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Student Awareness of Information Ethics in the Use of Artificial Intelligence for Academic Writing Based on the PAPA Framework

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ABSTRACT
The rapid development of Artificial Intelligence (AI) has provided new opportunities for students in academic activities and scientific writing while raising ethical concerns related to privacy, information accuracy, ownership, and accessibility. This study aimed to describe students' self-reported awareness and perceptions of Information Ethics in using AI for scientific writing based on Mason's Privacy, Accuracy, Property, and Accessibility (PAPA) framework. This study employed a quantitative descriptive approach. Data were collected through a closed-ended questionnaire from 100 Universitas Sumatera Utara students selected using purposive sampling. The instrument consisted of 18 Information Ethics items based on the PAPA dimensions and 14 supporting items related to scientific writing, covering aspects of the Theory of Planned Behavior and Information Literacy. Data were analyzed using descriptive statistics, Corrected Item-Total Correlation, and Cronbach's Alpha. The results showed that the overall mean score of Information Ethics was 3.9689, indicating a high category. Privacy obtained the highest mean score (4.0400), followed by Accuracy (3.9760), Property (3.9500), and Accessibility (3.8900). The supporting constructs also showed relatively high descriptive results. These findings reflect respondents' self-reported awareness and perceptions rather than direct evidence of actual ethical behavior. The findings provide contextual input for strengthening information literacy and responsible AI-use guidelines in higher education.
KEYWORDS: Information ethics; Artificial intelligence; Scientific writing; PAPA framework

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1. INTRODUCTION

The rapid development of Artificial Intelligence (AI), particularly Generative Artificial Intelligence (GenAI), has significantly influenced higher education and academic activities. AI-based tools are increasingly used by students to search for information, generate ideas, summarize academic materials, assist with writing, and support various stages of academic work. The widespread availability of these technologies has created new opportunities for improving learning and academic productivity [1], [2], [3]. However, the increasing use of AI has also raised important concerns regarding the ethical use of information, particularly in relation to privacy, information accuracy, intellectual property, academic integrity, and access to information [4], [5].

The use of AI in academic contexts presents ethical challenges because AI-generated outputs may contain inaccurate, incomplete, biased, or unsupported information. Kasneci et al. [2] emphasized that large language models offer significant opportunities for education but also present challenges related to reliability, bias, privacy, and the responsible use of generated information. Similarly, research on AI-assisted scientific and academic writing has highlighted concerns regarding the reliability of AI-generated content, scientific responsibility, and academic integrity [6], [7]. These concerns are particularly relevant in academic writing, where students are expected to evaluate information critically and remain responsible for the accuracy and appropriate use of information incorporated into their work [8], [9]

In addition to information accuracy, privacy has become an increasingly important issue in the use of AI. Students may provide personal, academic, or other sensitive information when interacting with AI systems without fully considering how such information may be processed or stored [2], [5]. Ethical concerns also extend to information ownership and intellectual property. The use of AI-assisted writing has generated discussions regarding authorship, originality, copyright, source attribution, and the boundaries between acceptable assistance and academic misconduct [10], [11], [12]. Recent studies have therefore emphasized the need for clearer institutional guidance and ethical principles governing the use of generative AI in higher education [1].

These ethical issues can be examined through the framework of Information Ethics. One of the foundational approaches in this area is Mason's Privacy, Accuracy, Property, and Accessibility (PAPA) framework [13]. Privacy concerns the protection and control of personal information; Accuracy concerns the reliability and correctness of information; Property addresses ownership, intellectual property, and rights related to information; and Accessibility concerns rights, limitations, and appropriate access to information. The PAPA framework provides a relevant perspective for examining ethical concerns associated with AI because the use of AI involves the collection, processing, generation, and utilization of information. Young et al. [14] subsequently extended Mason's framework to address ethical issues associated with contemporary data environments, demonstrating its continued relevance in the context of technological development.

Recent studies have increasingly examined university students' ethical awareness and perceptions regarding generative AI. Acosta-Enriquez et al. [15] examined students' knowledge, attitudes, and perceived ethics regarding the use of ChatGPT and highlighted the importance of ethical considerations in higher education. Similarly, Zhu et al. [16] investigated the roles of ethical awareness, perceived ethical risks, and ethical anxiety in university students' use of generative AI products. Yang et al. [17] further examined undergraduate students' perspectives regarding generative AI ethics. Together, these studies demonstrate that students' engagement with AI involves not only technological adoption but also awareness and perceptions regarding the ethical implications of its use. Recent work on AI ethics literacy has also emphasized the importance of developing students' understanding of ethical issues associated with AI [18].

Research has also explored the implications of generative AI for academic writing. Kim et al. [19] examined students' perspectives on generative AI-assisted academic writing, while Lund et al. [12] discussed students' perceptions of AI-assisted writing and its relationship with academic integrity and ethical concerns. Recent research has also examined patterns of interaction between students and generative AI in academic writing [19]. In addition, Farinosi and Melchior [6] highlighted students' perceptions of both the potential benefits and concerns associated with generative AI in higher education. These findings indicate that examining AI use in academic writing requires attention not only to the adoption of technology but also to students' understanding of ethical issues related to the information they receive and use.

