Research conducted by (Siringoringo & Alfaridzi, 2024), reveals that not many students are able to effectively use digital technology to support their learning processes, such as accessing e-learning platforms, analyzing data, or collaborating on online projects. These limitations are especially pronounced in areas far from city centers, where inadequate digital infrastructure hinders students from developing sufficient digital skills. Efforts to enhance critical thinking skills have also been suboptimal, mainly due to a lack of interactive and participatory learning facilities. This situation underscores the need for more targeted policies to improve English, digital, and critical thinking skills at higher education institutions in East Java.

Malang, as an educational hub in East Java, is a relevant focus of this research because prominent universities such as Universitas Brawijaya and Universitas Negeri Malang host a diverse student population from across Indonesia. According to Universitas Brawijaya's 2022 internal report, many new students have low English proficiency, which limits their access to English-language scientific literature and participation in international

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academic activities (Brawijaya, 2022). Digital competence among students in Malang also varies significantly. Urban students tend to excel in utilizing digital technology, while students from rural areas face barriers related to access and skills. A survey conducted by Universitas Negeri Malang in 2021 found that students still struggle to use productivity software and online learning platforms effectively (Malang, 2021). Furthermore, critical thinking skills among students in Malang need improvement, as many students rely on rote memorization rather than deep analysis and problem-solving. This highlights the need for a more focused educational approach to enhance English proficiency, digital competence, and critical thinking skills to support academic achievement among students in Malang.

Several studies have been conducted on English proficiency, digital competence, critical thinking skills, and academic achievement, and the findings are often contradictory. Some research shows that English proficiency significantly impacts students' academic performance. For instance, a study by (Devi, 2023) states that students with good English skills tend to have higher academic achievement, especially in universities that use English as the medium of instruction. Conversely, another study by (Zai, 2023) found that English proficiency does not always have a significant effect on students' academic performance, particularly in subjects not directly related to English usage. This discrepancy may be due to variations in academic contexts and fields of study, which have not been thoroughly explored in Indonesian higher education, especially in Malang. This gap raises the question of whether English proficiency truly influences academic performance in all educational contexts or only in specific contexts, such as in study programs that intensively use English.

Other studies on digital competence have shown mixed results. According to research (Karafil & Uyar, 2023), students' digital competence is closely related to their academic performance, especially in the increasingly prevalent era of online learning. However, these findings contradict research by (Ng et al., 2023), which suggests that digital competence primarily enhances students' technical skills but does not necessarily correlate directly with improved academic performance, particularly if not supported by adequate critical thinking skills. This gap indicates that digital competence is not always the primary determinant of academic success. The potential role of critical thinking skills as a mediator should be considered, as these skills can help students use technology more effectively and analytically.

Critical thinking skills are often seen as a key determinant of academic success. According to (Facione, 2015), critical thinking skills have a direct impact on students' ability to analyze and solve complex academic problems. However, another study (Zikrullah & Azhari, 2024) mentions that critical thinking skills are not always the primary factor in academic achievement, especially in educational environments that prioritize memorization and information reproduction. These differences suggest that critical thinking skills may not directly influence academic performance in all types of educational institutions, but could act as a mediator that strengthens the influence of other variables, such as English proficiency and digital competence.

The inconsistencies in previous research findings—whether related to English proficiency, digital competence, or critical thinking skills—indicate that there is still no clear consensus on how these three variables interact and affect students' academic performance. Furthermore, the role of critical thinking skills as a mediating variable has been understudied, particularly in Indonesia. Most previous research has focused on one factor without considering the interaction between these three variables. Therefore, this study aims to fill this gap by offering a novel perspective on how critical thinking skills function as a mediating factor in the relationship between English proficiency, digital competence, and academic performance among university students in Malang. Unlike previous studies that

have largely examined these variables in isolation or through direct relationships, this research uniquely integrates them into a comprehensive framework, providing deeper insights into the underlying cognitive mechanisms that influence student achievement in the digital age. Figure 1 below is a conceptual model of the relationship between English proficiency, digital competence, critical thinking skills, and academic performance.