The ethical use of AI may also be understood in relation to students' behavioral and informational capacities. The Theory of Planned Behavior (TPB) provides a perspective for understanding attitudes, subjective norms, and perceived behavioral control associated with behavioral tendencies [20]. Recent research has demonstrated the relevance of behavioral factors and technology-acceptance perspectives in understanding students' intentions to use AI technology [3]. Huang et al. [11] further explored a moral extension of the Theory of Planned Behavior in the context of academic cheating involving generative AI. In addition, Information Literacy remains important in AI-assisted academic work because students need to identify information needs, search for relevant information, evaluate the reliability of AI-generated outputs, and use information appropriately. Recent studies have highlighted the implications of generative AI for information literacy [8], while research on generative AI literacy has emphasized the importance of critical evaluation and responsible interaction with AI-generated information [9].

Despite the growing body of research on generative AI in higher education, several gaps remain. Previous studies have examined AI ethics, perceived ethical risks, academic integrity, AI-assisted writing, AI literacy, and institutional governance [15]. However, many of these studies focus on specific ethical concerns or individual aspects of students' perceptions. Privacy, information accuracy, ownership, academic integrity, and access are frequently discussed as separate concerns. There remains limited empirical research that examines these information-related ethical issues simultaneously through the four integrated dimensions of Privacy, Accuracy, Property, and Accessibility within the specific context of students' use of AI for academic writing.

This study addresses this gap by applying Mason's PAPA framework as an integrated analytical perspective for describing students' self-reported awareness and perceptions of Information Ethics in the use of AI for academic writing [13], [14]. Rather than examining privacy, accuracy, property, or accessibility separately, the study considers all four dimensions as interconnected components of Information Ethics. In addition, constructs derived from the Theory of Planned Behavior and Information Literacy are included as supporting descriptive perspectives to provide additional context regarding students' attitudes, subjective norms, perceived behavioral control, and information-related capabilities [8], [20]. The study does not test causal relationships among these constructs; therefore, the supporting constructs are interpreted as complementary descriptive information.

Accordingly, the novelty of this study lies in the integrated application of the PAPA framework to examine students' self-reported awareness and perceptions of Information Ethics in AI use for academic writing while incorporating TPB and Information Literacy as supporting descriptive constructs. This approach provides a broader information-ethics perspective by bringing together ethical awareness, behavioral context, and information-related capabilities within a single descriptive study. The findings are expected to contribute to the growing discussion on responsible AI use in higher education and provide insights for universities in developing educational initiatives, guidelines, and policies related to privacy protection, information verification, intellectual property, academic integrity, and responsible access to AI-supported information.

Based on this background, the study aims to describe students' self-reported awareness and perceptions of Information Ethics in the use of Artificial Intelligence for academic writing based on the Privacy, Accuracy, Property, and Accessibility (PAPA) framework. The study also describes supporting constructs derived from the Theory of

Planned Behavior and Information Literacy to provide additional context for understanding students' attitudes and information-related capacities associated with the use of AI in academic activities.

2. METHODOLOGY

2.1. Research Design / Proposed Method

This study employed a quantitative descriptive approach to describe the level of students' information ethics in the use of Artificial Intelligence (AI) for academic writing. The study did not directly measure ethical behavior; rather, it described self-reported awareness and perceptions obtained through a questionnaire.

Information ethics was examined using the Privacy, Accuracy, Property, and Accessibility (PAPA) framework proposed by Mason. The four dimensions were used to describe respondents' awareness regarding the protection of personal information, the accuracy and verification of information, information ownership, and the rights and limitations associated with information access when using AI.

2.2 Population and Sample

The study was conducted at Universitas Sumatera Utara (USU), Medan, North Sumatra, Indonesia, in 2026. The study population consisted of 42,687 active USU students, based on data published on the official Universitas Sumatera Utara website (www.usu.ac.id). However, the target population was limited to students who had experience using AI for academic activities or academic writing.

A total of 100 respondents participated in this study. Respondents were selected using purposive sampling because the study required participants who met specific characteristics relevant to the research objectives, particularly active students who had prior experience using AI for academic activities or academic writing. The use of purposive sampling was considered appropriate because the study focused on obtaining descriptive information from respondents with direct experience of the phenomenon being examined rather than statistically generalizing the findings to the entire population of USU students.

The sample size of 100 respondents was considered sufficient for the descriptive purpose of the present study and for conducting item validity and internal consistency analyses of the questionnaire. The study did not aim to perform complex multivariate modeling or population parameter estimation. Instead, the primary objective was to describe respondents' self-reported awareness and perceptions of Information Ethics based on the PAPA framework. Previous methodological literature also emphasizes that the adequacy of sample size should be considered in relation to the purpose of the study and the type of instrument evaluation being conducted.

The respondents were drawn from the Industrial Engineering, Nursing, Computer Science, and Forestry study programs. Therefore, the findings are not intended to be statistically generalized to all USU students but rather to describe the self-reported awareness and perceptions of the participating respondents.

The inclusion criteria comprised active USU students from the four selected study programs, students who had experience using AI for academic activities or academic writing, students who voluntarily agreed to participate, and respondents who completed the questionnaire in full. Conversely, respondents who were not active USU students, had no experience using AI for academic activities, declined to participate, or did not complete the questionnaire were excluded from the analysis.

2.2. Research Instrument

The research instrument consisted of a structured closed-ended questionnaire developed based on the theoretical framework and adapted to the context of Artificial Intelligence (AI) use in academic activities and academic writing. The questionnaire comprised 32 statement items, consisting of 18 items measuring Information Ethics as the main construct and 14 items measuring supporting constructs.

Information Ethics was measured using Mason's Privacy, Accuracy, Property, and Accessibility (PAPA) framework. The 18 items were distributed across four dimensions: Privacy (5 items), Accuracy (5 items), Property (4 items), and Accessibility (4 items). The Privacy dimension addressed the protection of personal data; Accuracy concerned the verification of information accuracy and reliability; Property addressed information ownership, copyright, and attribution; while Accessibility concerned the rights and limitations associated with access to information.

In addition to Information Ethics, the study included supporting constructs relevant to academic writing derived from the Theory of Planned Behavior (TPB) and Information Literacy. The TPB construct consisted of three dimensions: Attitude, Subjective Norm, and Perceived Behavioral Control, with two items for each dimension. Meanwhile, the Information Literacy construct comprised four aspects: identification of information needs, information searching, information evaluation, and information utilization, with two items for each aspect. Thus, the supporting constructs comprised a total of 14 statement items.

The TPB and Information Literacy constructs were analyzed separately as supporting information and were not combined with the Information Ethics score or any of the PAPA dimensions. In this study, TPB and Information Literacy were not conceptualized as dimensions of Information Ethics and were therefore excluded from the PAPA score. Instead, these two frameworks were employed as supporting constructs to provide additional context for understanding respondents' behavioral tendencies and capabilities related to responsible AI use and information management.

This positioning is consistent with the conceptual framework of the study, in which PAPA serves as the primary framework for assessing Information Ethics, while TPB and Information Literacy function as supporting frameworks. Accordingly, the analysis of TPB and Information Literacy provides complementary descriptive information without altering the conceptual structure or measurement of Information Ethics based on the PAPA framework.

Table 1. Variable Operationalization

Variable	Operational Definition	Indicators	Scale
Information Ethics	Students' self-reported awareness and perceptions regarding Information Ethics in the use of Artificial Intelligence (AI) for academic activities and academic writing.	Privacy: protection of personal data and sensitive information, as well as caution when entering information into AI systems. Accuracy: verification, checking, and responsibility for the accuracy of information generated by AI. Property: respect for copyright, information ownership, and proper source attribution. Accessibility: use of information in accordance with access rights and respect for information access restrictions.	Likert 1–5
Constructs Supporting The Writing of Scholarly Works	Students' activities in preparing scientific writing using AI in a directed manner, including behavioral and information-management aspects.	Attitude: attitudes toward the responsible use of AI in scientific writing. Subjective Norm: encouragement and expectations from the academic environment regarding ethical AI use. Perceived Behavioral Control: ability to control AI use in accordance with academic objectives and regulations. Information needs identification. Information searching. Information evaluation. Information utilization in scientific writing.	Likert 1–5

Source: Mason [13]; Ajzen [20]; Association of College and Research Libraries (ACRL).

All questionnaire items were measured using a five-point Likert scale, with 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. Higher scores indicated a higher level of agreement with the statements presented. The instrument measured respondents' self-reported awareness and perceptions, rather than their actual ethical behavior.

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) through descriptive statistical analysis, including frequencies, percentages, means, and standard deviations. The primary analysis focused on the 18 Information Ethics items based on the four PAPA dimensions. Mean scores were calculated both overall and for each dimension to describe the respondents' level of Information Ethics and to identify the dimensions with the highest and lowest scores. Meanwhile, the TPB and Information Literacy constructs were analyzed descriptively as supporting information regarding respondents' attitudes, subjective norms, perceived behavioral control, and information management capabilities.

Table 2. Interpretation of Mean Scores

Mean Interval	Category
1.00–1.80	Very Low
1.81–2.60	Low
2.61–3.40	Moderate
3.41–4.20	High
4.21–5.00	Very High

Source: Developed by the researchers based on a 1–5 Likert scale.

2.3 Validity and Reliability Testing

Validity testing was conducted to determine the extent to which each questionnaire item adequately measured the intended construct. Item validity was assessed using the Corrected Item–Total Correlation with the assistance of SPSS version 26. An item was considered to meet the validity criterion when its Corrected Item–Total Correlation value was ≥ 0.30.

Reliability testing was conducted to assess the internal consistency of the research instrument using Cronbach's Alpha, also with the assistance of SPSS version 26. In general, a Cronbach's Alpha value of ≥ 0.70 indicates

acceptable internal consistency. However, values slightly below 0.70 should be interpreted cautiously, particularly for constructs containing a limited number of items.

2.4 Pilot Testing and Instrument Evaluation

Prior to the main data collection, a pilot test was conducted involving 30 students who had experience using Artificial Intelligence (AI) for academic activities or academic writing. The purpose of the pilot test was to evaluate the preliminary validity and internal consistency of the questionnaire before its use in the main study.