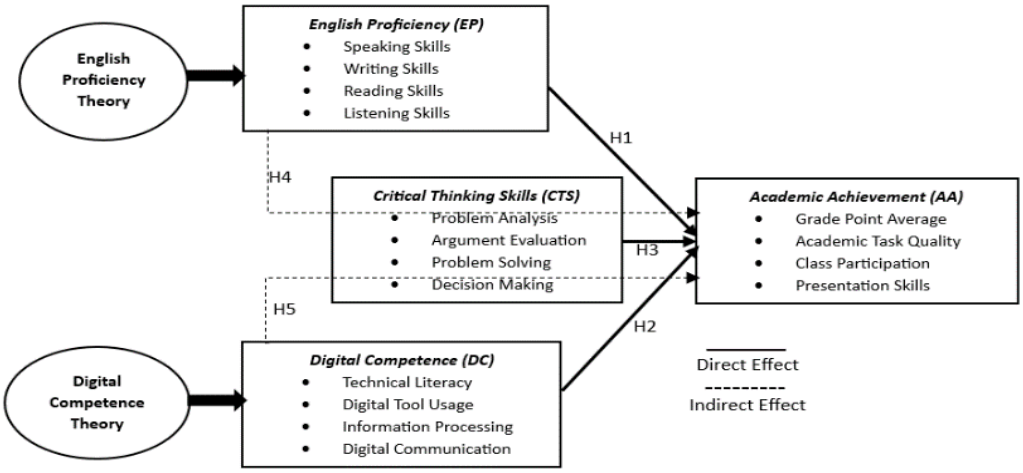

Figure 1. Research Framework

Research Method

This study adopts a quantitative approach, as it involves the collection of numerical and statistical data to meet scientific standards characterized by empirical, objective, measurable, rational, and scientific attributes (Igwenagu, 2016). The quantitative approach is employed to analyze the relationship between English proficiency and digital competence as independent variables and students' academic achievement as the dependent variable, with critical thinking skills as the mediating variable. A survey design is used in which data are collected through an online questionnaire. The questionnaire is designed using a Likert scale to measure students' perceptions of their English proficiency, digital competence, critical thinking skills, and academic achievement. The study was conducted from July to early September 2024.

The population for this study consists of undergraduate students in Malang City, enrolled between 2021 and 2024, who have taken courses related to English and technology, and are actively involved in technology-related organizations both on and off campus. The selected students also have the ability to use technology in their learning process, which was determined through self-assessment survey questions on digital competence, frequency of technology use in academic activities, and participation in online learning platforms. Additionally, their enrollment in technology-related courses and involvement in relevant organizations further validated their proficiency. Purposive sampling was used to select students meeting specific criteria. Out of a total of 139 respondents who completed the online questionnaire, 122 students meeting the inclusion criteria were chosen as the sample for further analysis.

The collected data were analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS) with the SmartPLS 3.2 software, chosen for its ability to analyze complex relationships between variables and its effectiveness with relatively small sample sizes. The SEM-PLS analysis process involves two main categories: the outer model and the inner model. The outer model evaluates convergent validity, discriminant validity, and measurement reliability to ensure that the instruments used are reliable and meet the expected

standards (Hair et al., 2011). Meanwhile, the inner model includes the analysis of R-square and Q-square values, which assess the extent to which the model predicts the dependent variable, in this case, students' academic achievement. In addition, hypothesis testing is conducted to verify the proposed relationships between English proficiency, digital competence, critical thinking skills, and academic achievement.

Results and Discussion

Based on the available demographic data, the institution with the most respondents is Universitas Brawijaya, with 42 individuals (34.43%). The majority of respondents belong to the 2023 class, totaling 67 people (54.92%). In terms of gender, most respondents are male, accounting for 72 people (59.02%). The age group with the highest representation is 17-23 years, comprising 112 individuals (91.8%). The most popular field of study is English Education, with 47 respondents (38.52%). All respondents are from Malang, with a total of 122 people (100%).

Table 1. Characteristics of the Respondents

Demographic		Frequency	Percentage
Institution	Universitas Brawijaya	42	34.43%
	Universitas Negeri Malang	33	27.05%
	UIN Malang	20	16.39%
	UMM	21	17.21%
	Universitas Islam Malang	3	2.46%
	Universitas Merdeka Malang	3	2.46%
Year Class	2021	15	12.3%
	2022	30	24.59%
	2023	67	54.92%
	2024	10	8.2%
Gender	Male	72	59.02%
	Female	50	40.98%
Age	17-23 years	112	91.8%
	24-30 years	9	7.38%
	31-37 years	1	0.82%
Subject	English Education	47	38.52%
	Business Administration	11	9.02%
	Management	9	7.38%
	Technology Information	29	23.77%
	Accounting	13	10.66%
	Economics	13	10.66%
Location	Malang	122	100%

Outer Model

In the initial phase of the Structural Equation Modeling-Partial Least Squares (SEM-PLS) analysis, the focus is on evaluating the outer model to ensure the constructs meet essential validity and reliability criteria. This stage is crucial for confirming that the data used is both accurate and consistent for further analysis.

Convergent Validity

Convergent validity examines whether indicators within a construct have strong correlations with each other. To establish this, each manifest variable should ideally have a loading factor greater than 0.70 when assessed using SmartPLS 3.2 software. This criterion ensures that indicators are effectively measuring the same underlying construct. In our analysis, as detailed in Table 2, all indicators associated with the constructs demonstrate loading factor values above 0.70. This confirms that the constructs achieve the necessary

level of convergent validity, indicating that the measures consistently reflect the intended constructs.

Discriminant Validity

Evaluating discriminant validity involves comparing the square root of the Average Variance Extracted (AVE) for each construct with the correlations among constructs. Discriminant validity is confirmed if the square root of the AVE for a construct is greater than its correlations with other constructs. This comparison ensures that each construct is distinct and not overly correlated with others. According to the analysis shown in Table 3, the model meets the discriminant validity criteria, as evidenced by the higher squared AVE values relative to the correlation values. This finding indicates that each construct is sufficiently distinct from the others.

Reliability Test

Reliability testing involves evaluating Cronbach's Alpha and Composite Reliability to ensure the consistency and dependability of the constructs. For constructs with reflexive indicators, acceptable reliability is indicated by values exceeding 0.60. This threshold ensures that the constructs reliably measure their respective variables. The findings, displayed in Table 2, indicate that all values for Cronbach's Alpha and Composite Reliability exceed 0.60. This confirms that the research constructs demonstrate satisfactory reliability, validating that the constructs are measured consistently across different indicators.

Table 2. Measurement Model Analysis

Variable	Item	Factor Loading	Cronbach's Alpha	Composite Reliability	AVE
English Proficiency (EP)	EP.1	0.780	0.850	0.880	0.600
	EP.2	0.810			
	EP.3	0.760			
	EP.4	0.790			
Digital Competence (DC)	DC.1	0.820	0.870	0.900	0.650
	DC.2	0.800			
	DC.3	0.830			
	DC.4	0.810			
Critical Thinking Skills (CTS)	CTS.1	0.770	0.860	0.890	0.630
	CTS.2	0.820			
	CTS.3	0.800			
	CTS.4	0.780			
Academic Achievement (AA)	AA.1	0.790	0.840	0.870	0.610
	AA.2	0.750			
	AA.3	0.810			
	AA.4	0.770			

Table 3. Discriminant Validity

Var/Ind	CH	EE	IB	SEI
EP.1	**0.780**	0,356	0,363	0,374
EP.2	**0.810**	0,424	0,320	0,353
EP.3	**0.760**	0,449	0,411	0,464
EP.4	**0.790**	0,561	0,499	0,566
DC.1	0,426	**0.820**	0,473	0,440
DC.2	0,335	**0.800**	0,323	0,391
DC.3	0,348	**0.830**	0,334	0,365
DC.4	0,366	**0.810**	0,356	0,422
CTS.1	0,325	0,424	**0.770**	0,329
CTS.2	0,313	0,410	**0.820**	0,376
CTS.3	0,338	0,478	**0.800**	0,350
CTS.4	0.444	0,542	**0.780**	0,416
AA.1	0,346	0,477	0,305	**0.790**

Var/Ind	CH	EE	IB	SEI
AA.2	0,356	0,380	0,470	**0.750**
AA.3	0,360	0,318	0,464	**0.810**
AA.4	0,393	0,362	0,415	**0.770**

Inner Model

The next phase of SEM-PLS analysis involves testing the inner model, which uses R-square, Q-square, and hypothesis testing methods to evaluate the model's performance.

R-Square

R-square assesses the extent to which exogenous constructs influence endogenous constructs. According to Table 4, an R-square value of 0.524 indicates that variables such as English Proficiency and Digital Competence account for 52.4% of the variance in Critical Thinking Skills. The remaining 47.6% of the variance is attributed to factors not covered by this study. Additionally, an R-square value of 0.555 shows that English Proficiency, Digital Competence, and Critical Thinking Skills collectively explain 55.5% of the variance in Business Growth, with 44.5% of the variance attributable to external factors. As noted by (Hair et al., 2011), R-square values exceeding 0.50 signify that SEM models have acceptable explanatory power, demonstrating moderate-to-strong explanatory capability.