The questionnaire consisted of 32 items, including 18 items measuring Information Ethics based on Mason's Privacy, Accuracy, Property, and Accessibility (PAPA) framework and 14 items measuring supporting constructs related to academic writing, derived from the Theory of Planned Behavior (TPB) and Information Literacy frameworks.

Item validity was assessed using Corrected Item–Total Correlation, with a minimum acceptable criterion of ≥ 0.30. The pilot-test results showed that all 18 Information Ethics items met the validity criterion, with Corrected Item–Total Correlation values ranging from 0.585 to 0.866. Similarly, all 14 supporting-construct items met the validity criterion, with values ranging from 0.624 to 0.909. Therefore, all 32 questionnaire items were considered valid.

Internal consistency was assessed using Cronbach's Alpha. The 18-item Information Ethics instrument yielded a Cronbach's Alpha value of 0.959, while the 14 supporting-construct items yielded a Cronbach's Alpha value of 0.954, indicating excellent internal consistency for both groups of items.

Since all questionnaire items met the predetermined validity criterion and demonstrated excellent internal consistency, no items were removed or revised following the pilot test. Consequently, all 32 items were retained in their original form and subsequently administered to the main study sample of 100 respondents. The pilot-test participants were not included in the main study sample.

3. RESULTS AND DISCUSSION

3.1 Respondent Characteristics

The respondents in this study were characterized based on gender, year of enrollment, frequency of Artificial Intelligence (AI) use, the AI application most frequently used, and study program. Of the 100 respondents, 62 (62%) were female and 38 (38%) were male. Based on the year of enrollment, the majority of respondents were from the 2023 cohort (54%), followed by the 2025 cohort (39%), the 2022 cohort (6%), and the 2024 cohort (1%).

Regarding the frequency of AI use, most respondents reported using AI on a daily basis (81%). In addition, 17 respondents (17%) used AI three to five times per week, while only 2 respondents (2%) reported using AI one to two times per week. These findings indicate that AI has become an integral part of the academic activities of most respondents.

Based on the AI application used most frequently, Claude was the most widely used platform, reported by 49 respondents (49%), followed by ChatGPT (36%), Gemini (11%), and Microsoft Copilot (4%). Regarding academic discipline, the respondents consisted of students from Industrial Engineering (39%), Nursing (27%), Computer Science (21%), and Forestry (13%).

3.2 Validity Test Results

The validity test was conducted using the Corrected Item–Total Correlation, with a minimum acceptable value of 0.30. The results showed that all questionnaire items met the validity criterion. For the 18 Information Ethics items, the Corrected Item–Total Correlation values ranged from 0.558 to 0.750. Likewise, the 14 supporting-construct items also exceeded the minimum criterion, with values ranging from 0.517 to 0.720. Therefore, all 32 questionnaire items were considered valid and suitable for subsequent data analysis.

3.3 Reliability Test Results

Reliability testing was conducted using Cronbach's Alpha to assess the internal consistency of the research instrument. The main Information Ethics construct, consisting of 18 items, yielded a Cronbach's Alpha value of 0.947, indicating excellent internal consistency. For the four PAPA dimensions, the respective reliability coefficients were Privacy = 0.869, Accuracy = 0.831, Property = 0.735, and Accessibility = 0.787.

Meanwhile, the supporting constructs yielded Cronbach's Alpha values of 0.673 for Attitude, 0.767 for Subjective Norm, 0.788 for Perceived Behavioral Control, and 0.885 for Information Literacy. Overall, the Information Ethics instrument and most of the supporting constructs demonstrated acceptable internal consistency.

However, the Attitude construct yielded a Cronbach's Alpha value of 0.673, which is slightly below the commonly used threshold of 0.70. This value should be interpreted with caution because the construct consists of only two items, and a limited number of items may affect the magnitude of Cronbach's Alpha. Furthermore, Attitude was included only as a supporting construct and was not the primary focus of the analysis. Therefore, it was retained to provide additional descriptive information, while its relatively lower reliability should be taken into consideration when interpreting the findings.

3.4 Overall Level of Information Ethics and Supporting Constructs for Academic Writing

Based on the descriptive analysis of the 18 Information Ethics items, the overall mean score was 3.9689, with a standard deviation of 0.74445, based on responses from 100 participants. The mean score falls within the 3.41–4.20 interval, indicating that the respondents' level of Information Ethics in using Artificial Intelligence (AI) for academic writing was categorized as high.

Table 3. Overall Level of Information Ethics

Construct	N	Mean	Std. Deviation	Category
Information Ethics	100	3.9689	0.74445	High

Source: Data processed using SPSS version 26, 2026.

The minimum score of 1.56 and the maximum score of 4.78 indicate variation in the respondents' levels of Information Ethics awareness and perceptions. These findings reflect the self-reported awareness and perceptions of the respondents and therefore do not directly indicate their actual ethical behavior in using AI.

Descriptive analysis of the supporting constructs related to academic writing showed that all constructs were categorized as high. Within the Theory of Planned Behavior (TPB), Subjective Norm had the highest mean score (M = 4.1050; SD = 0.8790), followed by Perceived Behavioral Control (M = 4.0100; SD = 0.9128) and Attitude (M = 3.9550; SD = 0.9413).