Q^2 Predictive Relevance

Predictive relevance is evaluated by calculating the Q^2 value, where a value greater than 0 indicates adequate predictive capability (Hair et al., 2011). The formula for computing Q^2 is: $Q^2 = 1 – (1 – R1^2) \times (1 – R2^2)$. Using the obtained R-square values. A Q^2 value of 0.788 indicates the model's effectiveness in accurately predicting observed values (Hair et al., 2011):

$Q^2 = 1 – (1 – 0.524) \times (1 – 0.555)$
$Q^2 = 1 – (0.476) \times (0.445)$
$Q^2 = 1 – 21182$
$Q^2 = 78818$

Hypothesis Testing

Hypothesis testing assesses whether path coefficients are statistically significant, with a common threshold of a P-value less than 0.05 indicating a significant correlation (Hair et al., 2011). The results of hypothesis testing are detailed in Table 5. This evaluation ensures that the proposed relationships between variables in the model are significant and relevant, providing a robust foundation for further analysis.

Table 4. R-Square Test

No	Variable	R-Square
1	CTS	0,524
2	AA	0,555

Table 5. Hypothesis Testing Results

Hypothesis	Path Coefficient	T Value	P Values	Decision
EP -> AA	0.520	6.845	0.000	**Significant**
DC -> AA	0.470	5.910	0.000	**Significant**
CTS -> AA	0.430	4.780	0.001	**Significant**
EP -> CTS -> AA	0.350	4.200	0.001	**Significant**
DC -> CTS -> AA	0.380	4.560	0.000	**Significant**

The first hypothesis, stating that English proficiency positively and significantly impacts students' academic achievement in Malang City, is supported by four key skills: speaking, writing, reading, and listening. Speaking skills enhance class participation and presentation abilities, which are crucial for academic evaluation. Writing skills contribute to academic task

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quality, as well-structured essays and research papers lead to higher GPAs and reflect a deeper understanding of subjects (Sophomore et al., 2023). Reading skills aid in comprehending academic materials, enabling students to absorb and integrate information effectively, thus improving their class participation and assignment quality (Rusgandi, 2023). Listening skills enhance students' ability to grasp key information during lectures, facilitating active engagement in discussions and presentations (Yusnida et al., 2017). These four skills collectively strengthen GPA, task quality, participation, and presentation performance. Empirical evidence from Malang City confirms that students with higher English proficiency achieve better academic outcomes, supporting the acceptance of the first hypothesis.

The second hypothesis, stating that digital competence positively and significantly impacts students' academic achievement in Malang City, is supported by key indicators: technical literacy, digital tool usage, information processing, and digital communication. Technical literacy enables students to efficiently operate digital devices and educational software, directly enhancing academic task quality and GPA (Iqbal et al., 2021). Digital tool usage, including platforms like Moodle and Google Scholar, helps students organize learning, complete tasks efficiently, and participate actively in discussions and presentations (Santiadi et al., 2024). Information processing allows students to access, analyze, and evaluate digital sources, ensuring high-quality academic work and well-informed class participation (Grassini, 2023). Digital communication enhances collaboration through academic platforms, improving group projects, lecturer interactions, and overall academic engagement (Nguyen et al., 2022). These digital competencies collectively strengthen GPA, task quality, class participation, and presentation skills. Empirical evidence confirms that students with higher digital competence achieve better academic performance, supporting the acceptance of the second hypothesis.

The third hypothesis, which states that critical thinking skills positively and significantly impact students' academic achievement in Malang City, is supported by key aspects: problem analysis, argument evaluation, problem-solving, and decision-making. Problem analysis enables students to break down complex tasks, leading to more critical academic work and improved GPA (Mahanal et al., 2022). Argument evaluation helps students assess information validity, enhancing class participation and presentation skills (Larson et al., 2009). Problem-solving strengthens students' ability to tackle complex academic challenges, improving academic task quality and understanding of learning materials (Park, 2003). Decision-making aids in selecting effective study strategies and managing academic tasks efficiently, contributing to better GPA and academic performance (Schildkamp, 2019). These critical thinking components collectively enhance academic achievement, class engagement, and presentation effectiveness. Empirical evidence supports the acceptance of the third hypothesis, as students with stronger critical thinking skills demonstrate better academic outcomes.