For the Information Literacy construct, Information Evaluation had the highest mean score (M = 4.0000; SD = 0.8848), followed by Information Searching (M = 3.9650; SD = 0.9684), Information Needs Identification (M = 3.9600; SD = 0.8160), and Information Utilization (M = 3.9250; SD = 0.9167).

Table 4. Overall Level of Constructs Supporting The Writing of Scholarly Works

Constructs Supporting The Writing Of Scholarly Works	N	Minimum	Maximum	Mean	Std. Deviation
Attitude	100	1,00	5,00	3,9550	0,9413
Subjective Norm	100	1,00	5,00	4,1050	0,8790
Perceived Behavioral Control	100	1,00	5,00	4,0100	0,9128
Information Needs Identification	100	1,00	5,00	3,9600	0,8160
Information Searching	100	1,00	5,00	3,9650	0,9684
Information Evaluation	100	1,00	5,00	4,0000	0,8848
Information Utilization	100	1,00	5,00	3,9250	0,9167

Source: Data processed using SPSS version 26, 2026.

These findings provide additional context for the main results concerning Information Ethics. However, the TPB and Information Literacy constructs were analyzed separately and were not combined with the Information Ethics score based on the PAPA framework. These findings also reflect self-reported assessments by the respondents rather than direct measurements of their actual behavior.

3.5 Level of Privacy

Based on the descriptive analysis of the Privacy dimension, the mean score was 4.0400, with a standard deviation of 0.80904, based on responses from 100 participants. The score falls within the 3.41–4.20 interval, indicating that the Privacy dimension was categorized as high. This finding suggests that respondents reported a high level of awareness regarding the importance of protecting personal information when using Artificial Intelligence (AI) for academic activities.

At the item level, P1 obtained the highest mean score of 4.2000, reflecting respondents' awareness of the importance of protecting personal data when using AI for academic activities. P2, P3, and P4 each obtained a mean score of 4.0100, indicating relatively similar levels of awareness regarding the need to exercise caution when entering personal information, consider security risks before providing sensitive information, and limit the personal information provided to AI to what is necessary. Meanwhile, P5 obtained the lowest mean score of 3.9700, although it remained within the high category. This item concerned respondents' consideration of the information they intended to enter into AI before providing it.

Overall, these findings indicate that respondents reported a high level of awareness regarding privacy protection. However, these results represent self-reported awareness and perceptions obtained through the questionnaire and therefore do not directly demonstrate that privacy protection practices are consistently implemented in respondents' actual use of AI.

3.6 Level of Accuracy

Based on the descriptive analysis of the Accuracy dimension, the mean score was 3.9760, with a standard deviation of 0.77709, based on responses from 100 participants. The score falls within the 3.41–4.20 interval, indicating that the Accuracy dimension was categorized as high. This finding suggests that respondents reported a high level of awareness regarding the importance of checking and verifying AI-generated information before using it in academic writing.

At the item level, A5 obtained the highest mean score of 4.0100, reflecting respondents' awareness of their responsibility for the accuracy of AI-generated information used in academic writing. This was followed by A4, with a mean score of 3.9900, A3, with 3.9800, and A1 and A2, which each obtained a mean score of 3.9500. All items were categorized as high, indicating that respondents reported relatively high awareness of the importance of verifying, comparing, and assessing the accuracy of information obtained through AI.

These findings indicate that Accuracy represents an important aspect of the respondents' self-reported Information Ethics awareness. Nevertheless, the results should not be interpreted as direct evidence that respondents actually verify every piece of information or source generated by AI before incorporating it into academic writing.

3.7 Level of Property

The Property dimension obtained a mean score of 3.9500, with a standard deviation of 0.77769. Based on the predetermined category intervals, this score falls within the high category. This finding indicates that respondents reported a high level of awareness regarding information ownership, copyright, and source attribution when using AI for academic writing.

At the item level, PR3 obtained the highest mean score of 4.0800, relating to the attribution of information sources used in academic writing, even when assistance from AI is involved. PR1 obtained a mean score of 3.9700, reflecting awareness of the importance of respecting copyright when using information with the assistance of AI. This was followed by PR2, with a mean score of 3.8800, while PR4 obtained the lowest mean score of 3.8700. Nevertheless, all items within the Property dimension remained within the high category.

These findings indicate that respondents reported a high level of awareness regarding information ownership and source attribution when using AI. However, the findings represent self-reported perceptions and cannot directly demonstrate that respondents consistently cite sources, avoid plagiarism, or comply with copyright requirements in their actual academic writing practices.

3.8 Level of Accessibility

The Accessibility dimension obtained a mean score of 3.8900, with a standard deviation of 0.83961. Based on the predetermined category intervals, this score falls within the high category. This finding indicates that respondents reported a high level of awareness regarding information access rights and the appropriate use of information when utilizing AI for academic activities.

At the item level, AC4 obtained the highest mean score of 3.9700, relating to the responsible use of information obtained through AI for academic purposes. This was followed by AC3, with a mean score of 3.9300, concerning the use of AI-generated information in accordance with the access rights available to the user. AC1 obtained a mean score of 3.8500, while AC2 obtained a mean score of 3.8100, making it the lowest-scoring item within the Accessibility dimension. Nevertheless, all items in the Accessibility dimension remained within the high category.