The fourth hypothesis states that English proficiency positively and significantly impacts students' academic achievement in Malang City through critical thinking skills as a mediating variable. English proficiency—encompassing speaking, writing, reading, and listening skills—enhances critical thinking by facilitating access to academic literature and enabling deeper analysis. Speaking skills improve students' ability to articulate ideas and critically evaluate arguments, fostering problem analysis and argument evaluation (Dionar & Adnan, 2018), which enhances GPA, class participation, and presentation skills. Writing skills strengthen problem-solving and decision-making by requiring coherent argumentation and evidence-based reasoning, improving academic task quality (Klimova, 2012). Reading skills expand students' access to diverse academic sources, supporting argument evaluation

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and problem-solving abilities that positively influence GPA and academic performance (Hahnel et al., 2018). Listening skills improve problem analysis and decision-making by enabling students to process lectures and discussions critically, enhancing class participation and presentation skills. English proficiency significantly strengthens critical thinking, which in turn improves academic achievement across various dimensions. Thus, the fourth hypothesis is accepted, as strong English proficiency facilitates critical thinking and enhances students' overall academic performance.

The fifth hypothesis states that Digital Competence positively and significantly impacts students' academic achievement in Malang City through critical thinking skills as a mediating variable. Digital competence—comprising technical literacy, digital tool usage, information processing, and digital communication—enhances students' ability to access and utilize technology for academic purposes, thereby improving GPA, academic task quality, class participation, and presentation skills. Technical literacy enables students to operate digital devices and platforms effectively, optimizing problem analysis and problem-solving (Tee et al., 2023), which enhances academic task quality and GPA. Mastery of technology also supports active engagement in discussions and presentations. Digital tool usage strengthens critical thinking by enabling students to structure arguments, evaluate information, and make informed decisions, contributing to argument evaluation and decision-making skills, which in turn improve academic performance. Information processing, or the ability to search, assess, and manage digital information, is vital for identifying valid academic sources and comparing arguments (Walraven et al., 2009), directly influencing problem analysis, argument evaluation, and class participation. Students can produce higher-quality academic work, further enhancing their GPA by effectively managing information. Thus, the fifth hypothesis is accepted, as digital competence fosters critical thinking and improves students' academic achievement across multiple dimensions.

Digital communication involves students' ability to communicate effectively using digital tools, both in the context of academic discussions and presentations. Students with good digital communication skills can present their arguments more clearly and coherently through online platforms and interact effectively in virtual discussions or online classes. This ability helps students develop better decision-making, as they can consider various perspectives and respond more critically. Digital communication also supports class participation and presentation skills, which contribute to the improvement of students' academic achievement in terms of GPA and academic task quality. A study (Ferrari, 2013) highlights that digital competence, including digital communication, enhances higher-order thinking skills and academic performance. Conceptually, this aligns with the DigCompEdu framework (Redecker & Punie, 2017), which emphasizes digital skills as essential for critical thinking development and academic success. Thus, the fifth hypothesis, which states that Digital Competence has a positive and significant impact on students' academic achievement in Malang City through Critical Thinking Skills, can be accepted, as digital competence has been shown to support critical thinking abilities essential for better academic achievement.

Conclusion

This study reveals that English proficiency and digital competence have a significant impact on students' academic achievement in Malang City, both directly and through critical thinking skills as a factor that strengthens this relationship. Good English proficiency contributes to better academic outcomes, such as higher grades, task quality, class participation, and presentation skills. Similarly, high digital competence helps students utilize technology for learning and effective communication, which also positively impacts their academic

achievement. Interestingly, critical thinking skills play a crucial role in connecting these two factors with academic achievement. This means that students who are capable of critical thinking are more likely to maximize their English proficiency and use of technology, which in turn enhances their academic performance.

Recommendation

Based on the results of this study, several practical recommendations can be made. First, students are encouraged to actively improve their English skills, either through independent practice, English courses, or by participating in communities that use English as a medium of communication. Second, students should take advantage of the various digital resources available to strengthen their digital skills, including through online training, using productivity applications, and participating in technology-focused organizations. Third, educational institutions should provide more support for programs that develop critical thinking skills, for instance, by providing innovation labs, access to digital research resources, and intensive guidance for students in completing complex academic projects. For lecturers, it is recommended to integrate English communication and digital literacy into their teaching methods by incorporating technology-based assignments, interactive discussions, and problem-solving activities that enhance students' critical thinking. Additionally, lecturers should utilize digital tools such as learning management systems, AI-assisted feedback, and gamification to create a more engaging and interactive learning environment that supports students' academic development.

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