The relatively lower mean score for Accessibility compared with the other three PAPA dimensions suggests that information access rights and limitations on information use may warrant further attention. However, this finding should still be understood as respondents' self-reported awareness and perceptions rather than direct evidence of actual compliance with information access restrictions.

3.9 Comparison of the Four PAPA Dimensions

The descriptive analysis showed that all four Information Ethics dimensions were in the high category. Privacy obtained the highest mean score of 4.0400, followed by Accuracy at 3.9760, Property at 3.9500, and Accessibility at 3.8900. Thus, Privacy was the dimension with the highest level of application, whereas Accessibility had the lowest mean score. Nevertheless, all four dimensions remained within the high category.

Table 5. Comparison of the Four PAPA Dimensions

Rank	Dimension	Mean	SD	Category
1	Privacy	4.0400	0.80904	High
2	Accuracy	3.9760	0.77709	High
3	Property	3.9500	0.77769	High
4	Accessibility	3.8900	0.83961	High

Source: Data processed using SPSS version 26, 2026.

The findings indicate that respondents reported the highest level of awareness in the Privacy dimension and the lowest in the Accessibility dimension. The difference between the highest and lowest mean scores was relatively small, suggesting that the overall level of awareness reported by respondents across the four PAPA dimensions was relatively consistent. These findings should be interpreted as self-reported awareness and perceptions, rather than as a direct measurement of actual ethical behavior.

3.10 Discussion

Overall Overview of Information Ethics and Supporting Constructs for Academic Writing

The findings indicate that the participating students reported relatively high awareness and perceptions of Information Ethics in the use of Artificial Intelligence (AI) for academic writing across the four dimensions of the PAPA framework: Privacy, Accuracy, Property, and Accessibility. This suggests that ethical issues related to personal information, information reliability, ownership, and access are recognized by respondents as relevant considerations when using AI in academic activities.

This finding is consistent with previous research showing that students' engagement with generative AI involves not only technological adoption but also ethical awareness and perceptions. Acosta-Enriquez et al. found that university students' use of ChatGPT was associated with considerations related to knowledge, attitudes, and perceived ethics. Similarly, Zhu et al. demonstrated the relevance of ethical awareness and perceived ethical risks in understanding university students' use of generative AI. Yang et al. also highlighted that undergraduate students recognize multiple ethical issues associated with generative AI. These studies support the present findings by indicating that ethical considerations have become an increasingly important aspect of students' engagement with AI.

The present study differs from these previous studies by examining Information Ethics through the integrated dimensions of Privacy, Accuracy, Property, and Accessibility. While previous research has often addressed ethical concerns such as privacy, risks, academic integrity, or responsible AI use separately, the PAPA framework enables these information-related concerns to be interpreted within a single ethical perspective [13], [14]. Therefore, the present findings provide a descriptive overview of how students report their awareness and perceptions across multiple dimensions of Information Ethics rather than focusing on only one specific ethical issue.

The supporting constructs related to academic writing provide additional context for understanding these findings. The inclusion of TPB-related constructs reflects the relevance of attitudes, subjective norms, and perceived behavioral control in understanding behavioral tendencies [20]. This is consistent with [3], who identified the relevance of behavioral and technology-acceptance factors in students' intentions to use AI in higher education. Huang et al. also demonstrated that behavioral and moral factors can provide insight into AI-related academic behavior. However, because the present study did not test structural or causal relationships among these constructs, they should be interpreted only as complementary descriptive information.

Privacy in the Use of Artificial Intelligence

Privacy emerged as the dimension with the highest reported awareness and perception among the four PAPA dimensions. This suggests that respondents recognized the importance of protecting personal and sensitive information when interacting with AI systems.

This finding is consistent with broader discussions concerning ethical principles for AI in education. Nguyen et al. emphasized that ethical considerations should be incorporated into the development and use of AI in educational environments. Similarly, Kasneci et al. identified privacy as an important challenge associated with the educational use of large language models. The growing use of AI platforms may require students to become increasingly aware of the potential implications of providing personal, academic, or sensitive information to AI systems.

The relatively strong awareness of privacy in the present study may also reflect the increasing visibility of data protection issues in discussions surrounding AI governance. Barus et al. highlighted the importance of governance considerations in the use of generative AI in higher education, while Dabis and Csáki demonstrated that higher education institutions have increasingly responded to generative AI through policies and institutional guidance. These developments may contribute to greater awareness among students regarding the ethical implications of sharing and managing information when using AI.

Nevertheless, this finding should be interpreted within the scope of self-reported data. A high reported level of awareness and perception regarding privacy does not necessarily demonstrate that students consistently apply privacy-protective practices in every instance of AI use. The findings therefore describe how respondents perceive and report their awareness of privacy rather than providing direct evidence of actual ethical behavior.

Accuracy and Information Literacy

The findings indicate that respondents reported relatively high awareness and perceptions regarding the importance of information accuracy when using AI for academic writing. This result is particularly important because generative AI may produce inaccurate, incomplete, biased, or unsupported information.

The present finding is consistent with Kasneci et al., who emphasized that AI-generated outputs should not be accepted uncritically because large language models may generate incorrect or unreliable information. Salvagno et al. similarly discussed the potential role of AI in scientific writing while emphasizing the continuing responsibility of users in evaluating generated content. Farinosi and Melchior also identified concerns related to the reliability and credibility of generative AI in higher education.

The relevance of Accuracy in the present study can also be understood through the perspective of Information Literacy. Marchese and Marchese highlighted the implications of generative AI for information literacy in academic environments, while Yan et al. emphasized that generative AI literacy extends beyond the ability to use AI tools and includes critical engagement with AI-generated information. Together, these studies support the

argument that responsible AI use in academic writing requires students to evaluate generated information rather than simply accept it.

The present findings contribute to this discussion by showing that respondents reported awareness of the importance of information verification and accuracy. However, the findings should not be interpreted as evidence that respondents consistently verify every AI-generated output before incorporating it into academic work. The questionnaire measures reported awareness and perceptions rather than direct observation of actual verification practices.

Property and Academic Integrity

The findings regarding Property indicate that respondents reported awareness and perceptions related to information ownership, copyright, attribution, and the responsible use of AI-generated content. These issues have become increasingly important because generative AI may create uncertainty regarding authorship, originality, intellectual property, and the boundary between legitimate assistance and academic misconduct.

This finding is consistent with Gruenhagen et al., who examined students' perceptions and use of generative AI in relation to academic integrity. Their study demonstrated that the increasing availability of generative AI has created new challenges concerning acceptable and unacceptable uses of AI in academic assessments. Similarly, Lund et al. discussed ethical concerns, academic misconduct, and students' perceptions of AI-assisted writing. Huang et al. further demonstrated the relevance of behavioral and moral considerations in understanding academic cheating involving generative AI.

The findings are also relevant to the discussion of AI-assisted academic writing. Kim et al. examined students' perspectives regarding generative AI-assisted academic writing, while Kim et al. investigated patterns of interaction between students and generative AI and their relationship with academic writing. These studies suggest that the increasing use of AI requires students and institutions to reconsider issues related to authorship, responsibility, originality, and appropriate use.

The present study contributes to this discussion by examining Property as one component of a broader Information Ethics framework. Nevertheless, respondents' reported awareness of ownership, attribution, and intellectual property should not be interpreted as evidence that they consistently apply proper citation practices or avoid all forms of academic misconduct. The findings reflect self-reported awareness and perceptions rather than observed academic behavior.

Accessibility and Information Access Rights

Accessibility received the comparatively lowest reported level among the four PAPA dimensions, although it remained within the high category. This finding may suggest that issues related to access rights, limitations, and appropriate access to information receive comparatively less attention from respondents than privacy, accuracy, and property.

The importance of Accessibility can be understood in relation to the broader ethical and institutional challenges associated with generative AI. Barus et al. discussed governance issues surrounding the use of generative AI in higher education, while Dabis and Csáki highlighted the development of institutional policy responses to generative AI. These discussions suggest that responsible AI use involves not only decisions about how information is used but also consideration of who has access to information and technologies, under what conditions, and within what limitations.

Accessibility is particularly relevant as AI tools become increasingly embedded in academic activities. Differences in access to digital technologies, AI platforms, advanced features, and information resources may influence how students benefit from AI. Thus, ethical awareness related to Accessibility should include an understanding of appropriate access, rights, restrictions, and the responsible use of available information resources.

The comparatively lower result in this dimension may therefore indicate an area that deserves greater attention in institutional guidance and AI literacy initiatives. However, the finding should not be interpreted as evidence that students actually violate access restrictions or fail to comply with institutional rules. It reflects only respondents' reported awareness and perceptions regarding accessibility-related issues.

Information Ethics, Behavioral Context, and Information Literacy

The findings suggest that Information Ethics, behavioral tendencies, and information-related capabilities provide complementary perspectives for understanding students' use of AI in academic activities. The PAPA framework focuses on ethical issues associated with information, whereas TPB provides a behavioral perspective involving attitudes, subjective norms, and perceived behavioral control [20]. Information Literacy, meanwhile, emphasizes the ability to identify information needs, locate relevant information, evaluate information, and use it appropriately [8].

Previous studies also demonstrate the relevance of combining ethical, behavioral, and informational perspectives. Nurtanto et al. showed that behavioral and technology-acceptance factors are relevant to understanding students' intentions to use AI technology. Yang, Xie, and Ni developed an AI ethics literacy framework and highlighted its relevance to students' self-rated learning competence. Huang et al. similarly showed that the examination of generative AI-related academic behavior can benefit from the inclusion of moral and behavioral factors.

These previous findings support the conceptual relevance of including TPB and Information Literacy as supporting constructs in the present study. However, the present study differs because it does not examine causal or predictive relationships among these variables. Consequently, the supporting constructs should not be interpreted as determinants of Information Ethics or academic writing outcomes. Instead, they provide additional descriptive context for understanding respondents' reported awareness and perceptions regarding the ethical use of AI.

Comparison with Previous Research and Contribution of the Study

Previous studies have examined generative AI in higher education from various perspectives. Some have focused on ethical principles and institutional governance [4], while others have examined students' ethical awareness and perceptions [15], [17]. Research has also explored academic integrity [10], AI-assisted academic writing [19], behavioral intentions [11], [3], and information or AI literacy[8], [18].

The present study contributes to this body of literature by bringing these discussions together through an integrated Information Ethics perspective. Rather than treating privacy, information accuracy, ownership, and accessibility as separate ethical concerns, the study applies the PAPA framework to describe respondents' awareness and perceptions across all four dimensions [13], [14].

This approach is particularly relevant to AI-assisted academic writing because the use of AI simultaneously involves multiple information-related ethical issues. For example, a student may need to consider whether personal or sensitive information is shared with an AI system, whether generated information is accurate, whether the use of AI affects authorship or intellectual property, and whether information or AI services are accessed appropriately. The PAPA framework provides a structured perspective for considering these issues collectively.

The inclusion of TPB and Information Literacy as supporting constructs also adds descriptive context to the study. However, the novelty of the research should be understood primarily as the integrated application of the PAPA framework within the context of AI-assisted academic writing, rather than as evidence of causal relationships among Information Ethics, behavioral factors, and Information Literacy.

Practical Implications

The findings have several practical implications for higher education institutions. First, although respondents reported relatively high awareness and perceptions across the PAPA dimensions, awareness does not necessarily guarantee consistent ethical practice. Universities may therefore need to move beyond general awareness and provide practical guidance regarding how students should use AI responsibly in academic activities.

Such guidance may include recommendations on avoiding the disclosure of personal and sensitive information to AI platforms, verifying AI-generated information using credible academic sources, respecting copyright and authorship, appropriately acknowledging AI assistance where required, and understanding institutional policies regarding access to information and AI technologies. These recommendations are consistent with previous studies emphasizing the need for ethical principles, institutional policies, and governance frameworks for AI in higher education [5].

Second, the findings highlight the importance of integrating Information Ethics with information and AI literacy initiatives. As suggested by Marchese and Marchese, generative AI has important implications for students' information literacy. Yan et al. further emphasized that AI literacy requires more than technical familiarity and should involve critical engagement with AI-generated information. Therefore, universities may consider developing educational programs that combine technical AI competence with critical evaluation and ethical awareness.

Finally, institutional guidance should address academic writing specifically. Previous research has demonstrated continuing concerns regarding AI-assisted writing, academic integrity, originality, and the boundaries of acceptable AI use [10], [12]. Clear institutional guidelines may help students distinguish between legitimate AI assistance and inappropriate use while maintaining responsibility for the content they submit as academic work.

Research Limitations

This study has several limitations. First, the respondents were selected using purposive sampling and were limited to students from selected study programs. Therefore, the findings cannot be statistically generalized to the entire student population of Universitas Sumatera Utara.

Second, the study relied on self-reported questionnaire responses. Consequently, the findings describe respondents' awareness and perceptions and may not fully reflect their actual ethical practices when using AI. Self-reported responses may also be influenced by subjective assessment and social desirability.

Third, although TPB and Information Literacy were included as supporting constructs, the study employed a descriptive design and did not test causal, predictive, or structural relationships among Information Ethics, behavioral factors, Information Literacy, and academic writing.

Future research could involve larger and more diverse samples, use more representative sampling strategies, and examine the relationships among these constructs using appropriate inferential methods. Further studies may also combine self-reported questionnaires with interviews, document analysis, experimental approaches, or observations of actual AI-use practices to provide a more comprehensive understanding of how ethical awareness is translated into practice.

4. CONCLUSION

This study found that respondents' level of Information Ethics in using Artificial Intelligence (AI) for academic writing was categorized as high, with an overall mean score of 3.9689. All four PAPA dimensions were also categorized as high: Privacy (4.0400), Accuracy (3.9760), Property (3.9500), and Accessibility (3.8900). These findings indicate relatively high levels of reported awareness and perceptions regarding data protection, information verification, information ownership, and information access.

The supporting constructs related to academic writing, comprising aspects of the Theory of Planned Behavior (TPB) and Information Literacy, also showed high descriptive scores. However, all findings in this study were based on respondents' self-reported assessments and therefore should not be interpreted as direct evidence of actual ethical behavior.

Practically, the findings may provide input for Universitas Sumatera Utara to consider strengthening guidelines for AI use in academic activities, particularly concerning privacy protection, information verification, academic integrity, and appropriate boundaries for AI use. These recommendations should be interpreted within the contextual scope of the study, given that purposive sampling was employed and respondents were limited to four study programs. Future research could employ broader samples and methodological approaches capable of assessing actual AI-use practices more directly. Recent research also emphasizes the importance of clear institutional guidelines and ethical frameworks to support responsible AI use in higher education.

DECLARATIONS

Artificial Intelligence Use

Generative AI was used only to assist with language editing during manuscript revision. The authors reviewed the final text and remain responsible for the article content, analysis, and conclusions.

Author Contributions

The first author contributed to the study design, methodology, data collection and analysis, and manuscript preparation. The second author provided supervision, reviewed and edited the manuscript, and contributed to methodological and interpretive refinement. Both authors approved the final manuscript.

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Conflict of Interest

The authors declare no conflict of interest.

Ethics Approval / Ethical Clearance

There isn't any

Data Availability Statement

The data supporting the findings of this study are not publicly available to protect the privacy and confidentiality of the participants. The data may be made available by the corresponding author upon reasonable request and subject to ethical and privacy considerations.

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